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9
10 **FIRST JUDICIAL DISTRICT COURT OF NEVADA**
IN AND FOR CARSON CITY

11 NATIONAL TAXPAYERS UNION, a non-
12 profit organization, and ROBIN L. TITUS,
MD,

13 Plaintiffs,

14 v.

15 THE STATE OF NEVADA, ex, rel., JOSEPH
16 LOMBARDO, in his official capacity as
Governor of the State of Nevada; ZACH
17 CONINE, in his official capacity as Nevada
State Treasurer; RICHARD WHITLEY, in his
18 official capacity as Director of the Nevada
Department of Health and Human Services;
19 SCOTT J. KIPPER, in his official capacity as
the Nevada Commissioner of Insurance; and
20 RUSSELL COOK, in his official capacity as
Executive Director of the Silver State Health
21 Insurance Exchange,

22 Defendants.

Case No. 2500000000

Dept. No. A

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M2	A Comprehensive Examination of Nevada's Healthcare Industry Sector's Value Network and Supply Chain	1030-1108

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**A COMPREHENSIVE EXAMINATION OF NEVADA'S
HEALTHCARE INDUSTRY SECTOR'S VALUE NETWORK AND
SUPPLY CHAIN**



A COMPREHENSIVE EXAMINATION OF NEVADA'S HEALTHCARE INDUSTRY SECTOR'S VALUE NETWORK AND SUPPLY CHAIN

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May 2024

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Thank you.



The Nevada Office of Workforce Innovation (OWINN), originally created via Executive Order in 2016 and codified into state statute in 2017, helps drive a skilled, diverse, and aligned workforce in the state of Nevada by promoting collaboration and cooperation among all entities focused on workforce development. Under the administrative umbrella of the Nevada Department of Employment, Training and Rehabilitation since July 2021, OWINN works to support Nevada's workforce by providing leadership in assessing workforce policies and developing innovative ideas to strengthen the workforce system, promoting registered apprenticeships and work-based learning, leveraging labor-market and workforce data, validating industry-recognized credentials, and developing career pathways.

<https://gowinn.nv.gov/>

1.0 Introduction and Overview

Overview

This University Center for Economic Development technical report presents a comprehensive summary of a value network and supply chain mapping project of Nevada's Healthcare industry sector completed by graduate students in the Masters of Business Administration program in the College of Business at the University of Nevada, Reno. Seventeen total graduate students participated in this semester-long project, completed during the Spring 2024 academic semester. This effort was divided into four separate parts. Part 1 focused on exploring the historical development and evolution of Nevada's Healthcare industry sector, a general overview of the industry sector's regulatory environment, a broad county-by-county description of various Healthcare industry sector activities throughout the state of Nevada including a general economic impact assessment of the sector, and a comprehensive Strengths, Weaknesses, Opportunities, and Threats of Nevada's Healthcare industry sector.

Part 2 involved completing a comprehensive value network and supply chain mapping project of Nevada's Healthcare industry sector using Input-Output (I/O) Analysis to identify critical 'gaps' in the value network and supply chain of Nevada's Healthcare industry sector. Part 3 created a 'workforce development overlay' of the results developed in Part 2 of this comprehensive mapping of the value network and supply chain of Nevada's Healthcare industry sector using data provided by the Office of Workforce Innovation through the Nevada P-20 to Workforce Research Data System. Part 4 of this effort included a comprehensive assessment of Nevada's Healthcare industry sector regarding the overall strength, balance, and resiliency found within the industry's value network and supply chain, evaluating the impacts that the COVID-19 global pandemic has had on the industry's value network and supply chain, and recommendations for closing identifying 'gaps' in the industry's value network and supply chain through targeted community and economic development strategies.

For each of the four individual parts of this comprehensive value network and supply chain mapping project of Nevada's Healthcare industry sector, the 17 participating graduate students, working as one large group, prepared a separate white paper summarizing their analysis and results. For Part 1, Part 2, and Part 3 of the semester-long project, a separate in-class presentation was completed, and, for Part 4, students facilitated a half-day Nevada Healthcare industry sector value network and supply chain symposium held on Monday, May 13, 2024. Section 2.0 of this University Center for Economic Development technical report presents an edited version of the first white paper for Part 1, *Historical Overview and Evaluation of the 'State' of the State of Nevada's Healthcare Industry Sector*, and Section 3.0 presents an edited version of the second white paper for Part 2, *Development of a Comprehensive Value Network and Supply Chain Map of the Healthcare Industry Sector in Nevada*. Section 4.0 of this

University Center for Economic Development technical report presents an edited version of the third white paper for Part 3, *Identification of Workforce Development Gaps in the Value Network of the Healthcare Industry Sector in Nevada*, and Section 5.0 presents an edited version of the fourth and final white paper for Part 4, *Targeted Economic Development Recommendations for Business Creation, Attraction, Retention, and Expansion Strategies*.

While an analysis of the value network and supply chain for Nevada's Healthcare industry sector is presented for the entire state of Nevada, this analysis was also presented for each of the existing eight regional economic development authorities to support community-level and regional economic development efforts. As of the time of publication of this University Center for Economic Development technical report, the eight existing regional economic development authorities in Nevada are:

- Economic Development Authority of Western Nevada (Washoe County)
- Churchill Fallon Economic Development (Churchill County)
- Lincoln County Regional Development Authority (Lincoln County)
- Las Vegas Global Economic Alliance (Clark County)
- Nevada 95-80 Regional Development Authority (Humboldt County, Pershing County)
- Northern Nevada Development Authority (Carson City, Douglas County, Lyon County, Mineral County, Storey County)
- Northeastern Nevada Regional Development Authority (Elko County, Eureka County, Lander County, White Pine County)
- Southwest Central Regional Economic Development Authority (Esmeralda County, Nye County)

Funding for this comprehensive examination of Nevada's Healthcare industry sector's value network and supply chain was provided as part of a state of Nevada Office of Workforce Innovation Nevada P-20 to Workforce Research Data System (NPWR) research grant awarded to the University Center for Economic Development in 2024. The University Center for Economic Development is a U.S. Economic Development Administration recognized university center. It is the mission of the University Center for Economic Development, part of the College of Business at the University of Nevada, Reno, to foster economic development throughout state by making the extensive resources of the University of Nevada, Reno available to organizations and areas that can benefit from job and income creation and job retention efforts.

2.0 Historical Overview and Evaluation of the ‘State’ of the State of Nevada’s Healthcare Industry Sector

This section of this University Center for Economic Development technical report presents an edited version of the initial white paper developed for Part 1, *Historical Overview of ‘State’ of the State of Nevada’s Healthcare Industry Sector*. Part 1 of this initial analysis of the value network and supply chain of Nevada’s Healthcare industry sector included the following elements:

- A comprehensive overview of the ‘state’ of the state of Nevada’s Healthcare industry sector, considering growing levels of demand by general healthcare ‘type’ (i.e. emergency services, advanced physical and mental healthcare services, etc.) and a segregation of demand for these various healthcare services by geographic space and by population group including a preliminary assessment of general workforce development needs in the sector.
- An assessment of the current state of the state of Nevada’s Healthcare industry sector relative to other comparable states throughout the United States, considering how other states are addressing emerging healthcare needs and how they are addressing ‘gaps’ in the value network and supply chain of their own Healthcare industry sector.
- A detailed evaluation of the state’s Healthcare industry sector’s regulatory environment including a discussion on relevant federal, state, and local government laws and regulations and an overview of relevant fiscal and taxation policies that firms within the industry sector are subject to within the state of Nevada.
- Development and presentation of a general overview of county-by-county healthcare needs and an overall assessment of the economic importance of the Healthcare industry sector to individual counties located throughout the state including estimated total employment throughout and across the sector, the total number and type of firms operating within the sector, and an estimation of the types of healthcare services that are present in each individual county.
- A comprehensive Strengths, Weaknesses, Opportunities, and Threats analysis of Nevada’s Healthcare industry sector.

Nevada’s Healthcare industry sector plays an important role in the overall economic health of the state and the overall health of local communities and counties throughout the state. By itself, the Healthcare industry sector is a major employment sector paying relatively high wages and serving as a major source of innovation. Healthcare is also critical to maintaining workforce productivity across a variety of industry and occupation sectors and the quality and availability of various healthcare services is a major determining factor in recruiting and retaining critically

needed workers across various industry sectors. Understanding the historical evolution of Nevada's Healthcare industry sector, in addition to understanding the current state of this industry sector and the regulatory environment that governs industry operations, is crucial for understanding the changing nature of the state's broader community and economic development landscape. A broad understanding of the industry sector's regulatory environment provides an additional and useful perspective for understanding the opportunities and challenges that individual firms and entire communities face within the industry and a county-by-county assessment of different healthcare activities and services provides an essential insight as to how important the industry sector is to general levels of economic output and growth.

The various strengths and weaknesses of the industry sector and the individual opportunities and threats that individual firms and the entire industry sector faces will each serve as important starting points in developing and identifying targeted new business creation and attraction and existing business retention and expansion economic development efforts explored in the following sections of this University Center for Economic Development. These targeted new business creation and attraction and existing business retention and expansion efforts serve the purpose of further diversifying and strengthening the economic base of individual communities and regions across the state and for the state as a whole and the purpose of bolstering the overall competitiveness of all industry sectors that comprise the state's existing economic base by addressing gaps in the availability of critically needed healthcare services.

2.1 Historical Overview of Nevada's Healthcare Industry Sector

Nevada's Healthcare industry has evolved significantly over the years, shaped by historical developments and the state's own unique demographic and geographic characteristics. The analysis presented in this subsection relies primarily on secondary sources and past assessments of Nevada's Healthcare industry sector, providing a historical perspective along with an analysis of current healthcare facilities and services.

2.1.a Historical Evaluation of Nevada's Healthcare Industry Sector

The history of the state's Healthcare industry sector can be divided into and categorized by five different periods including pioneering healthcare institutions (1864 to 1910), the emergence of specialized care (1910 to 1945), growth of the industry sector in the post-World War II period (1945 to 1970), emerging rural healthcare challenges (1970 to 1990), and increased technological integration and comprehensive care (1990 to the current period).

2.1.a.1 1864 to 1910: Pioneering Healthcare Institutions

This first period in the evaluation of the state of Nevada's Healthcare industry sector marked the early stages of organized healthcare in Nevada following the state's establishment in 1864. During this time, healthcare services were essential and primarily consisted of basic medical care, vaccination clinics, and limited surgical procedures. Challenges during this period in the emerging industry sector included limited medical knowledge, skills, infrastructure, and a lack of accessibility in rural areas.

During this period from 1864 to 1910, Nevada saw the establishment of pioneering healthcare institutions that laid the foundation for organized medical services in the state. Among these emerging institutions, St. Mary Louise Hospital, founded in 1869 in Virginia City, emerged as a key healthcare provider. St. Mary Louise Hospital played a pivotal role in addressing the immediate healthcare needs of the growing mining community during the Comstock Lode boom. St. Mary Louise Hospital offered basic medical care, surgical procedures, and maternity services, contributing significantly to community health. Challenges, however, emerged such as limited medical knowledge and resources posed obstacles to providing comprehensive healthcare services. Another notable institution during this era was Carson City Hospital, founded in 1876, serving as a vital healthcare facility for the young state's capital. In its early years, the Carson City Hospital focused on general medical care, basic surgeries, and addressing health challenges faced by the local population. Being situated in a then very rural area, Carson City Hospital encountered difficulties in accessing specialized healthcare services due to limitations in infrastructure and medical expertise.

The introduction of smallpox vaccination clinics marked a crucial development in public health initiatives in the early history of the state of Nevada. In response to outbreaks of diseases like smallpox, these clinics were organized across the various frontier towns located across the state. These clinics played a significant role in providing vaccinations to mitigate the spread of infectious diseases, reflecting a basic yet critical aspect of public health during this period. Additionally, many communities in Nevada relied on independent local practitioners who played a crucial role in providing medical care. These local physicians and practitioners offered a range of services, including basic medical consultations to simple surgical procedures, contributing significantly to community health. Despite the challenges posed by limited resources and medical knowledge, these early healthcare pioneers played a foundational role in establishing and sustaining healthcare services in Nevada during its formative years.

The challenges faced in the healthcare sector were multifaceted. There was a notable limitation in medical knowledge and skill due to the scarcity of formally trained healthcare professionals, particularly in specialized areas of healthcare. Infrastructure challenges were prevalent, especially in rural areas, where a lack of proper healthcare infrastructure, including hospitals and clinics, constrained the range of available medical services. Accessibility in rural areas presented an additional hurdle as geographical challenges and limited transportation meant that residents had restricted access to healthcare services, making timely medical care a considerable challenge. The state's emerging healthcare system during this period exhibited a limitation in specialization, with services primarily focused on addressing basic medical needs. The absence of specialized care or advanced medical procedures further compounded the healthcare challenges experienced during this time.

2.1.a.2 1910 to 1945: The Emergence of Specialized Care

During this second distinct period in the history of Nevada's Healthcare industry sector, significant advances in medical knowledge and technology shaped the healthcare landscape in Nevada. Major urban population centers, particularly Las Vegas in southern Nevada and Reno in northern Nevada, witnessed the establishment of more sophisticated hospitals and clinics,

marking the emergence of specialized healthcare services. In Las Vegas, the Southern Nevada Hospital, founded in 1921, became a cornerstone in the delivery of specialized healthcare services within the state. Initially a general hospital, the Southern Nevada Hospital would continue to evolve and grow with advancing medical knowledge to provide more specialized care. In Reno, the Washoe General Hospital, established in 1910 and later renamed Renown Regional Medical Center, experienced significant growth during this period. Embracing a wide variety of emerging medical technologies, Washoe General Hospital expanded its services to include specialized care units. St. Mary's Hospital, established in 1938, played a pivotal role in advancing maternity care and women's health services in Reno, showcasing healthcare specialization during this era. The University of Nevada, Reno School of Medicine, established in 1969, played a crucial role in promoting specialized medical education, contributing to the emergence of specialized healthcare professionals.

This era witnessed notable developments in medical specialization, including advancements in surgical techniques, leading to the establishment of specialized surgical units within major hospitals. Specialized maternity units improved care for expectant mothers and improved diagnostic technologies, such as X-rays and laboratory tests, became more widely available in major hospitals, enabling more accurate diagnoses. Despite these advancements in specialized care, challenges throughout the industry sector persisted across the state. Urban-rural disparities were notable, with the benefits of specialized care concentrated in major urban centers, creating disparities for the residents in the state's more rural areas. Limited access and availability of specialized services in rural communities remained a significant challenge, highlighting the need for continued efforts to address healthcare disparities in the state.

2.1.a.3 1945 to 1970: Post-War Healthcare Growth

The post-World War II period is characterized by the significant amount of growth that occurred in Nevada's Healthcare industry sector with the establishment of pivotal institutions and a focus on increasing specialization across a wide variety of different healthcare services. This era saw the development of advanced medical facilities, surgical units, and maternity care services, contributing to the rapid evolution of the state's overall healthcare landscape.

Renown Regional Medical Center in Washoe County, initially known as Washoe Medical Center, played a crucial role in providing advanced healthcare services during this period. It evolved from a general hospital to a comprehensive medical center. The growth of Renown Regional medical Center included the establishment of specialized units, such as advanced surgery units incorporating the latest technologies and techniques in surgical procedures and expansion of the maternity care services, providing comprehensive care for expectant mothers and newborns. The Desert Research Institute, established through legislation passed in 1951, initially focused on atmospheric research in 1959, expanded its scope to include medical research, further contributing to healthcare specialization in the region. University Medical Center in Las Vegas and Clark County became a pivotal healthcare institution during this time. Initially established to serve the community's healthcare needs, it expanded to become a major academic medical center. Specialized in responding to the growing demand for specialized care and later introducing a regional trauma center in recognition for the need for expanded critical care services, University Medical Center developed a Level I Trauma Center, providing

specialized emergency medical care. University Medical Center also embraced a comprehensive medical services approach, offering specialized services across various medical disciplines.

The post-World War II period also saw advancements in surgical techniques, with major hospitals adopting modern approaches to surgery. This included the use of sterilization practices and improvements in anesthesia and, in response to the baby boom following World War II, hospitals like Renown and United Medical Center expanded maternity care services, introducing modern labor and delivery units to accommodate the increased demand. Despite continued growth and advances in specialization, the state's Healthcare industry sector and the state continued to encounter significant challenges. Specialized care benefits were more readily available in urban areas, creating further disparities for residents in rural regions. The heightened demand for specialized services, particularly in maternity care, placed a strain on the capacity of healthcare facilities.

2.1.a.4 1970 to 1990: Rural Healthcare Challenges

The period from 1970 to 1990 in Nevada experienced a shift in focus towards addressing healthcare disparities between Nevada's growing urban population centers and its rural counties. Efforts were made to enhance accessibility and healthcare provision in regions and counties such as Elko County, Humboldt County, and White Pine County. This era also saw the development and use of telehealth initiatives aimed at connecting rural communities with specialized care in urban centers. In Elko County, Elko Family Medical and Dental Center was established in 1972, serving as a community clinic aimed at providing primary medical and dental care services. The Elko Family Medical and Dental Center played a crucial role in addressing the healthcare needs of the local population and the broader population located in other parts of the northeastern part of the state, offering services beyond the scope of traditional hospitals. In Humboldt County, Winnemucca Community Health was founded in 1975, contributing to the enhancement of healthcare accessibility in Humboldt County and in this mostly rural and sparsely populated part of the state. Winnemucca Community Health focused on providing primary care services and played a key role in improving health outcomes in the region. The Ely Community Health Center in White Pine County was established in 1980 and it quickly became an essential healthcare provider in White Pine County. Offering a fairly wide range of primary care services, the Ely Community Health Center addressed the specific needs of the local community.

The establishment of the Nevada Telehealth Network was in response to the challenges encountered by the state's more rural and non-metropolitan communities. The Nevada Telehealth Network's primary mandate was and remains to facilitate telehealth services statewide. The Nevada Telehealth Network focuses on connecting rural healthcare facilities with urban medical centers, allowing the remote provision of specialized care, including mental health services. Extending to mental health programs, the Nevada Telehealth Network links rural community residents with specialized mental health professionals located in the state's more urban and metropolitan areas. This approach has and continues to effectively address the chronic shortage of mental health providers in the state's rural counties.

Despite the implemented initiatives, the state continued to grapple with challenges throughout this period, particularly among the rural healthcare facilities and service providers facing

resource limitations. These constraints have and continue to restrict the range and scale of services that they could offer. Infrastructure barriers also played a role, with the absence of robust telecommunication infrastructure throughout the state's rural areas posing challenges to the effective implementation of telehealth services in some cases.

2.1.a.5 1990 to the Present Day: Technological Integration and Comprehensive Care

The period from 1990 to the present has seen a transformation in Nevada's Healthcare industry sector, marked by the significant integration of technology and a shift towards comprehensive care. Major players, including Dignity Health in Clark County, and community focused clinics in counties like Douglas County in the northern part of the state and Nye County in the southern part of the state, play pivotal roles in contributing to a more technologically advanced and accessible healthcare system. In the early 2000s, Nevada took significant steps in technological integration with a focus on electronic health records. Statewide adoption of electronic health records systems was implemented, particularly among major hospitals and clinics, including those in Clark County. The implementation of electronic health records systems has greatly enhanced the accuracy and accessibility of patient information.

Simultaneously, telemedicine services play a pivotal role in improving overall healthcare accessibility. Dignity Health, operating St. Rose Dominican Hospitals in Clark County, spearheaded the development and implementation of a set of robust telehealth programs. These initiatives enable patients to consult with healthcare professionals remotely, helping overcome geographical barriers and enhancing overall access to specialized care. Notably, community clinics in Douglas County have also embraced telemedicine, extending healthcare services to remote geographic areas. This approach has ensured that patients in rural locations can access consultations, diagnostics, and follow-ups through virtual platforms. The integration of electronic health records and telemedicine services collectively have contributed to an improved and technologically advanced healthcare landscape in Nevada.

Comprehensive and accessible healthcare initiatives have been robustly implemented in both Douglas County and Nye County. Since its establishment in 1995, the Douglas County Community Health Clinics have been instrumental in delivering comprehensive primary care services to the local community. These clinics have evolved to address specific healthcare needs, providing preventive care, vaccinations, and chronic disease management. In parallel, Nye County has emphasized community health initiatives tailored to the unique needs of its population. These initiatives include health education programs, preventive screenings, and collaborative efforts to address community specific health challenges. In Clark County, St. Rose Dominican Hospitals have significantly expanded maternity and women's health services. This expansion ensures a comprehensive range of care options for expectant mothers, contributing to an enhanced healthcare experience for women located across the service region. Dignity Health, as a major healthcare provider, has introduced comprehensive care initiatives in the same region, with a specific focus on chronic disease management programs. These initiatives aim to improve patient outcomes and reduce the burden on emergency services.

The combined efforts in Douglas County and Nye County, alongside the expansions in Clark County, have contributed to a more comprehensive and accessible healthcare landscape across

the state. This collective commitment addresses diverse healthcare needs within their respective communities, showcasing a holistic approach to healthcare solutions. Challenges that continue to exist across the state's Healthcare industry sector, however, encompass significant technological disparities, especially evident when comparing the state's more urban and metropolitan communities to the state's more rural and non-metropolitan areas where limited access to high-speed internet and technology infrastructure impedes the adoption and utilization of advanced healthcare technologies. Remote communities in the state's more rural areas such as Elko County struggle to implement telehealth services due to insufficient connectivity. Despite commendable efforts in comprehensive care initiatives improving overall healthcare access, disparities persist in ensuring equitable access across diverse demographic groups such as those in lower income brackets residing in Las Vegas or specific ethnic groups as these groups continue to face barriers in accessing essential healthcare services, underscoring the need for targeted interventions to bridge these gaps and ensure healthcare equity for all.

2.1.b Stakeholders and Community Involvement in Nevada's Healthcare Industry Sector

Notable stakeholders that have shaped and continue to shape the overall landscape of Nevada's Healthcare industry sector generally include various government agencies, individual non-profit and community-based organizations, major insurance companies, and local community clinics operating across the state. Among the many government agencies that continue to shape the overall landscape of Nevada's Healthcare industry sector, the Nevada Department of Health and Human Services has been an anchor in coordinating statewide health initiatives. The Nevada Department of Health and Human Services addresses healthcare disparities, provides regulatory oversight, and facilitates health programs, ensuring a cohesive approach to public health.

Entities like the Nevada Primary Care Association represent the pivotal role that many non-profit and community-based organizations play in championing community-based healthcare solutions, especially across the state's more rural and non-metropolitan communities. By advocating for accessible and quality healthcare, the Nevada Primary Care Association contributes to improved health outcomes in underserved regions. Major insurance providers, including Anthem and Health Plan of Nevada, significantly impact levels of accessibility and the level of affordability of healthcare services across the state. The influence of these major insurance companies and many others on coverage policies and reimbursement rates shapes the state's overall healthcare landscape. Local community clinics, often supported through federal grants and various philanthropic foundations, play a crucial role in providing basic healthcare services, particularly in the state's more rural areas. Notable examples of these critically important local community clinic include Elko Family Medical and Dental Center and Winnemucca Community Health Center, each of which contribute to community well-being.

2.1.c The Current Career and Employment Landscape of Nevada's Healthcare Industry Sector

The total number of individuals employed across Nevada's Healthcare industry sector was an estimated 133,850 total individuals in 2022. Between 2018 and 2028, employment in just the state's Healthcare industry sector (a projected 22.1 percent growth rate trend) is projected to outpace the overall average pace of total employment (a projected 17.2 percent growth rate trend), creating approximately 30,000 new jobs. Twenty of the fastest growing one hundred

careers in Nevada are found in subsectors of the state's Healthcare industry sector. Unlike nearly every other industry in Nevada, the state's Healthcare industry sector, that includes hospitals, clinics, nursing homes, pharmacies, behavioral health facilities, medical, dental, and vision practices, along with other medical providers, is one of Nevada's major economic pillars, providing stability and consistent growth since the 1900's. Despite this growing trend, Nevada, as of 2021, ranked just 48th among all states when comparing the number of primary care physicians per 100,000 residents and second to last at 49th among all states in the available number of general surgeons per 100,000 residents. Nevada would need to increase their physicians per 100,000 residents by 52 active physicians just meet national average levels. The Governor's Office of Economic Development has noted that Nevada has a population growth rate trend of 1.0 percent per year while the national average is just 0.12 percent. Nevada's rapidly aging population as of 2021, while still below the national average at 16.5 percent of Nevada residents being aged 65 years of age or older, increased significantly from just 13.4 percent in 2016. Nevada's physician shortage will continue to lag behind national averages if these two growth trends persist and physician retention and growth continue to operate at a deficit.

Access to primary care professionals continues to operate at a deficit. As a state, Nevada would need to add 1,600 more physicians, around 800 additional nurse practitioners, more than 4,200 additional registered nurses, 5,700 new nursing assistants, along with an estimated 15,200 home health and personal care aides, and approximately 670 radiology technicians to reach national per capita averages. To compound these shortages, Nevada has a nearly 17.0 percent inactive rate for licensed physicians. The shortage of licensed physicians coupled with a growing aging population magnifies the necessity to reverse these trends. In some rural Nevada counties, practicing physicians' average age is nearly ten years older than the national average, at 61.2 years of age compared to 52.9 for general practitioners.

2.1.d Segregating the Demand for Various Healthcare Services

To better understand the current state of Nevada's existing Healthcare industry sector, a segregation of market demand for various healthcare services throughout the state of Nevada was performed. This segregation of market demand was performed by looking at the varying levels and types of demand for various healthcare services between the state's more urban and metropolitan communities and the state's more rural and non-metropolitan communities and by population group. This analysis is concluded with an overall examination of the growth in demand the state of Nevada continues to experience for various levels and for various types of healthcare services.

2.1.d.1 Segregation of Demand, Urban and Metropolitan Communities versus Rural and Non-Metropolitan Communities

According to the United States Census Bureau, "Metropolitan statistical areas consist of the county or counties (or equivalent entities) associated with at least one urban area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties." Using this as a basis for determining whether a county is urban metro or rural non-metro, Nevada's counties fall into two

separate categories, urban metro and rural non-metro. Urban metro counties in Nevada include the counties of Carson City, Clark County, and Washoe County. Rural non-metro counties in Nevada include the remaining 14 counties of Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, and White Pine counties. As seen in Table 2.1, urban metro and rural non-metro each have vastly different demands with regards to healthcare. Urban metro counties throughout the state of Nevada have an estimated and approximate \$16.7 billion in total demand compared to rural non-metro counties located throughout the state of Nevada with only and approximately \$764.9 million in total demand. The largest areas of demand for both urban metro and rural non-metro counties are physicians and hospitals. Urban metro counties have an estimated total demand of approximately \$4.3 billion for physicians and an estimated total demand of approximately \$6.7 billion for hospitals (25.75 percent and 40.23 percent of total demand, respectively). Rural non-metro counties have an estimated total demand of approximately \$165.8 million for physicians and an estimated total demand of approximately \$277.5 million for hospitals (21.67 percent and 36.28 percent of demand, respectively).

These differences in demand levels leads to different trends in employment in the medical field as well as in services utilized within the medical field. Some of the largest differences in employment come from the number of physicians employed and hospital staff employed within different counties. Also seen in Table 2.1, urban metro counties, including Carson City, Clark County, and Washoe County, have approximately 30,979 total physicians and 32,015 total hospital staff employed whereas Nevada's 14 rural non-metro counties combined have approximately 1,277 total physicians and 1,570 total hospital staff employed. The three urban metro counties have a combined employment of 124,824 total employees across all medical related fields while rural non-metro counties have a combined employment of just 6,572 total employees across all medical fields.

Urban metro and rural non-metro counties have vastly different demand profiles for various healthcare services, requiring different amounts and types of staff. This is due to several factors, the first being the total population of the two groups of counties as well as the average age in each group of counties. According to the Rural Health Information Hub, Nevada's urban metro counties have a combined population of 2,877,860 total individuals and an average age of 38.4 years of age while Nevada's rural non-metro counties have a total population of 299,912 total individuals and an average age of 44.2 years of age. This difference in population levels and median ages leads to a difference in the proportions of demand in each of the medical fields. Rural non-metro counties rely more on nursing and community care facilities than urban metro counties do due to the higher average age present among Nevada's rural non-metro counties. Due to the lack of expanded healthcare facilities in rural non-metro areas, the population is not able to rely on physicians and hospitals as much as the population located in Nevada's urban metro counties are.

2.1.d.2 Segregation of Demand, By Population Group

It is important to segregate demand by geographic region and by different characteristics in the population such as household income level. Segregating Nevada's healthcare demand by household income provides an insight into the different healthcare needs of the population based

Table 2.1 – Healthcare Demand by Geographic Designation, Urban Metro vs. Rural Non-Metro State of Nevada 2022				
	Grouping	Total Employment	Estimated Total Demand	Percent of Total Demand
Urban Metro	Offices of Physicians	30,979	\$165,775,489.38	21.67%
	Offices of Dentists	11,029	\$76,751,579.96	10.03%
	Offices of Other Health Practitioners	10,801	\$75,686,238.07	9.90%
	Outpatient Care Centers	8,335	\$46,633,480.55	6.10%
	Medical and Diagnostic Laboratories	5,539	\$12,488,638.12	1.63%
	Home Health Care Services	7,219	\$17,697,238.23	2.17%
	Other Ambulatory Health Care Services	4,132	\$277,466,542.72	2.31%
	Hospitals	32,015	\$63,403,143.72	36.28%
	Nursing and Community Care Facilities	10,916	\$63,403,143.72	8.29%
	Residential Intellectual Disability, Mental Health, Substance Abuse, and Other Facilities	3,859	\$12,384,976.83	1.62%
Urban Metro Total	-	124,824	\$764,886,383.19	100.00%
	Grouping	Total Employment	Estimated Total Demand	Percent of Total Demand
Rural Non-Metro	Offices of Physicians	1,277	\$4,299,628,214.40	25.75%
	Offices of Dentists	842	\$1,167,622,807.18	6.99%
	Offices of Other Health Practitioners	841	\$1,023,344,096.60	6.13%
	Outpatient Care Centers	460	\$994,590,183.70	5.96%
	Medical and Diagnostic Laboratories	105	\$386,131,033.88	2.31%
	Home Health Care Services	249	\$603,965,067.68	3.62%

Table 2.1 Cont'd – Healthcare Demand by Geographic Designation, Urban Metro vs. Rural Non-Metro State of Nevada 2022				
	Grouping	Total Employment	Estimated Total Demand	Percent of Total Demand
	Other Ambulatory Health Care Services	265	\$274,560,825.87	1.64%
	Hospitals	1,570	\$6,716,749,640.20	40.23%
	Nursing and Community Care Facilities	779	\$960,820,634.80	5.75%
	Residential Intellectual Disability, Mental Health, Substance Abuse, and Other Facilities	184	\$270,330,529.38	1.62%
Rural Non-Metro Total	-	6,572	\$16,697,743,033.69	100.00%

Source: IMPLAN

on annual household income. Based on the estimated total amount spent by healthcare category in 2022 for the entire state of Nevada as presented in Table 2.2, expenditures on hospitals was the largest healthcare category in-terms of total expenditures for all levels. In general, the second largest healthcare expenditure category across most household income levels. The only income level that failed to follow this trend was households with an annual household income between \$15,000 and \$30,000, whose second highest sector was for nursing and community care facilities. Table 2.3 provides a breakdown of healthcare demand as a percentage of both overall demand and demand by individual household income group. All household income levels generally follow the same distribution of demand except for households with an annual income between \$15,000 and \$30,000 per year. The average demand for physicians for all other income levels falls between 20.0 percent and 30.0 percent, whereas households with an annual household income between \$15,000 and \$30,000 fall below this at just under 15.0 percent. This gap in healthcare demand is largely absorbed by nursing and community care facilities. Households with an annual household income between \$15,000 and \$30,000 generally spend approximately 29.0 percent of their healthcare spending on nursing and community care facilities, compared to the average level of 3.0 percent to 13.0 percent for all other annual household income levels.

2.1.e Evaluating Growing Levels of Healthcare Demand in Key Areas

Over the past several years, significant increases in overall demand in healthcare services across Nevada's Healthcare industry sector have been seen in two key areas, including emergency services and advanced physical and mental healthcare services. Trauma centers in both Clark County and Washoe County, such as those operated by Renown Regional Medical Center in Washoe County and University Medical Center in Clark County, handle a significant volume of

Table 2.2 – Estimated Total Healthcare Demand by Income Group State of Nevada										
Description	Less than \$15,000	\$15,000 to \$30,000	\$30,001 to \$40,000	\$40,001 to \$50,000	\$50,001 to \$70,000	\$70,001 to \$100,000	\$100,001 to \$150,000	\$150,001 to \$200,000	\$200,001 or Greater	
Offices of physicians	\$75,801,463	\$213,735,142	\$254,991,730	\$257,767,675	\$664,913,277	\$852,485,426	\$1,025,498,819	\$540,061,619	\$660,231,699	
Offices of dentists	\$36,710,128	\$81,084,034	\$92,635,678	\$78,303,162	\$156,406,741	\$303,016,561	\$262,468,504	\$141,091,766	\$122,437,532	
Offices of other health practitioners	\$14,299,462	\$61,043,804	\$54,621,146	\$40,775,259	\$104,159,251	\$276,406,614	\$178,038,089	\$155,383,026	\$222,503,942	
Outpatient care centers	\$24,797,226	\$66,396,826	\$50,380,040	\$45,627,774	\$128,895,252	\$215,053,748	\$203,328,508	\$148,161,312	\$158,577,358	
Medical and diagnostic laboratories	\$5,516,604	\$19,449,870	\$17,270,109	\$19,992,266	\$72,296,365	\$104,987,624	\$83,092,831	\$49,395,161	\$40,107,349	
Home health care services	\$21,763,240	\$30,503,073	\$25,075,969	\$37,841,456	\$68,121,814	\$87,036,025	\$145,958,793	\$56,607,198	\$148,412,072	
Other ambulatory health care services	\$6,693,370	\$20,400,177	\$13,577,114	\$11,600,908	\$33,693,383	\$66,226,833	\$54,181,410	\$45,061,276	\$47,845,685	
Hospitals	\$132,307,969	\$467,240,233	\$252,639,128	\$505,643,769	\$1,094,685,521	\$1,441,945,048	\$1,383,339,150.4\$3	\$1,022,810,377	\$768,981,409	
Nursing and community care facilities	\$45,658,265	\$414,397,979	\$89,946,737	\$67,225,380	\$89,677,463	\$129,320,227	\$97,633,680	\$59,706,454	\$47,969,424	
Residential intellectual disability, mental health, substance abuse and other facilities	\$8,404,583	\$51,876,428	\$17,748,275	\$19,017,116	\$43,270,612	\$63,123,438	\$41,896,940	\$19,231,890	\$25,053,762	
Total	\$371,952,311	\$1,426,127,564	\$868,885,926	\$1,083,794,765	\$2,456,119,679	\$3,539,601,544	\$2,092,097,574	\$2,237,510,078	\$2,242,120,231	

Source: IMPLAN

Table 2.3 – Estimated Total Healthcare Demand by Income Group as a Percentage State of Nevada									
Description	Less than \$15,000	\$15,000 to \$30,000	\$30,001 to \$40,000	\$40,001 to \$50,000	\$50,001 to \$70,000	\$70,001 to \$100,000	\$100,001 to \$150,000	\$150,001 to \$200,000	Percent of Total
Offices of physicians	20.4%	15.0%	29.4%	23.8%	27.1%	24.1%	29.5%	24.1%	25.7%
Offices of dentists	9.9%	5.7%	10.7%	7.2%	6.4%	8.6%	7.6%	6.3%	7.2%
Offices of other health practitioners	3.8%	4.3%	6.3%	3.8%	4.2%	7.8%	5.1%	6.9%	6.3%
Outpatient care centers	6.7%	4.7%	5.8%	4.2%	5.3%	6.1%	5.9%	6.6%	5.9%
Medical and diagnostic laboratories	1.5%	1.4%	2.0%	1.8%	2.9%	3.0%	2.4%	2.2%	2.3%
Home health care services	5.9%	2.1%	2.9%	3.5%	2.8%	2.5%	4.2%	2.5%	3.5%
Other ambulatory health care services	1.8%	1.4%	1.6%	1.1%	1.4%	1.9%	1.6%	2.0%	1.7%
Hospitals	35.6%	32.8%	29.1%	46.7%	44.6%	40.7%	39.8%	45.7%	39.9%
Nursing and community care facilities	12.3%	29.1%	10.4%	6.2%	3.7%	3.7%	2.8%	2.7%	5.9%
Residential intellectual disability, mental health, substance abuse and other facilities	2.3%	3.6%	2.0%	1.8%	1.8%	1.8%	1.2%	0.9%	1.6%

Source: IMPLAN

emergency cases. The demand for emergency services remains critical, necessitating ongoing investments in trauma care. Nevada’s Healthcare industry sector has experienced a significant and sudden increase in the demand for various advanced physical and mental healthcare services over the past several years. Facilities like the Desert Parkway Behavioral Healthcare Hospital in Clark County continue to expand their services and continue to contribute to addressing the evolving mental health needs of the area’s population.

2.2 Comparing Nevada’s Healthcare Industry Sector to the Healthcare Industry Sector in other Comparable States

The analysis presented in this sub-section of this University Center for Economic Development technical report identifies states comparable to Nevada and evaluates how healthcare needs in these states are addressed relative to how similar healthcare needs are addressed in Nevada. The individual states selected as part of this analysis highlight the similarities and differences in how solutions to gaps in healthcare services have been addressed in other states. The states selected for comparison as part of this analysis include New Mexico, Oklahoma, and Wyoming.

2.2.a New Mexico

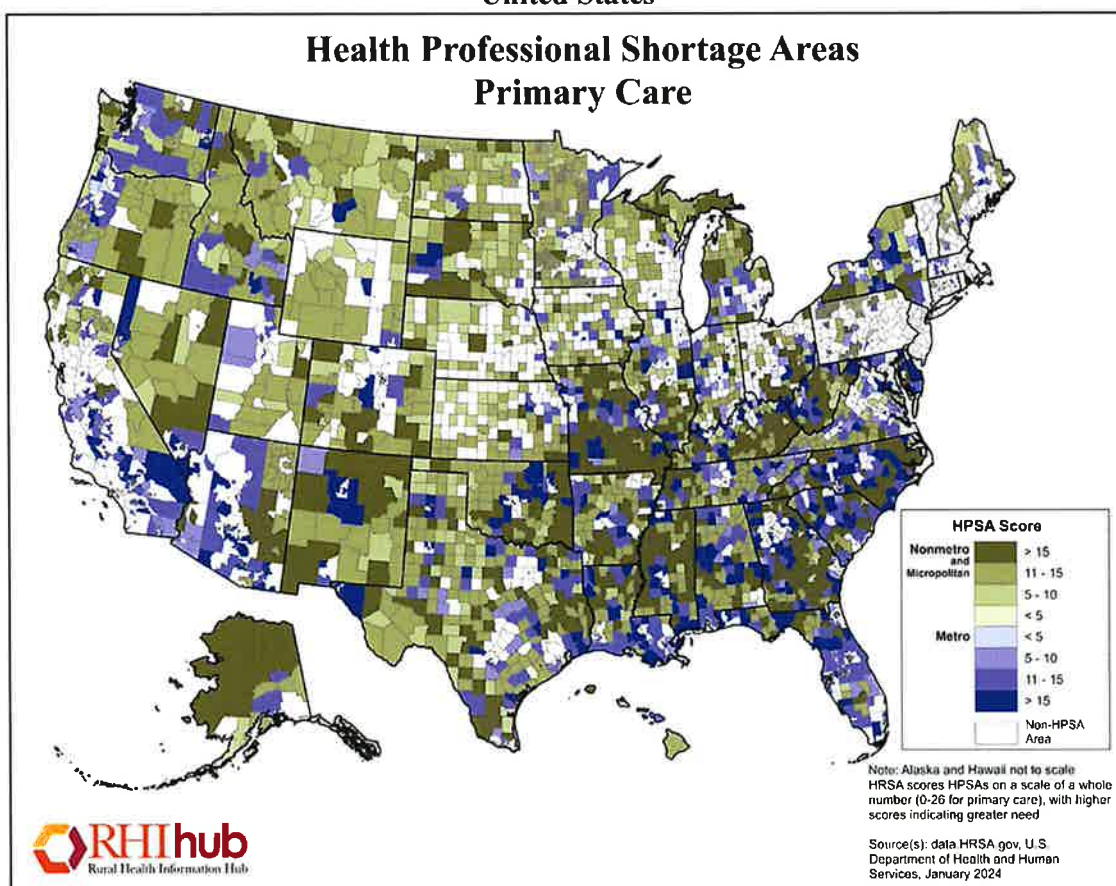
The state of New Mexico had a 2020 population of 2,097,021 total individuals, of which 687,412 total individuals or 32.8 percent of the state’s total population lived in non-metro areas. Like Nevada, the majority of New Mexicans live in the state’s largest cities and existing urban and metropolitan communities with Albuquerque, Las Cruces, and Santa Fe accounting for much of the state’s total population. Outside of these existing metropolitan areas, the state of New Mexico operates various types of clinics in response to healthcare needs in the state’s more rural and non-metropolitan communities. As shown in Table 2.4, New Mexico splits its rural healthcare facilities into four types, including: (1) Critical Access Hospitals, (2) Rural Health Clinics, (3) Federally Qualified Health Centers, and (4) Short Term/PPS Hospitals.

Table 2.4 – Rural Healthcare Facilities Across Comparable States Nevada, New Mexico, Oklahoma, Wyoming 2021				
Category	Nevada	New Mexico	Oklahoma	Wyoming
Critical Access Hospitals	13	11	40	16
Rural Health Clinics	19	20	128	28
Federally Qualified Health Centers	17	108	112	15
Short Term/PPS Hospitals	1	18	43	8

These categories are generally the same for Nevada. However, New Mexico has a much higher amount of Federally Qualified Health Centers. These health centers serve at-risk populations where many of the transactions are covered by Medicaid. This high quantity of centers is needed to support the near 63.0 percent of the New Mexican rural population that relies on Medicaid for healthcare coverage. This is in contrast to the state of Nevada where only 39.0 percent of Nevada's rural population is currently on Medicaid.

Like Nevada, New Mexico is currently struggling with a significant physician shortage. Figure 2.1 presented here displays health professional shortages for the United States by county.

Figure 2.1 – Estimated Healthcare Professional Shortage Areas, Primary Care by County United States



Along with the existing shortage, New Mexico also has an aging physician base with an estimated 37.0 percent of practitioners operating throughout the state of New Mexico over the age of 60. Many physicians have opted to terminate their practice, especially in the state's rural and non-metropolitan areas, due to low income earned caused by a high Medicaid population and higher than normal malpractice insurance costs in the state. Unlike Nevada, the state of New Mexico also has a state income tax with the highest earners being taxed at a rate of 5.9 percent. To increase the number of active physicians in the state, New Mexico has two medical schools.

The University of New Mexico School of Medicine is the state's only allopathic medical school, and the school had a cohort size of 104 total students in 2022. Burrell College of Osteopathic Medicine also operates in New Mexico and had a cohort size of 195 total students in 2022. The University of New Mexico offers 19 different medical residency programs to attract physicians from outside of the state and to keep local physicians in state. To attract more physicians and fill vacant positions in the state's more rural and non-metropolitan communities, the state of New Mexico offers loan forgiveness for medical practitioners through the Health Professional Loan Repayment Program. To be eligible for this program, the physician must work full-time in an area facing a medical shortage for at least three years before receiving loan reimbursement.

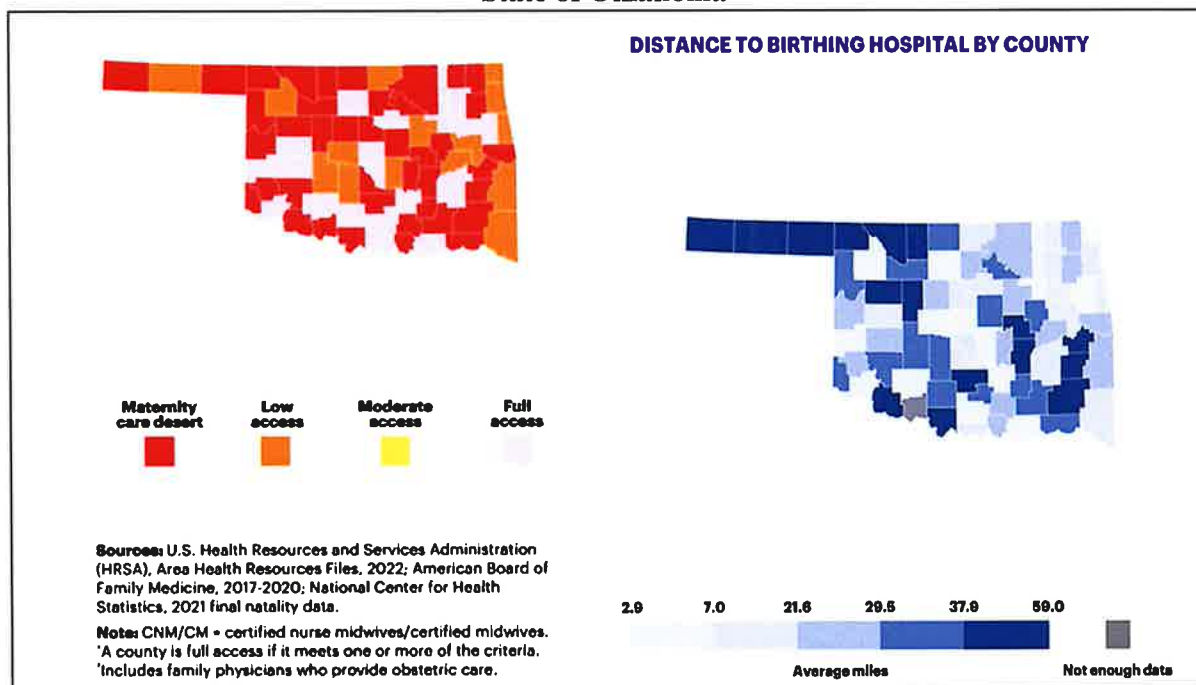
2.2.b Oklahoma

The state of Oklahoma had a 2020 population of 3,959,353 total individuals of which 1,325,762 total individuals or 33.5 percent of the state's total population lived in the state's non-metro areas. Like Nevada, a large portion of Oklahomans live in the state's largest cities and existing urban and metropolitan areas such as Oklahoma City and Tulsa. Outside of these urban metropolitan areas, there are many types of clinics currently operating throughout the state of Oklahoma. As presented in Table 2.4, rural healthcare facilities in Oklahoma are divided into the same four categories as Nevada and New Mexico. However, Oklahoma has approximately five times the amount of all kinds of rural healthcare facilities when compared to Nevada. Where Oklahoma's healthcare sector falls short is in its maternity care deserts, coverage for immigrant citizens, and physician shortages.

Maternity care deserts are counties across the United States in which access to maternity care services is limited or completely absent. Currently, 53.2 percent of all counties in Oklahoma are defined as a 'maternity care desert', compared to the national average of just 32.6 percent. An estimated 12.8 percent of women living in Oklahoma had no birthing hospital within 30 minutes of their residential address compared to the national average of 9.7 percent. As shown in Figure 2.2, there is a strong correlation between counties identified as maternity care deserts and the counties with the largest time needed to reach a birthing hospital. This indicates a need for more maternity care facilities and physicians in rural Oklahoman areas to meet existing and growing levels of demand and move closer to established national averages.

Oklahoma also falls short in providing healthcare services for immigrants. Though Medicaid expansions in 2019 helped drop the state's uninsured percentage from 14.9 percent to 11.7 percent by 2022, there are still an estimated 537,825 uninsured individuals living in the state of Oklahoma and an estimated 82,000 total individuals who are uninsured are immigrants. Immigrants living in the state of Oklahoma account for approximately \$92.8 million of the approximately \$663.0 million of uncompensated care costs which end up being covered by taxpayers and hospitals. However, steps can be taken to reduce these costs to taxpayers and hospitals by expanding state-funded Medicaid to more Oklahoma residents including children of immigrants and undocumented immigrants living throughout the state. Such expansions would reduce the amount of severe and emergency Medicaid coverage that the state must give to all residents by providing more general healthcare before these problems become severe. This reduces surgeries and large medical costs across the population and reduces overall costs for taxpayers and hospitals.

**Figure 2.2 – Maternity Desert Areas versus Distance to Birthing Hospitals by County
State of Oklahoma**



Like Nevada and New Mexico, Oklahoma is currently struggling with a physician shortage. As presented above in Figure 2.1, severe healthcare professional shortages exist across the state of Oklahoma, including among the state’s more urban and metropolitan counties and the state’s more rural non-metropolitan counties. Along with this existing shortage, Oklahoma also ranked 45th in the nation for active physicians per 100,000 total individuals in population and 46th for active primary care physicians as of 2017 which was exacerbated by physician exodus during the COVID-19 global pandemic. Since 2000, approximately 25.0 percent of Oklahoma’s nursing homes have closed due to staffing shortages and a lack of funding. Staff shortages have been seen due primarily to a 20.0 percent labor cost increase for skilled nursing since 2020 and an exodus of new and seasoned physicians working throughout the state. In 2022, the Oklahoma State Legislature appropriated \$4.5 million in American Rescue Plan Act (ARPA) funds to Care Providers for “The purpose of recruiting, educating, and stabilizing Oklahoma’s health care workforce.” As more of Oklahoma’s Baby Boomer generation reaches retirement age, however, a greater focus on the education of new physicians and retention of seasoned physicians will become paramount to keeping hospitals and taxpayers and hospitals from fronting the bill for expensive emergency Medicaid and Medicare and health services over the next ten to 20 years.

2.2.c Wyoming

The advantage of comparing Nevada and Wyoming stems from the similarities found in each state’s rural areas. In 2020, Wyoming had a population of 581,348 total individuals with 402,009 total individuals or 69.2 percent of the state’s total population in rural and non-metro areas. This percentage is much different than Nevada’s population distribution among urban

metropolitan communities and rural non-metropolitan communities, with approximately 9.2 percent of Nevada's total population living in a rural non-metropolitan community. However, the population of Nevada was more than five times that of Wyoming, meaning the total number of residents living in rural non-metro areas is closer between the two states than that of New Mexico or Oklahoma. Wyoming has 16 total critical access hospitals across 23 counties and Nevada has 13 total facilities across 17 equivalencies. As Wyoming has a higher percentage of its statewide total population living in rural areas, Wyoming currently has 28 rural health clinics while Nevada has just 19 rural health clinics. The number of federally qualified health centers is comparable between the two states, with Nevada leading by just two federally qualified health centers over Wyoming.

In 2018, both the state of Wyoming and the state of Nevada had uninsured averages higher than the national average of 10.4 percent. In Wyoming, 12.7 percent of the state's total population were uninsured and approximately 25.0 percent of adults between the ages of 18 years of age and 64 years of age had a pre-existing health condition that would have caused them to be denied health coverage. In Nevada, an estimated 13.2 percent of the state's total population were uninsured and 26.0 percent of adults between the ages of 18 years of age and 64 years of age would have also been denied because of a pre-existing health condition. The issue in these two states is a lack of physicians that causes the population to become less healthy. One perk that could help bring more physicians to each state is the lack of an individual state income tax. As pointed out in an article published by Medical License Pro, "The National Health Service Corps tries to get practitioners to areas that have the most need." Nevada and Wyoming both could utilize this service to increase the number of physicians in each state.

Another part of the supply chain that is important to note is that for both Nevada and Wyoming is the effect of weather on medication shipments and other necessary equipment. Both Nevada and Wyoming have mountain ranges and are in the top five highest in-terms of elevation states in the country. This leads to snow and inclement weather in the winter that limits shipments of supplies to healthcare facilities, especially in the remote rural and non-metropolitan areas of both states. As the amount of healthcare availability across each state is already lower than the national average, an even larger gap is created when shipments of medications are not able to reach their destinations. Some hospitals that share a local area are known to share medications with each other when shortages occur but the 47 rural health clinics across the two states do not have the same access to share when they do not receive an order. Even in the summer months, both states are heavily affected by wildfires within their borders and in neighboring states. These cause delays to patient care when pharmaceuticals or specialized equipment is unavailable for use.

2.3 The Regulatory Environment of Nevada's Healthcare Industry Sector

Nevada's Healthcare industry sector is intricately shaped due to a series of relevant federal, state, and even local governmental regulatory controls. These regulatory standards highlight the dynamic nature of healthcare practices, with the ongoing evolution of technology and the increasing importance of data security. Amid unpredictable times and global health challenges like the COVID-19 global pandemic, understanding and adhering to these regulations is crucial

for healthcare providers and facilities to navigate and contribute to the well-being of the community within the regulatory framework established by the state of Nevada. The interplay of federal and state regulations in Nevada reflects a commitment to patient well-being, technological advancement, and strategic planning. As the general healthcare landscape continues to evolve, these regulations provide a robust framework for maintaining quality, transparency, and adaptability in healthcare practices throughout the state.

Healthcare in Nevada is guided by many laws derived from various federal to state sources which dictates how healthcare functions in the state and drives commerce across the state's Healthcare industry sector. The most relevant federal laws include the Healthcare Insurance Portability and Accountability Act of 1996, the Health Information Technology for Economic and Clinical Health Act of 2009, and Clinical Laboratory Improvement Act of 1967 (amended in 1988 to reestablish laws that enhanced its intent on healthcare). Some, but not all, state laws to be aware of are Nevada Revised Statute Chapter 439A Planning for the Provision of Health Care, Chapter 449 Medical Facilities and other Related Entities, the Prescription Monitoring Program Chapter 453.164(8), and Chapter 652 Medical Laboratories.

2.3.a Federal Regulatory Standards and Laws

The Healthcare Insurance Portability and Accountability Act was created nationally to protect patient and health information. It was then followed up with the Health Information Technology for Economic and Clinical Health Act which acted as an extension of the Healthcare Insurance Portability and Accountability Act that protected how information regarding personal health information was transferred electronically. This Act also mandated electronic health records, leading practices, and hospitals to implement electronic systems throughout their normal services provided to the community. However, this does not fully dictate all current practice. As small independent physicians cannot afford servers and network services to incorporate these new technologies, oftentimes these outlier facilities request waivers to not be included in electronic health records systems, thus relying on paper charting techniques.

Federal regulations like the Healthcare Insurance Portability and Accountability Act, Health Information Technology for Economic and Clinical Health Act, and Clinical Laboratory Improvement Act lay the foundation for healthcare practices for the state of Nevada and for the entire country, emphasizing the importance of the protection of patient information, electronic health records, and proper laboratory testing. While the Healthcare Insurance Portability and Accountability Act serves as a safeguard for patient information, the subsequent Health Information Technology for Economic and Clinical Health Act reflects a significant step towards modernizing healthcare systems. However, the practical implementation of electronic systems faces challenges, particularly for smaller independent physicians who may seek waivers due to financial constraints.

2.3.b State of Nevada Regulatory Standards and Laws

Nevada Revised Statute Chapter 439A covers the general provisions governing the provision of healthcare throughout the state. Its general provisions include a required Certificate of Need specifically for healthcare facilities over \$2,000,000. This chapter defines the majority of

definitions governing healthcare in the state and provides guidance on enforcement of the guidelines. The Prescription Monitoring Program, as outlined in Nevada Revised Statute Chapter 453.164(8), plays a key role in which healthcare providers can prescribe scheduled drugs to patients. Currently, the state of Nevada has in place the Nevada Prescription Monitoring Program, a database of information regarding the controlled substance prescriptions that were dispensed to patients in Nevada. By using this database, healthcare providers can obtain a patient's history of medications with ease, making the market full and open with information.

A practitioner, defined in Nevada Revised Statute Chapter 453 Section 126 subparts 1 and 2, is “a physician, dentist, veterinarian or podiatric physician who holds a license to practice his or her profession in this State and is registered pursuant ... [and/or] an advanced practice registered nurse who holds a certificate from the State Board of Pharmacy...” This definition of a practitioner in the state of Nevada is necessary because it states that a registered nurse is considered a practitioner, which is unique to Nevada. Registered nurses are allowed to prescribe drugs to patients in times of emergency without consulting with a doctor. If a practitioner performs illegal or negligent acts, then he or she will open themselves and their practices to malpractice lawsuits. In the state of Nevada, malpractice regulations include a set statute of limitations in reporting, certain criteria for filing a valid case against a practitioner, and price limitations set of lawyer fees to prevent price gouging. The statute of limitations for filing a malpractice case in the state is two years from time of discovery and/or three years from the time the provider caused harm. *Recently, the rule of statute of limitations increased from one to two years with a revision to Nevada Revised Statute Chapter 41A Section 097 in October 2023. Any acts that occurred before then are still subject to the one-year rule.* The elements of a valid claim must include a medical professional that has a duty of care owed to the prosecuting party, the defendant breach said duty of care, and the breach led to a physical injury of the patient. A bill was signed into law by Governor Lombardo in June of 2023, Assembly Bill 404, that changed the set percentage of what a malpractice attorney can collect from the total amount recovered to a maximum of 35.0 percent.

2.3.c Federal and State of Nevada Laboratory Regulatory Standards and Laws

In the wake of the COVID-19 global pandemic, it is important to point out the regulations and definitions regarding medical laboratories operating throughout the state of Nevada. In Nevada Revised Statute Chapter 652, Medical Laboratories, a medical laboratory is “any facility for microbiological... chemical, hematological, biophysical, toxicological, or other methods of examination of tissues, secretions or excretions of the human body.” Beyond existing federal regulations that are set forth and enforced by the Center for Disease Control and other agencies, Nevada state law has a basic level of entry into the market regarding a laboratory startup. All associated regulations regarding certifications, renewals, and applications are maintained by the state’s Division of Public and Behavioral Health and Human Services who require all new or existing applicants to attend continuing education courses to maintain good standing as a laboratory in the state of Nevada. The Division has the right to inspect the premises at any time, conduct proficiency tests to ensure accurate results that are stemming from labs, and require formal reports from administrators and directors of labs to ensure compliance.

The Clinical Laboratory Improvement Act was amended in 1988 to further focus on laboratory testing that could be done through outpatient facilities. Testing was broken down into three different levels, including high complexity, moderate complexity, and low complexity. This Act insured outpatient clinics only to do low complexity testing to ensure test results were not providing skewed results. Leaving moderate and high complexity testing for clinical laboratories. The Prescription Monitoring Program and applicable regulations on medical laboratories, specifically outlined in Nevada Revised Statute Chapter 652, play pivotal roles in ensuring controlled substance prescription oversight and maintaining standards for laboratory startups. The Nevada Prescription Monitoring Program serves as a comprehensive database, facilitating healthcare providers in accessing patient medication histories efficiently, ensuring a transparent and well-informed market.

2.3.d Regulatory Standards and Laws Governing Personnel and Employment Standards in Nevada's Healthcare Industry Sector

Several state laws govern specific matters regarding the governing of personnel who work throughout different parts of Nevada's Healthcare industry sector. One of these relevant state laws includes how nurse practitioners are regulated and how they can prescribe medications as this varies state by state. Currently, 13 of 50 states do not allow nurse practitioners to prescribe Schedule 2 drugs to patients. The unique recognition of registered nurses as practitioners in Nevada, granting them the authority to prescribe Schedule 2 drugs, adds a distinctive layer to the state's healthcare dynamics. This means that approximately 25.0 percent of states in the United States do not allow nurse practitioners to administer Schedule 2 drugs to patients directly. This may not be relevant to most states but, as Nevada is a state with high drug use and policy in place to rectify the problem, it is quite relevant to the state's existing Healthcare industry sector.

Other laws regarding the governance and regulation of individuals who work across Nevada's Healthcare industry sector are found in Nevada Revised Statute Chapter 630 Section 0129 that states that a medical assistant "Performs clinical tasks under the supervision of a physician or physician assistant; and does not hold a license, certificate or registration issued by a professional licensing or regulatory board in this State to perform such clinical tasks." This effectively means that a medical assistant needs no real clinical training. Yet they can be trained by a physician or other provider to meet the needs of the current clinic. Some states, including the state of Washington and the state of New Jersey, require medical assistants to be certified to complete certain tasks, including injections. This is an arduous process that requires schooling as well as Continuing Education Units, up to 12 total credits per year. Nevada Revised Statute Chapter 630 Section 0129 is important as it indicates that medical assistants can only work under the supervision of physicians and physicians assistants, meaning that it would be unlawful in Nevada if they worked directly under the supervision of nurse practitioners. Yet a nurse practitioner has more weight with the Drug Enforcement Agency than a physician assistant. On their website, the Nevada Advanced Practitioner Nurse Association notes that they should not do any advanced procedures that could be considered invasive, including most procedures that are usually deferred to medical assistants.

2.4 An Initial County-by-County Assessment and Overview of Nevada's Healthcare Industry Sector

In the state of Nevada, the healthcare sector plays an important role in the state's economy, with an average of 4.17 percent of the state's total workforce employed in this industry sector. This includes a diverse range of professionals, from doctors to nurses to administrative staff and medical technicians, working in various healthcare facilities. This statistic underscores the importance of the healthcare industry in providing essential services and employment opportunities for the residents of Nevada. It also highlights the sector's contribution to the overall economic vitality of the state, reflecting its role as a key to employment and economic growth.

2.4.a Initial Estimate of the Economic Impact of and Firms in the Healthcare Industry Sector

The total population for each of Nevada's eight individual regional economic development authorities is presented in Table 2.5.

Table 2.5 – Estimated Total Population for Each of Nevada's Eight Regional Economic Development Authorities 2022	
Regional Economic Development Authority	Estimated Total Population
Churchill Fallon Development Authority	25,843
Economic Development Authority of Western Nevada	496,745
Las Vegas Global Economic Alliance	2,322,985
Lincoln County Regional Development Authority	4,482
Nevada 95-80 Regional Development Authority	23,734
Northeastern Nevada Regional Development Authority	37,173
Northern Nevada Development Authority	178,038
Southwest Central Regional Economic Development Authority	55,482

Source: IMPLAN

In 2022, the Las Vegas Global Economic Alliance, encompassing only Clark County, had the single largest total population, with an estimated total population of 2,322,985 total individuals. The Economic Development Authority of Western Nevada, including only Washoe County, had the second largest total population in 2022, with an estimated total population of 496,745 total

individuals and the Northern Nevada Development Authority, including Carson City, Douglas County, Lyon County, Mineral County, and Storey County, had the third largest total population in 2022, with an estimated total population of 178,038 total individuals.

A summary of the types of healthcare firms operating by each of Nevada's eight individual regional economic development authorities is presented in Table 2.6, including total employment by area in the broader Healthcare industry sector. This total includes all employment related to offices of physicians, dentists, and other health practitioners, outpatient care centers, medical and diagnostic laboratories, home health care services, other ambulatory health care services, hospitals, nursing and community care facilities, and residential mental retardation, mental health, substance abuse and other facilities.

2.4.b Estimated Healthcare Needs of Nevada Residents

The lack of healthcare in the state of Nevada is apparent when reviewing the statistics of person per hospital. Research shows that the national average ratio of people to hospital is 23,540 people per hospital within the nation. In Nevada, the ratio of people per hospital is 37,110 people per hospital. This shows that the state of Nevada has 57.65 percent more people to service in hospital facilities. While the state of Nevada is below this average, it is especially crucial for the state of Nevada because of the many rural areas that make it difficult to get to a hospital within a reasonable amount of time. For example, Esmeralda County does not have any doctor's offices, dentist's offices, or hospitals. The 744 estimated total residents in Esmeralda County have no choice but to travel to the nearest county with these facilities in the event of an emergency or for routine appointments.

The national average ratio of people per individual hospital employee is 50 people per hospital employee. Research shows that in the state of Nevada there are 42,332 people who work in hospital facilities within a state that consists of 3,080,156 people living within the state. This breaks down to an estimated 73 people per hospital employee. This means that the state of Nevada has 45.52% greater the amount of people per hospital employee compared to the United States national average. These statistics are crucial to patient needs. Research has shown that nursing staff having patients over the optimal ratio leads to higher rates of preventable deaths, longer hospital stays, worse patient outcomes, higher costs, and more readmissions.

When comparing Nevada's largest county, Clark County including the Las Vegas metropolitan statistical area, there are 23,496 people who work in hospitals within a county with an estimated total population 2,322,985 total individuals. This breaks down to about 99 people per hospital facility employee. This is about 25 percent greater than the state average and double the national average of 50 people per hospital employee. To meet the healthcare needs of the residents of Nevada, it is suggested that the state meet two critical benchmarks. First, the national average of 23,540 people per hospital and, second, 50 people per hospital employee. These measures are relevant because it has been shown that a higher person per healthcare worker and hospital leads to worse patient outcomes. Because there are demographic and geographic aspects that are unique to Nevada, similar states were analyzed to highlight needs in Nevada's healthcare system. The states chosen to compare were Oklahoma, New Mexico, and Wyoming. Below is a table summarizing the people per hospital and people per healthcare worker in these states. Compared

Table 2.6 – Estimated Total Employment within the Healthcare Industry Sector for Each of Nevada’s Eight Regional Economic Development Authorities 2022		
Regional Economic Development Authority	Grouping within the Healthcare Industry Sector	Estimated Total Employment
Churchill Fallon Development Authority	Hospitals	380
	Nursing, Community care, residential mental health, and substance abuse facilities	276
	Offices of Physicians, Dentists, and Other health practitioners	277
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	44
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	59
Total Employment in the Healthcare Industry Sector		1,036
Economic Development Authority of Western Nevada	Hospitals	7,246
	Nursing, Community care, residential mental health, and substance abuse facilities	2,933
	Offices of Physicians, Dentists, and Other health practitioners	9,680
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	1,505
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	2,434
Total Employment in the Healthcare Industry Sector		23,797
Las Vegas Global Economic Alliance	Hospitals	23,496

Table 2.6 Cont'd – Estimated Total Employment within the Healthcare Industry Sector for Each of Nevada's Eight Regional Economic Development Authorities 2022

Regional Economic Development Authority	Grouping within the Healthcare Industry Sector	Estimated Total Employment
	Nursing, Community care, residential mental health, and substance abuse facilities	11,086
	Offices of Physicians, Dentists, and Other health practitioners	41,603
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	9,630
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	11,206
Total Employment in the Healthcare Industry Sector		97,020
Lincoln County Regional Development Authority	Hospitals	1
	Nursing, Community care, residential mental health, and substance abuse facilities	12
	Offices of Physicians, Dentists, and Other health practitioners	10
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	0
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	0
Total Employment in the Healthcare Industry Sector		23
Nevada 95-80 Regional Development Authority	Hospitals	0
	Nursing, Community care, residential mental health, and substance abuse facilities	5
	Offices of Physicians, Dentists, and Other health practitioners	2

Table 2.6 Cont'd – Estimated Total Employment within the Healthcare Industry Sector for Each of Nevada's Eight Regional Economic Development Authorities 2022

Regional Economic Development Authority	Grouping within the Healthcare Industry Sector	Estimated Total Employment
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	0
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	0
Total Employment in the Healthcare Industry Sector		7
Northeastern Nevada Regional Development Authority	Hospitals	359
	Nursing, Community care, residential mental health, and substance abuse facilities	114
	Offices of Physicians, Dentists, and Other health practitioners	780
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	275
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	108
Total Employment in the Healthcare Industry Sector		1,635
Northern Nevada Development Authority	Hospitals	1,785
	Nursing, Community care, residential mental health, and substance abuse facilities	1,129
	Offices of Physicians, Dentists, and Other health practitioners	2,683
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	244

Table 2.6 Cont'd – Estimated Total Employment within the Healthcare Industry Sector for Each of Nevada's Eight Regional Economic Development Authorities 2022		
Regional Economic Development Authority	Grouping within the Healthcare Industry Sector	Estimated Total Employment
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	454
Total Employment in the Healthcare Industry Sector		6,295
Southwest Central Regional Economic Development Authority	Hospitals	317
	Nursing, Community care, residential mental health, and substance abuse facilities	164
	Offices of Physicians, Dentists, and Other health practitioners	614
	Outpatient healthcare centers, home health care services, and other ambulatory health care services	156
	Outpatient healthcare centers, medical and diagnostic laboratories, home health care services, and other ambulatory health care services	144
Total Employment in the Healthcare Industry Sector		1,397

Source: IMPLAN; Office of Workforce Innovation, NPWR

to Nevada, with an estimated 23,540 total individuals per hospital facility, Oklahoma has 16,767 people per hospital facility, New Mexico has 16,254 people per hospital facility, and Wyoming has 18,086 people per hospital facility. Compared to Nevada, with 73 people per healthcare employee, Oklahoma has 54 people per healthcare employee, New Mexico has 54 people per healthcare employee, Wyoming has 47 people per healthcare employee.

2.4.c Estimated Healthcare Needs Nevada's Rural Counties and Communities

Another need that is apparent when reviewing the data is that of Nevada's rural counties. Nevada's metrics of person per hospital employee are below the national average and those of comparable states. A larger need is evident when reviewing Nevada's rural counties compared to those of Carson City, Clark County, and Washoe County. Nevada's rural counties and communities have the added challenge of needing to service a large geographical area. This analysis compared the total number of people per hospital employee for the two predominately

urban metro regional economic development authorities, the Economic Development Authority of Western Nevada and the Las Vegas Global Economic Alliance, and the remaining six but largely rural non-metro regional economic development authorities combined. The Economic Development Authority of Western Nevada has 67 people per hospital employee. The Las Vegas Global Economic Alliance has 96 people per hospital employee. The combined six rural non-metro rural regional economic development authorities in Nevada have 93 people per hospital employee. The estimated total number of people per hospital employee for the Las Vegas Global Economic Alliance, with an estimated 96 people per hospital employee, is almost double the national benchmark of 50 people per hospital. This shows a need for more healthcare staffing in rural areas of Nevada as it has been shown that this metric is a strong indicator of patient outcomes.

2.5 A Strengths, Weaknesses, Opportunities, and Threats Analysis of Nevada's Healthcare Industry Sector

Nevada's Healthcare industry sector has undergone several transformations, shifts, and periods of growth over the last two decades. The growth of Nevada's two largest counties is comparable to the growth of the healthcare industry and sector, as both have dramatically increased in recent years. According to the Nevada Department of Employment, Training, and Rehabilitation, jobs in health and medical services cover a wide range of positions, from moderately to very highly skilled, and employment has grown steadily over the past decade in the state of Nevada, remaining positive even during the recent economic recession. Healthcare sectors worldwide are going through a period of turmoil and change as medical distribution and supply chains were severely affected by the COVID-19 global pandemic. There are many political and socioeconomic factors that directly influence the Healthcare industry sector in both Nevada and for the entire nation. Examples include elections, Medicare, Medicaid, disability, Social Security, and unemployment. The following section will conduct a Strengths, Weaknesses, Opportunities, and Threats analysis of Nevada's Healthcare industry sector.

2.5.a Strengths

The population of Nevada is more concentrated in metro areas than most other states. An estimated 13.8 percent of all Americans live in a rural area compared to just 9.2 percent of Nevadans. The metro concentration of Nevada's population means that there is more access to healthcare for a larger percentage of the state's population when compared to the national average. The rural population of Nevada also has a lower poverty rate at 10.9 percent when compared to the urban population of the state at 14.3 percent. High school completion rates are also higher for those living in rural Nevada with 10.9 percent of the population having not completed high school compared to 13.2 percent of the state's urban population having not completed high school. While there are significant gaps within Nevada's rural health care system and the access to healthcare for rural Nevadans is limited, the rural population has a lower poverty rate and a higher rate of completion of primary education.

2.5.b Weaknesses

Nevada faces a distinct shortage of healthcare providers and professionals. Nevada, as of 2021, ranked as the 48th state when examining the number of primary care physicians per 100,000 Nevadans, and second to last at 49th in available general surgeons for the same population. Nevada also has a moderate rural population with 9.2 percent (278,000 residents) of the state's total population living outside of metro areas as of 2020. The rural population is below the average rural population for the United States. However, Nevada's rural population also faces significant challenges unique to Nevada such as the requirement for significant travel to obtain various healthcare services and a lack of reliable internet. Nevada also encompasses a unique geography that further limits travel including inclement weather (particularly in the winter months) and is subject to visibility and air quality hazards during fire seasons which may not only cause travel issues for those seeking medical care but also delay shipments to healthcare facilities. While the telehealth industry has grown in Nevada, remote rural communities have issues obtaining affordable and reliable high-speed internet access to capitalize on these telehealth services. As of 2018 Nevada had an uninsured population of 13.2 percent with 26.0 percent of adults that could be denied new insurance based on pre-existing health conditions.

2.5.c Opportunities

The increasing adoption of telemedicine presents a significant opportunity for Nevada's healthcare sector. By leveraging technology, healthcare providers can extend their reach to remote and underserved areas, addressing access barriers and improving patient outcomes. Telemedicine offers convenience, cost-effectiveness, and flexibility, making it an attractive solution for both patients and healthcare professionals. Moreover, advancements in telehealth platforms and regulations supporting virtual care services further enhance the feasibility and scalability of telemedicine initiatives in Nevada. Nevada could enact policy reforms aimed at enhancing healthcare affordability and accessibility. By expanding Medicaid coverage and implementing initiatives to reduce healthcare disparities, policymakers can improve health outcomes and mitigate financial burdens on both individuals and healthcare providers. Additionally, investing in preventive care and community health programs can help address underlying health issues and reduce the demand for costly medical interventions, leading to long-term cost savings and improved population health. Nevada's robust tourism industry presents a unique opportunity to stimulate growth in medical tourism. By marketing the state as a destination for specialized medical treatments and procedures, healthcare providers can attract patients from both domestic and international markets. Nevada's reputation for innovation and excellence in healthcare, combined with its vibrant entertainment and hospitality offerings, positions it as a compelling choice for medical tourists seeking high-quality care coupled with a memorable experience. Collaborations between healthcare institutions, tourism agencies, and local businesses can drive investment and create jobs in the healthcare sector while boosting the state's economy.

2.5.d Threats

Nevada's economy is inherently vulnerable to fluctuations, particularly in industries like tourism and hospitality. Economic downturns can result in reduced healthcare spending, leading to budget cuts, layoffs, and decreased investment in healthcare infrastructure and services. The unpredictability of external factors, such as global crises and market instability, amplifies the risk

of economic volatility impacting the sustainability of Nevada's healthcare sector. To mitigate this threat, stakeholders must diversify revenue streams, prioritize financial resilience, and advocate for policies that stabilize the economy and support healthcare resilience during periods of economic uncertainty.

The evolving landscape of healthcare regulations and legal frameworks poses significant challenges and risks for healthcare providers in Nevada. Complexities surrounding liability issues, malpractice claims, and compliance requirements create legal vulnerabilities that can disrupt operations, strain resources, and damage reputations. Moreover, conflicting state and federal regulations, coupled with ambiguous legal precedents, contribute to regulatory uncertainty and legal disputes, further exacerbating the threat to healthcare providers' viability and service quality. Proactive risk management strategies, including comprehensive compliance programs, legal counsel engagement, and continuous monitoring of regulatory changes, are essential to mitigate legal risks and safeguard the integrity of Nevada's healthcare delivery system.

Nevada's susceptibility to natural disasters, such as wildfires, floods, and earthquakes, as well as public health emergencies like pandemics, presents a significant threat to its healthcare infrastructure and resources. These events can disrupt critical healthcare services, overwhelm healthcare facilities, and strain emergency response capabilities, exacerbating healthcare disparities and compromising patient safety. Additionally, the long-term effects of climate change, including extreme weather events and environmental degradation, pose systemic risks to Nevada's healthcare resilience and public health preparedness. To address this threat, stakeholders must prioritize disaster planning and mitigation efforts, invest in infrastructure resilience, and strengthen collaboration across sectors to enhance the state's capacity to respond effectively to emergencies and safeguard population health.

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3.0 Development of a Comprehensive Value Network and Supply Chain Map of the Healthcare Industry Sector in Nevada

This section of this University Center for Economic Development technical report presents an edited version of the initial white paper developed for Part 2, *Development of a Comprehensive Value Network and Supply Chain Map of the Healthcare Industry Sector in Nevada*. Part 2 of this analysis of the value network and supply chain of Nevada's Healthcare industry sector included the following elements:

- An overview of overall economic performance for the state of Nevada as a whole, for each individual regional economic development authority, and, when possible, at a county-by-county level as it relates to the state's Healthcare industry sector including employment compensation, total employment, and proprietor income. Whenever possible, this analysis is broken out by type of healthcare activity and service.
- Identification and discussion of existing and possible linkages across the value network and supply chain of Nevada's Healthcare industry sector and directly and indirectly related industry and occupation sectors including the identification of existing importing and exporting elements of the industry sector.
- Development of a comprehensive Input-Output (I/O) model for Nevada's Healthcare industry sector and an examination of how the results of this model apply to critical value network and supply chain management functions including critical value network and supply chain management functions, the importance and types of relationships and partnerships across the industry sector, and the role of strategic planning in further growing and developing the industry sector to meet changing and growing needs.

There are many elements of Nevada's Healthcare industry sector that influences the business-to-business relationships that healthcare providers have with key suppliers upstream across the value network and supply chain and that influence the relationship that healthcare providers with patients and other end users downstream of the value network and supply chain. Understanding the direct and indirect relationships across the state's Healthcare industry sector's value network and supply chain is a critical step in developing strategic actions designed to enhance the overall balance, strength, and resiliency of the sector. Identification of key 'gaps' in the existing business-to-business relationships across the state's Healthcare industry sector and between service providers and end users is also critical in determining targeted community and economic development strategies and specific business creation, attraction, retention, and expansion efforts to close those identified 'gaps'. These strategies and efforts can be implemented as part of the efforts of the state government, namely through the Governor's Office of Economic Development, and as part of the efforts of individual regional economic development authorities to further grow and diversify the overall economic base of the state's economy while ensuring that end users of various healthcare services have a reasonable degree of access to the various

basic emergency and more expanded physical and mental healthcare services needed to ensure a robust quality of life across the state.

Appendix A through Appendix I of this University Center for Economic Development contains the comprehensive results of the Input-Output analysis completed for each of the individual eight regional economic development authorities operating throughout the state as well as for the state of Nevada as a whole. These appendices further include an evaluation of the top ten industry sectors, in-terms of total economic output, for each individual regional economic development authority and for the state as a whole and an estimation of total output and total employment for key related sectors to the Healthcare industry sector. This analysis is also performed at the individual county level (except for the Churchill Fallon Development Authority, the Economic Development Authority of Western Nevada, the Las Vegas Global Economic Alliance, and the Lincoln County Regional Development Authority as each of these regional economic development authorities are a single county development authority). For the state of Nevada as a whole, the identification of backward linkages for six prominent healthcare related sectors is performed, including offices of dentists, medical and diagnostic laboratories, hospitals, nursing and community care facilities, residential mental retardation, mental health, substance abuse and other care services, and individual and family services. Forward linkages for hospitals for the state of Nevada are also presented in Appendix I.

3.1 Overall Economic Performance by Regional Economic Development Authority

To deliver a comprehensive analysis of the value networks across the state's Healthcare industry sector, an economic examination of the existing economic performances for each individual regional economic development authority was completed. There are eight individual regional economic development authorities operating across the state of Nevada and the overall examination of each individual regional economic development authority is presented in this sub-section.

3.1.a Churchill Fallon Development Authority

Appendix A of this University Center for Economic Development contains a comprehensive collection of the results for the Churchill Fallon Development Authority. The Churchill Fallon Development Authority, which includes only Churchill County, top five industry sectors in-terms of total economic output are employment and payroll of federal government and military, owner-occupied dwellings, dry, condensed, and evaporated dairy product manufacturing, facilities support services, and scenic and sightseeing transportation and support activities for transportation. For employment and payroll of the federal government and military, the total output was \$178,104,599.74, the total employment was 1,452 total individuals employed, and no data for proprietor income was available. For owner-occupied dwellings, the total output was \$152,630,778.87 and data for both total employment and proprietor income was unavailable. For dry, condensed, and evaporated dairy product manufacturing, total output was \$122,453,808.72, total employment was 106 total individuals, and proprietor income was \$272,846.57. For facilities support services, total output was \$ 97,433,510.70, total employment

was 515 total individuals, and proprietor income was \$1,366,638.64. For scenic and sightseeing transportation and support activities for transportation, total output was \$86,826,158.70, total employment was 640 total individuals, and proprietor income was \$194,024.90.

The top five industry sectors in Churchill County and across the Churchill Fallon Development Authority are owner-occupied dwellings, employment and payroll of federal government and military, dry, condensed, and evaporated dairy product manufacturing, facilities support services, and scenic and sightseeing transportation and support activities for transportation. Even with a significant output of \$178,104,599.74, employment and payroll of federal government and military sector employs just 1,452 individuals. Owner-occupied dwellings emphasize asset ownership by contributing \$152,630,778.87 to the county's and region's overall economic output. With just 106 total individuals employed in this sector, \$122,453,808.72 in total economic output and a positive proprietor income of \$272,846.57, dry, condensed, and evaporated dairy product manufacturing is a major contributor to regional economic activity. Facilities support services employed an estimated 515 total individuals and generated \$97,433,510.70 in total economic output. Its strong positive proprietor income of \$1,366,638.64 indicates relative strength and strong contribution to the region's existing economic base. Employing 640 total individuals, the scenic and sightseeing transportation and support activities for transportation sector generated \$86,826,158.70 in total economic output and a positive proprietor income of \$194,024.90, demonstrating robust contribution to regional employment and economic activity.

3.1.b Economic Development Authority of Western Nevada

The results of the economic performance assessment and Input-Output analysis for the Economic Development Authority of Western Nevada are presented in Appendix B. The top five industry sectors for the Economic Development Authority of Western Nevada, which includes just Washoe County in northern Nevada, were owner-occupied dwellings, other real estate, other communication and energy wire manufacturing, insurance carriers, except for direct life, and hospitals. For owner-occupied dwellings, total economic output was \$3,423,224,647.06 but data for both total employment and proprietor income was unavailable. For other real estate, total economic output was \$3,197,571,607, total employment was 17,041 total individuals, and proprietor income was an estimated -\$15,690,631.39. For other communication and energy wire manufacturing, total economic output was \$1,892,051,572.22, total employment was 2,819 total individuals, and proprietor income was \$832,796.26. For insurance carriers, except direct life, total output was \$1,615,641,298.77, total employment was 1,766 total individuals, and proprietor income was \$1,849,055.17. For hospitals operating throughout Washoe County, the total economic output was \$1,502,502,978.07, total employment was 7,246 total individuals, and proprietor income was an estimated \$3,632,965.52.

Owner-occupied homes drive significant economic activity without direct work or proprietor income, highlighting the asset-driven nature of this sector. Despite a negative proprietor income, real estate services contribute significantly to overall economic output and total employment throughout Washoe County. Manufacturing, especially in communication and energy wire production, was a major contributor to the county's and region's overall level of economic activity. Excluding direct life insurance, insurance carriers maintain reasonable output,

employment, and positive proprietor income, indicating overall economic stability and strength. Hospitals play a crucial role in Washoe County's overall economic performance and employment, supported by necessary positive proprietor income for high-quality healthcare services.

Table B.2 presents the specific economic output and employment impacts for various sectors within the Healthcare industry sector for just Washoe County and the Economic Development Authority of Western Nevada's region. Surgical appliance and supplies manufacturing stands out with an estimated total economic output of \$31,339,805.49, employing 48 total individuals. Ophthalmic goods manufacturing follows closely behind, generating \$22,779,747.29 in total economic output and providing employment for an estimated 40 total individuals. Dental laboratories contributed significantly to overall economic activity, with an estimated total economic output of \$20,036,970.77 and employing an estimated 111 total individuals. Surgical and medical instrument manufacturing had an estimated total economic output of \$14,743,537.23 with 29 total individuals employed. Dental equipment and supplies manufacturing, while comparatively smaller to other healthcare related sectors in Washoe County, still contributed \$4,192,468.83 in overall economic output and employed nine total individuals. Total economic output across each of these five healthcare related sectors for just Washoe County amounted to an estimated \$93,092,529.61, employing an estimated 237 total individuals.

3.1.c Las Vegas Global Economic Alliance

The results of the economic performance assessment and Input-Output analysis for the Las Vegas Global Economic Alliance, which includes just Clark County in southern Nevada, are presented in Appendix C. The top five industry sectors in Clark County and for the Las Vegas Global Economic Alliance region were hotels and motels, including casino hotels, owner-occupied dwellings, other real estate, management of companies and enterprises, and full-service restaurants. For hotels and motels, including casino hotels, total output was \$14,096,413,226.83, total employment was 89,452 total individuals, and proprietor income was \$109,057,147.59. For owner occupied dwellings, total economic output was \$13,536,734,120.79 but data for total employment and total proprietor income was unavailable. For other real estate for just Clark County, total output was \$12,736,492,510.79, total employment was 59,747 total individuals, and proprietor income was an estimated \$458,620,205.15. Total output for management of companies and enterprises was \$7,836,301,201.99, total employment was 29,295 total individuals, and proprietor income was -\$133,782,473.45. In Clark County and for the Las Vegas Global Economic Alliance's region, total economic output was \$6,715,882,041.44, total employment was 58,718 total individuals, and proprietor income was an estimated \$425,574,083.33.

With an estimated \$109,057,147.59 in proprietor income for hotels and motels, including casino hotels, industry produces a significant \$14,096,413,226.83 in total economic output. Despite having no data for proprietor income or total employment, owner-occupied homes make up a considerable portion of the Las Vegas Global Economic Alliance's region's economic base with a total economic output of \$13,536,734,120.79, underscoring the asset-driven nature of this particular sector. Other real estate has a noteworthy \$12,736,492,510.79 in total economic output, with an estimated 59,747 total individuals employed and a noteworthy \$458,620,205.15

in proprietor income. With 29,295 total individuals employed and a total economic output of \$7,836,301,201.99, management of businesses and enterprises was a significant contributor to regional economic activity. However, proprietor income was negative, at an estimated total proprietor income of -\$133,782,473.45. Full-service restaurants employed an estimated 58,718 total individuals and generated an estimated \$6,715,882,041.44 in total economic output with a notable proprietor income of \$425,574,083.33. Despite challenges posed by the COVID-19 global pandemic for several of the region's top industry sectors, the Las Vegas Global Economic Authority's region continues to remain diversified and is the single largest contributor to statewide economic activity for the entire state of Nevada.

Table C.2 presents total economic output and total employment for various related sectors throughout Clark County's existing Healthcare industry sector. For surgical appliance and supplies manufacturing, total economic output was an estimated \$107,182,286.89 and total employment was an estimated 170 total individuals. Surgical and medical instrument manufacturing had an estimated total output of \$91,353,988.86 with 193 total individuals employed. Dental laboratories had an estimated total economic output of \$38,504,582.68 and an estimated total employment of 219 total individuals. Ophthalmic goods manufacturing had a total economic output of \$9,551,924.03 and employed 22 total individuals. Lastly, no data was available for total economic output or total employment for dental equipment and supplies manufacturing. Total economic output across Clark County and the Las Vegas Global Economic Alliance's region in related healthcare industry sectors was an estimated \$246,592,782.46 with an estimated total employment of 604 total individuals.

3.1.d Lincoln County Regional Development Authority

Appendix D of this University Center for Economic Development contains a comprehensive collection of the results for the Lincoln County Regional Development Authority, which includes only Lincoln County. The top 5 industry sectors for the Lincoln County Regional Development Authority's region were owner-occupied dwellings, all other crop farming, rail transportation, monetary authorities and depository credit intermediation, and beef cattle ranching and farming, including feedlots and dual-purpose ranching. For owner-occupied dwellings, the total output was \$27,745,314.06 and no employment or proprietor income data was available. For all other crop farming, total economic output was \$19,205,490.98, total employment was 224 total individuals, and proprietor income was \$5,612,326.01. The economic total output for rail transportation for just Lincoln County and the Lincoln County Regional Development Authority's region was \$15,768,886.90, total employment was an estimated 19 total individuals, but data was not available for proprietor income. For monetary authorities and depository credit intermediation, total economic output was \$15,223,398.85, total employment was 29 total individuals, and proprietor income was just \$36,439.46. For beef cattle ranching and farming, including feedlots and dual-purpose ranching, total economic output was \$14,670,180.16, total employment was 18 total individuals, and proprietor income was \$3,244,563.61.

The top five industry sectors for the Lincoln County Regional Development Authority's entire region were owner-occupied dwellings, all other crop farming, rail transportation, monetary authorities and depository credit intermediation, and beef cattle ranching and farming, including feedlots and dual-purpose ranching. Despite having an estimated \$27,745,314.06 in total

economic output, the owner-occupied dwellings sector is asset-driven because there is no proprietor income or employment for this sector. With an estimated 224 total individuals employed and a significant proprietor income of \$5,612,326.01, all other crop farming generated an estimated \$19,205,490.98 in total economic output. With 19 total individuals employed and no proprietor income, rail transportation produced a total estimated economic output of \$15,768,886.90. The combined economic output of firms operating throughout the county's monetary authorities and depository credit intermediation sector for all of Lincoln County was an estimated \$15,223,398.85, with 29 total individuals employed and a total of \$36,439.46 in proprietor revenue. This analysis highlights the noteworthy contributions made by different sectors to Lincoln County's overall level of economic output, total employment, and proprietor income.

3.1.e Nevada 95-80 Regional Development Authority

Appendix E of this University Center for Economic Development contains a comprehensive collection of the results for the Nevada 95-80 Regional Development Authority, which includes both Humboldt County and Pershing County. The top five industry sectors, in terms of total economic output for the Nevada 95-80 Regional Development Authority region, were gold ore mining, metal mining services, owner-occupied dwellings, all other crop farming, and silver ore mining. For gold ore mining, the total economic output was \$1,323,495,718.31, total employment was 2,325 total individuals, and proprietor income was \$9,081,928.02. For metal mining services, the total economic output was \$311,280,037.19, total employment was 370 total individuals, and proprietor income was \$1,051,051.65. The third largest industry sector, in terms of total economic output, for the Nevada 95-80 Regional Development Authority region was owner-occupied dwellings, with an estimated total output of \$144,872,827.45 but no total employment or proprietor income data was available. For all other crop farming, the estimated total economic output was \$132,313,529.82, total employment was 741 total individuals, and proprietor income was -\$1,910,047.23. Total economic output for silver ore mining, the region's fifth largest industry sector, was an estimated \$123,853,065.30, total employment was 260 total individuals, and proprietor income was \$1,122,485.48.

The major industry sectors in Humboldt County and Pershing County combined were silver ore mining, owner-occupied dwellings, metal mining services, gold ore mining, and all other crop farming. Leading the way was gold ore mining, which produced \$1,323,495,718.31 in total economic output, employs 2,325 total individuals, and earned proprietors \$9,081,928.02 in total income. Services related to metal mining generated \$311,280,037.19 total output, with 370 total individuals employed and \$1,051,051.65 in proprietor revenue. Owner-occupied homes are asset-driven because they do not generate direct employment or proprietor. Although the sector employed 741 total individuals and produced \$132,313,529.82 in total output, all other crop farming has a negative owner income of -\$1,910,047.23. Silver ore mining generated an estimated \$123,853,065.30 in total economic output for Humboldt County and Pershing County combined while employing 260 total individuals and generating \$1,122,485.48 in proprietor income. A significant part of the overall economic base for the Nevada 95-80 Regional Development Authority's region is natural resource based, either depending heavily on various mining and natural resource extraction operations or agricultural production activities.

3.1.f Northern Nevada Development Authority

The Northern Nevada Development Authority consists of five counties, including Carson City, Douglas County, Lyon County, Mineral County, and Storey County. Appendix F contains a comprehensive collection of the results for the Northern Nevada Development Authority. The top five industry sectors, in terms of total economic output for the Northern Nevada Development Authority, were owner-occupied dwellings, petroleum refineries, storage battery manufacturing, other real estate, and employment and payroll of state government, other services. For owner occupied dwellings, total economic output for the entire five-county Northern Nevada Development Authority region was \$1,145,755,797.64 with no reported total employment or proprietor income data. For petroleum refineries, total output was \$1,025,484,731.57, total employment was 95 total individuals, and proprietor income was \$9,059,312.21. For storage battery manufacturing, one of the region's fastest growing industry sectors, total economic output was \$831,937,991.36, total employment was 1,859 total individuals, and proprietor income was \$1,382,844.48. For other real estate, total economic output for the entire five-county region was \$797,138,558.20, total employment was 4,668 total individuals, and proprietor income was \$40,650,819.22. The estimated total economic output for the entire five-county region for employment and payroll of state govt, other services was an estimated \$600,270,616.95, total employment was 5,400 total individuals, but no proprietor income was reported.

The top five industry sectors for the entire five-county Northern Nevada Development Authority were owner-occupied dwellings, petroleum refineries, storage battery manufacturing, other real estate, and employment and payroll of state government, and other services. Without no reported total employment or proprietor revenue data, owner-occupied homes lead with an estimated total economic output of \$1,145,755,797.64. Next were petroleum refineries, with \$1,025,484,731.57 in total output, 95 total individuals employed, and generating \$9,059,312.21 in proprietor income. The production of storage batteries yielded \$831,937,991.36 in total economic output, generated 1,859 total jobs, and created \$1,382,844.48 in proprietor revenue. Total output for other real estate was \$797,138,558.20, employing 4,668 total individuals, and generated a substantial \$40,650,819.22 in proprietor income. Lastly, although no proprietor income data was available, the employment and payroll of state government, other services had an estimated total economic output of \$600,270,616.95 and employed 5,400 total individuals. The overall economic base of the entire Northern Nevada Development Authority is one of the most diversified of each of the eight regional economic development authorities operating throughout the state of Nevada.

Table F.2 presents total economic output and total employment for various related sectors throughout the Northern Nevada Development Authority region's existing Healthcare industry sector. For surgical appliance and supplies manufacturing, the estimated total economic output was \$2,977,979.20 with just six total individuals employed. Surgical and medical instrument manufacturing had an estimated total economic output of \$2,716,827.49 with also just six total individuals employed. Similarly, dental equipment and supplies manufacturing had an estimated total economic output of \$2,610,286.37 and employing just six total individuals. Dental laboratories had a relatively small total economic output across the entire five-county region with an estimated \$664,022.59 and employing just four total individuals. There was no reported total

economic output or total employment data for ophthalmic goods manufacturing for the entire Northern Nevada Development Authority region. The combined total economic impact of related Healthcare industry sector sectors across the entire Northern Nevada Development Authority was an estimated \$8,969,115.65 with a total employment estimated of 22 total individuals.

3.1.g Northeastern Nevada Regional Development Authority

The Northeastern Nevada Regional Development Authority consists of four counties, including Elko County, Eureka County, Lander County, and White Pine County. Appendix G contains a comprehensive collection of the results for the Northeastern Nevada Regional Development Authority. The top five industry sectors for the entire four-county Northeastern Nevada Regional Development Authority were gold ore mining, metal mining services, wholesale-petroleum and petroleum products, owner-occupied dwellings, and electric power transmission and distribution. The total economic output for gold ore mining for the Northeastern Nevada Regional Development Authority was \$3,889,522,612.69, total employment was 6,693 total individuals, and proprietor income was \$70,367,611.77. For metal mining services, total output was \$1,409,146,409.05, total employment was 1,658 total individuals, and proprietor income was an estimated \$4,699,860.08. For wholesale-petroleum and petroleum products, total economic output was \$455,432,579.08, total employment was 213 total individuals, and proprietor income was \$242,441.32. For the Northeastern Nevada Regional Development Authority, the total economic output for owner-occupied dwellings was \$440,391,074.64 with no reported total employment or proprietor income reported. For electric power transmission and distribution, total output was \$431,583,155.58, total employment was 255 total individuals, and proprietor income was an estimated \$ 349,684.07.

The top five industry sectors for the entire four-county Northeastern Nevada Regional Development Authority region were owner-occupied dwellings, metal mining services, wholesale petroleum and petroleum products, gold ore mining, and electric power transmission and distribution. With an estimated total economic output of \$3,889,522,612.69, 6,693 total individuals employed, and proprietor income of \$70,367,611.77, gold ore mining was the single largest industry sector for the entire region. The next leading industry sector was metal mining services, which generated \$1,409,146,409.05 in total output, 1,658 total individuals employed, and \$4,699,860.08 in owner revenue. Wholesale-petroleum and petroleum products generated \$455,432,579.08 in total output, employed 213 total individuals, and generated \$242,441.32 in proprietor income. Owner-occupied homes contributed \$440,391,074.64 in total economic output to the four-county region's economic base and the transmission and distribution of electric power produced \$431,583,155.58 in total economic output, employed 255 total people, and yielded \$349,684.07 in proprietor income. While mining and natural resource extraction activities and related mining and natural resource extraction activities contributed significantly to the region's economic base, several noteworthy contributions were made by different industry sectors to overall economic output, employment, and proprietor income.

3.1.h Southwest Central Regional Economic Development Authority

The Southwest Central Regional Economic Development Authority consists of just two counties, Esmeralda County and Nye County. Appendix H contains a comprehensive collection of the results for the Southwest Central Regional Economic Development Authority. The top five industry sectors for this two-county regional economic development authority were gold ore mining, scientific research and development services, owner-occupied dwellings, electric power transmission and distribution, and other real estate. For gold ore mining, total economic output was \$538,545,226.43, total employment was 940 total individuals, and proprietor income was \$18,704,131.77. For scientific research and development services, total output was an estimated \$441,912,771.88, total employment was an estimated 1,706 total individuals employed, and proprietor income was an estimated \$ 7,370,284.52. Total economic output for owner-occupied dwellings was \$313,769,848.20 with no reported total employment or proprietor income data. For electric power transmission and distribution, total output was \$283,762,471.01, total employment was 175 total individuals, and proprietor income was \$111,949.06. For other real estate, total output across the entire two-county region was \$145,137,780.69, total employment was 787 total individuals, and proprietor income was \$5,049,996.26.

The top five industry sectors for the Southwest Central Regional Development Authority were owner-occupied dwellings, electric power transmission and distribution, owner-occupied dwellings, and scientific research and development services. Gold ore mining is the single largest industry sector for this region in terms of total economic output, generating an estimated \$538,545,226.43 in total output, employing 940 total individuals, and earning proprietors \$18,704,131.77 in income. Scientific research and development services produced an estimated \$441,912,771.88 in total economic output for the region, employed an estimated 1,706 total people, and generated \$7,370,284.52 in proprietor income. Owner-occupied homes contributed an estimated \$313,769,848.20 to regional total economic output and the transmission and distribution of electricity produced \$283,762,471.01 in total economic output, employed 175 total people, and yielded \$111,949.06 in proprietor income. The other real estate industry sector generated \$145,137,780.69 in total output, employed 787 total people, and created \$5,049,996.26 in proprietor income.

Table H.2 presents total economic output and total employment for various related sectors throughout the Southwest Central Regional Economic Development Authority region's existing Healthcare industry sector. Surgical appliance and supplies manufacturing generated an output of \$2,391,754.83 and employed just five total individuals while dental laboratories contributed \$489,154.11 to the region's total economic output and employed just four total individuals. No reported total output or total employment was reported for surgical and medical instrument manufacturing, ophthalmic goods manufacturing, or for dental equipment and supplies manufacturing for the entire Southwest Central Regional Economic Development Authority region. The combined total economic impact of related Healthcare industry sector sectors across the entire Southwest Central Regional Economic Development Authority region was an estimated \$2,880,908.94 with a total estimated employment of just nine total individuals.

3.2 Identification of Linkages and Possible Gaps in the Value Network and Supply Chain of Nevada's Healthcare Industry Sector

This subsection presents an overview of the identified gaps and linkages present in the value network of Nevada's Healthcare industry sector. To accomplish this, the existing backward and forward linkages for the state's Healthcare industry sector were analyzed. Strong and weak linkages were differentiated using an evaluation of sector-level Average Regional Purchasing Coefficients and Average Regional Supply Coefficients. Average Regional Purchasing Coefficients calculate the percentage of local demand that is met by regional production. The closer a Regional Purchasing Coefficient is to 100.0 percent, the better the area is at meeting the estimated local demand for specific goods and services. A Regional Purchasing Coefficient close to 0.0 percent suggests that there is a 'gap' in local production for that specific industry sector, requiring goods and services to be imported from outside the region to meet local demand.

While the Regional Purchasing Coefficient (RPC) identifies areas that are generally lacking in local production, the dollar amount of the gap was calculated to determine the full extent of the opportunity to close the identified gap through targeted business creation, attraction, retention, and expansion efforts. Subtracting the Regional Inputs from the Gross Inputs creates an estimation of the dollar amount that is leaving the area due to a gap in the local industry for a specific industry sector. The largest gaps were targeted for investigation for future economic expansion. Forward Linkages were used to identify which industries were exporting surplus goods and services produced within a geographic area that can be exported outside of the specified area. The Average Regional Supply Coefficient (RSC) measures the percentage of the local supply that goes toward meeting the local demand. A Regional Supply Coefficient that is close to 100.0 percent means that most of a produced good or service goes toward satisfying local demand within a specific area.

For this analysis of the state's Healthcare industry sector, the state of Nevada was selected as the targeted geographic area, with additional input from specific regional economic development authorities provided as needed and as appropriate. Appendix I of this University Center for Economic Development contains a summary of the resulting analysis performed on backward and forward linkages across the state of Nevada's Healthcare industry sector's value network and supply chain.

3.2.a Churchill Fallon Development Authority

A commodity with a major gap in the Healthcare industry sector for just Churchill County is curtains and linens. This commodity had an RPC of 0.00 percent for the related healthcare industries of nursing and community care, mental health facilities, and family services. These values indicate that all of the curtain and linen demand within Churchill County throughout the county's own Healthcare industry sector is met by manufacturers and providers located outside the area. The total gap for this commodity across all three related healthcare industries was an estimated \$153,795. Sanitary paper products also appeared as a gap for Churchill County and throughout the Churchill Fallon Development Authority's region, with an observed leakage present in the family services, mental health, nursing care, and outpatient center related healthcare industries. The combined gap for this commodity across each of these related healthcare industries was an estimated \$172,752. The RPC for sanitary paper products for just Churchill County was 0.02 percent across all the relevant industries.

The laboratory commodity was another commodity area with identified gaps in the supply chain connecting laboratory products and services with healthcare providers operating within Churchill County. For just the outpatient care sector, there was a \$151,083 gap for the medical and diagnostic laboratories commodity. With an estimated RPC of 24.67 percent, much of the demand located within Churchill County for this commodity is met by outside sources. In the dental office sector, there was a \$440,170 gap for dental laboratory services, with an estimated 0.00 percent of the local demand met by local suppliers. There were many commodities related to professional services within each related healthcare sector that presented large gaps and opportunities for possible closure through targeted business creation, attraction, retention, and expansion efforts in Churchill County. For example, the legal fees commodity had a total estimated gap across the entire county's own Healthcare industry sector of \$379,603 and local demand for legal fees is only being met by local suppliers with an RPC of 11.57 percent. Other commodities exhibited similar gaps such as real estate, employment services, and accounting services. Despite the high dollar amounts of each of these estimated gaps, successful closure of these gaps may be difficult. These commodities require professionals with extensive training in each respective field and additional workforce development efforts may be required to successfully close these gaps.

3.2.b Economic Development Authority of Western Nevada

One specific commodity with a major gap in the Healthcare industry sector in Washoe County and for the Economic Development Authority of Western Nevada's region is in-vitro diagnostic substances. The RPC for this commodity was 0.00 percent, indicating that it is not being produced locally, while the RSC was 3.24 percent, indicating a significant demand within the county. The gross inputs for in-vitro diagnostic substances amounted to \$48,706,098.96, which represents the total value of products and services within this commodity area consumed within Washoe County. However, since there is no local production, the gross absorption remains at 0.00 percent, meaning that all the products and services consumed in this commodity area in Washoe County were imported into the county.

Another commodity with a notable gap for Washoe County was biological products (except diagnostic), with an estimated gross absorption of \$7,313,548.27. Similar to in-vitro diagnostic substances however, the regional absorption was 0.00 percent, indicating no local production or consumption. This represents a missed economic opportunity for Washoe County, as it fails to capture the potential economic impact from ongoing demand for biological products across the county's Healthcare industry sector. The RPC for biological products was also an estimated 0.00 percent, indicating stable local demand, while the RSC stands at 0.00 percent, signaling a lack of local production. Examining both the RPC and RSC reveals a consistent demand for biological products without a corresponding local production to meet that demand. A notable gap in the Healthcare industry sector in just Washoe County and across the Economic Development Authority of Western Nevada's region is evident in the production of surgical appliances and supplies, resulting in a substantial loss of potential economic impact. The dollar value of this gap amounts to an estimated \$770,503.71.

By analyzing the RSC alongside the RPC, deeper insights into both production and consumption patterns within the region emerge. For example, surgical and medical instruments had a gross absorption of \$377,943.21. Despite this demand, the regional absorption was an estimated 0.00 percent, suggesting that no local production or consumption of this commodity exists within Washoe County. The RPC for surgical and medical instruments was 0.04 percent, indicating stable demand, while the RSC was also 0.00 percent, indicating a lack of local production. This analysis reveals that, despite consistent demand for surgical and medical instruments, the region does not produce or consume them locally.

3.2.c Las Vegas Global Economic Alliance

The Las Vegas Global Economic Alliance's region encompasses all of Clark County, one of the three urban metro counties in the state. Due to its large urban population, the Las Vegas Global Economic Alliance's region demands a much larger amount of healthcare services compared to other parts of the state of Nevada. When analyzing the backward linkages for all of Clark County and for the Las Vegas Global Economic Alliance's region, several major gaps in this value network and supply chain for Clark County's own Healthcare industry sector are evident. The first major gap is in biological products (except diagnostic), with an estimated RPC of 0.05 percent, meaning that out of the over \$208.8 million spent per year across the county's Healthcare industry sector on biological products, only \$128,389 was met with local area producers, leaving an estimated total gap of \$208,681,770.62. Out of the over \$208.8 million of biological products purchased by Healthcare industry sector service providers across all of Clark County, over \$208.6 million in biological products and services had to be imported to the county from producers located outside the region.

The second major gap identified for the value network and supply chain of Clark County's own Healthcare industry sector was for surgical appliance and supplies. Surgical appliance and supplies had an RPC of just 0.21 percent. This gap is caused by the variance between gross inputs of \$53.1 million and regional inputs of \$111,110. The total estimated gap of \$52,933,379.78 indicates that healthcare service providers operating throughout Clark County spent \$52.99 million to import surgical appliance and supplies into the region for use. A third major gap that appeared for the Healthcare industry sector located within Clark County and operating across the Las Vegas Global Economic Alliance's region was surgical and medical instruments, with an estimated RPC of just 0.21 percent, an estimate similar to that for surgical appliance and supplies. Gross inputs for surgical and medical instruments for just Clark County was an estimated \$27.45 million with estimated regional inputs of \$57,412, resulting in an estimated total gap of \$27,393,302.43 million.

3.2.d Lincoln County Regional Development Authority

For just the Lincoln County Regional Development Authority, there were five healthcare related industries that each had significant spending for specific goods and services that are not locally produced. Employment services expenditures were an estimated \$49,442 with an RPC of just 0.74 percent. Curtains and linens expenditures were \$19,892 with no local sourcing. Other insurance expenditures have no local sourcing with a resulting leakage of \$27,695. Sanitary paper products are the last major shared expenditure across the five healthcare related industries

with an estimated \$10,099 in total local demand throughout Lincoln County with no local sourcing. Two industries had expenditures of over \$10,000 in industry specific areas with offices of dentists in Lincoln County expenditures for dental laboratories of \$29,460 with an RPC of 0.00 percent and professional and commercial equipment and supplies expenditures are \$22,257 with a total estimated leakage of \$21,738. The behavioral health industry had an estimated total annual expenditure of \$12,154 on meat except poultry with only 0.18 percent of this particular product produced and procured locally. While the total expenditures and leakage for the Lincoln County Regional Development Authority region's own Healthcare industry sector are relatively small when compared to other larger urban and metropolitan communities across the state, there are common areas of leakage such as curtains and linens, dental laboratories, and employment services that are shared between the Lincoln County Regional Development Authority's region and other regional economic development authorities.

3.2.e Nevada 95-80 Regional Development Authority

A commodity with a significant gap that was apparent across multiple industries was sanitary paper products with RPC's and regional absorption rates of 0.00 percent. This gap was present for offices of physicians, outpatient care centers, hospitals, nursing and community care facilities, and individual and family services. This indicates that approximately 0.00 percent of sanitary paper products demanded by local firms in this area are provided by local suppliers. The regional absorption rate of 0.00 percent confirms that there is an economic leakage for sanitary paper products. Demand for this specific commodity, sanitary paper products, is being satisfied by suppliers located outside the Nevada 95-80 Regional Development Authority's territory. At least \$34,000 for this commodity alone provided by suppliers of sanitary paper products located outside either Humboldt County or Pershing County and is not captured by the value network and supply chain that current exists in this region.

Another commodity with a large gap was the wholesale services of professional and commercial equipment and supplies across multiple healthcare related industry sectors. These include offices of physicians, offices of dentists, medical and diagnostic laboratories, hospitals, nursing and community care facilities, and individual and family services. With an RPC of approximately 0.00 percent and a higher than most gross input for each of these related industries, this commodity is important to focus on. A combined amount of at least \$368,174 in gross inputs is leaving this region across numerous healthcare related industries operating within the Nevada 95-80 Regional Development Authority's territory. The 0.00 percent regional absorption rate across for this commodity further indicates a significant economic leakage caused by the wholesale services of professional and commercial equipment and supplies. One of the largest singular gaps detected in this region is for dental laboratories. With an RPC of 0.00 percent and a gross input of \$309,617, local demand for dental laboratory services for Humboldt County and Pershing County combined is being satisfied by providers located outside this region.

3.2.f Northern Nevada Development Authority

The Northern Nevada Development Authority's current value network reflects a distinct trend toward warehousing, energy projects, data centers, and advanced manufacturing. Total demand for wholesale pharmaceutical consumables throughout the Northern Nevada Development

Authority's region was an estimated \$4.4 million, was an estimated \$5.0 million for biological products and reagents, and was an estimated \$6.1 million for botanicals and medicines. Across just these three commodity areas, an estimated \$15.0 million gap in the region's own Healthcare industry sector was identified. These commodity areas lend themselves well to the region for additional growth by tapping the available workforce in neighboring Washoe County but also in terms of relatively low development costs, favorable regional policy, and regional access to well-established logistical infrastructure located across the Northern Nevada Development Authority's region.

Pharmaceutical consumables and sundries such as plastic prescription containers, could be manufactured at scale relatively quickly since the lines that create them are already very well developed and can be acquired as a turnkey operation as a low overhead solution. The region's favorable policy, land availability, transportation infrastructure, and access to skilled workers accentuates the attractiveness for investment in this specific area. The industries that exist in this region also present some unique potential synergies for additional business creation, attraction, retention, and expansion efforts. There is also a significant existing demand for precursors, process chemicals, and raw materials across the region, many of which are also used in the manufacturing of batteries, cement, construction materials, the recycling of metallics, as well as the extraction and refinement of minerals. This region exists along a river and other habitats with cultural and environmental complexity that should not be ignored when forecasting for timeline, sociopolitical nuance, capital investment and operational viability. There is an attractive investment, start up and operation cost opportunity that is regionally sustainable as shown by other production facilities in the area. To support the healthcare consumables and supply chain, it can also support further growth and sustain regional economic stability, resiliency, and responsibility.

3.2.g Northeastern Nevada Regional Development Authority

The value network and supply chain for the Healthcare industry sector present within the territory of the Northeastern Nevada Regional Development Authority has significant economic leakages. Four main areas linked to the region's own Healthcare industry sector with an estimated RPC of 0.00 percent for in-vitro diagnostic substances, for pharmaceuticals, for sanitary paper products, and for curtains and linens. In-vitro diagnostic substances and pharmaceuticals each represent unique opportunities for the Northeastern Nevada Regional Development Authority, with estimated total leakages of \$2,575,400 and \$2,126,733 respectively. Curtains and linens, as part of the region's Healthcare industry sector's own value network and supply chain, had an estimated RSC of 0.00 percent with a total estimated economic leakage of \$131,083 while sanitary paper products had a total estimated economic leakage of \$376,722.

There were two apparent wholesale services areas of leakage for the Northeastern Nevada Regional Development Authority's own unique Healthcare industry sector, with single-digit RPCs of 4.49 percent and 5.71 percent for professional and commercial equipment and supplies and for drugs and druggists' sundries respectively. Note that druggist' sundries are typically non-medicinal items sold alongside prescription and non-prescription drugs. For wholesale services – professional and commercial equipment and supplies, there is a cumulative gap in

regional supply equating to an estimated \$2,880,825 for the region's own Healthcare industry sector. These two economic leakages are quite substantial for the Northeastern Nevada Regional Development Authority's region, with the possibility of correlation and a collective approach to capturing more of these dollars within this region. Another interesting segment worth additional assessment is management consulting services. With an RPC of 25.12 percent an estimated \$2,615,059 worth of total economic leakage and with a regional absorption rate of 76.04 percent, demonstrating that there are systems in place that currently support this area, investing in and improving upon them can capture some of this additional value. The combination of financial opportunity for this region given an established market and/or companies existing within this commodity is rare, adding to the management consulting services in the Northeastern Nevada Regional Development Authority's region can provide a boost in improved economic impact.

3.2.h Southwest Central Regional Economic Development Authority

The Southwest Central Regional Economic Development Authority's region, consisting of Esmeralda County and Nye County, has a surprising amount of leakage of various services related to the region's own Healthcare industry sector. An estimated \$3,136,768 was spent on the management of companies and other enterprises with an estimated total leakage of \$2,556,152. An estimated \$5,176,738 was spent on employment services with only \$894,540 remaining in the Southwest Central Regional Economic Development Authority's region. Accounting, tax preparation, bookkeeping, and payroll saw total expenditures of \$1,455,310 with an estimated \$1,288,823 leaving the region annually.

Leakage from the purchase of goods and services was severe in various categories. Wholesale services for Esmeralda County and Nye County combined had an estimated total local/regional demand of \$2,457,880 with only just \$276,266 remaining inside the region and spent among local/regional producers and service providers. Nearly all the estimated total local/regional demand of \$424,666 for just sanitary paper products left the Southwest Central Regional Economic Development Authority's region. Curtains and linens had no local supply with an estimated \$140,434 in total annual leakage. Dental laboratories had expenditures of \$469,415 with only \$83 being sourced from regionally based suppliers and surgical appliances and supplies had a total leakage of \$702,175. The Southwest Central Regional Economic Development Authority's region had leakages in the largest categories that equated to well over 10.0 percent of the total expenditures generated across the region's own Healthcare industry sector. Many of these leakages are shared amongst the other regional economic development authorities and some of the leakage may be contained within the state but not within the Southwest Central Regional Economic Development Authority's own territory.

3.2.i State of Nevada

As a state, Nevada-based producers and service providers meet an estimated 88.23 percent of the goods and services demanded and purchased by firms operating throughout the state's Healthcare industry sector, meaning that almost 12.0 percent of this total demand is satisfied by producers and service providers located outside the state. On the value network supply side of the state's Healthcare industry sector, an estimated 91.0 percent of Nevada's healthcare supply

network is consumed by Nevadans, while the remaining 9.0 percent is exported to neighboring states or across the world.

A few notable and important outliers present themselves as growth opportunities when examining specific average RPCs & RSCs for individual healthcare related industries and commodity areas. Sanitary paper products, statewide, had an average RPC of 11.20 percent and an RSC of 8.86 percent, meaning that, while there is growth in this industry, the state is currently exporting more sanitary paper products than is being consumed within the state. Office of physicians, office of other health practitioners, medial and diagnostic laboratories, and other ambulatory health care services each followed a similar trend when the RPCs and RSCs for each of these healthcare related sectors and commodity areas are compared to the RPC and RSC for sanitary paper products. Investing in targeted business creation, attraction, retention, and expansion efforts for each of these areas could lead to statewide supply exceeding statewide demand, thus converting these industries from an importing sector to an exporting sector if they can successfully capture demand from other states.

There are three main areas for the state of Nevada where state supply capacity, RSCs, are nearly 100.0 percent and where the demand is still close to nearly 20.0 percentage points away from being supported locally. Healthcare related sectors and commodity areas where the RPC is relatively low and present the state with an opportunity are outpatient care centers with an RPC of 23.66 percent, home health care services with an RPC of 40.93 percent, and residential mental retardation, mental health, substance abuse and other care services with an RPC of 19.29 percent. These three individual components of the statewide Healthcare industry sector's value network and supply chain capacity is nearly 100.0 percent, meaning investing and expansion within these individual segments could boost Nevada's Healthcare industry sector and better pair statewide demand with local and regional supply.

3.3 Identifying the Critical Value Networks and Partnerships for Nevada's Healthcare Industry Sector

A general discussion, that will be used to build specific and targeted community and economic development strategic recommendations for building a more balanced, stronger, and more resilient statewide Healthcare industry sector, regarding the critical value networks and partnerships for Nevada's Healthcare industry sector is presented in this subsection.

3.3.a General Results of the Input-Output Model for Nevada's Healthcare Industry Sector

Nevada's overall Healthcare industry sector is built upon a relatively strong network of suppliers and distributors that play an intricate role in the distribution of goods based on community and regional needs. The input and output of goods are an essential part of the needs of the state as well as its communities. In terms of various healthcare needs, some of the higher identified inputs for the state include pharmaceuticals, in-vitro diagnostic substances, other insurances, and surgical equipment and appliances. Each of these entities and commodity areas play an important role for the entire statewide system and networks of control and implementation of needs to create additional growth across Nevada's existing Healthcare industry sector. As input

is a high commodity necessity, the outliers and commodities that increase import needs do not increase commodity values. The appreciation of the goods and services that outliers provide by increasing the internal services as necessary so that the economic value of the state's health outcomes can be increased. This is essential to growth from an institutional perspective. Creating growth value is also essential for state-funded programs that have the potential to sustain the additional growth of the broader sector. Increased needs to expand revenue cycles is an essential approach to growth management as whole.

The inputs show a greater need for imported specialized equipment that would require much expansion to the current specialties that Nevada employees currently hold. These include in-vitro diagnostics substances, pharmaceuticals, and surgical instruments. For example, Medtronic with a market capital of over \$117 billion in surgical and medical equipment has factories located and operating throughout the United States. Those factories are in many different states but the ones that are closest to Nevada include one in Arizona, three in Colorado, and eight in California. Currently, there are no manufacturers or transportation hubs in Nevada for those specific commodities. Another company that produces market capital of over \$59 billion in surgical instrumentation and medical equipment is Boston Scientific. Similarly, most of Boston Scientific's current operations and research and development efforts are currently located in Minnesota.

The most critical outputs identified for the state of Nevada included necessary healthcare resources that are vital to overall community care. These include surgical instrumentation and equipment for hospital and outpatient service-based care. Ensuring that the state has the appropriate levels and supply to meet the needs of individual communities located across Nevada is important for the state's long-term sustainable growth. This process is generally dominated by supply chain leaders such as McKesson, Cardinal Health, and Henry Schein. These companies have many distribution centers already located throughout Nevada. Though most of these commodities are researched and developed elsewhere, the distribution centers are important to the delivery of critical services to Nevada communities.

3.3.b Critical Value Network and Supply Chain Management Elements

Through the IMPLAN analysis of the forward linkages in the state of Nevada's Healthcare industry sector, 24 unique industries were identified that generally comprise Nevada's Healthcare industry sector's value network. However, of these 24 identified industries, 13 had an RPC of less than 75.0 percent which denotes a material gap in the value chain. For example, in-vitro (in glass) diagnostic substances had an RPC of 0.02 percent in 2022. This demonstrates that virtually none of the total demand for this specific commodity is being provided by local suppliers operating within the state. This is a problem as in-vitro diagnostic substances had a gross input of \$247,632,594 and regional input of \$41,120, creating an overall gap of \$247,591,474. In other words, a Boeing 787-8 Dreamliner's worth of value in in-vitro diagnostic substances is being provided to Nevada by firms located outside of the state's value network. Furthermore, an approximate \$1 billion in costs related to gaps in the value network can be identified across all 13 of these identified industries.

These identified gaps in the value network of Nevada's Healthcare industry sector expose critical vulnerabilities and dependencies. As previously stated, the 13 industries with RPCs of less than 75.0 percent show a huge failure in the ability of local supply to meet local demand for these specific commodities. However, this is not to say all 13 of these deficiencies can be reasonably addressed by increasing in-state production. For example, the production of curtains and linens has been identified as a major gap and source of economic leakage across Nevada's Healthcare industry sector. Despite this clear gap, however, it may be impractical to build curtain and linen manufacturing plants in Nevada. For one thing, Nevada lacks the environment to economically grow the raw materials needed to produce curtains and linens. As such, production would require the importation of these materials which may be more expensive than just buying finished products from curtain and linen providers located outside the state. Moreover, it may also be impractical to compete on price if Nevada tried to compensate its curtain and linens production by selling excess stock to other states as foreign markets may be able to drop prices low enough and for long enough to force in-state production to cease. For these reasons, some industries such as curtains and linens may not be feasible for in-state investment and production.

Finally, there are also key industries that represent strategic vulnerabilities and dependencies in Nevada. In some cases, crucial goods and services, such as pharmaceuticals and surgical appliances and supplies, are almost entirely supplied to Nevada through producers and service providers located outside the state and foreign markets. This represents a major vulnerability to value network and supply chain of Nevada's Healthcare industry sector. In the event of another major disruption, such as the COVID-19 global pandemic, Nevada could find itself without the critical healthcare materials, supplies, services, and medicines it needs to serve the state's population. To prevent this type of situation, it may be necessary for the state government to produce or keep a rotating stockpile of critical supplies and materials for just such a disruption. Policies such as just-in-time or lean manufacturing may work for Toyota. But for Nevada's healthcare needs, a dependable access to a supply of essential medical goods and services will be needed to face any kind of large market disruptions that may occur in the future.

3.3.c Importance and Types of Potential Relationships and Partnerships

Nevada's Healthcare industry sector is made up of a series of interconnected value chains that consist of numerous interdependent firms. A value chain is a group of stakeholders that work together to bring a good or service to the end user through the supply chain while acting in the firm's and the end user's interests. For Nevada's Healthcare industry sector, creating a value chain of both interdependent and independent firms or stakeholders can be complex due to the various economic activities across a state as geographically large and diverse as Nevada. To fully understand Nevada's Healthcare industry sector, firms need to communicate across the value chain to identify specific outputs and leverage strategic partnerships to deliver end outputs to stakeholders.

For instance, to generate more value from sanitary paper products in Nevada, it is crucial to understand the key suppliers and inputs needed to produce the end product. By identifying critical suppliers in the network and their importance to the industry, firms can better manage the value chain and ensure that the end goods or services are delivered to the customer. The sanitary paper product industry includes single-use items such as tampons, pads, toilet paper, seat covers,

and paper towels. Unfortunately, their short product life cycle contributes to environmental waste. However, with the growing focus on sustainability and eco-friendliness, Nevada has an opportunity to partner with key suppliers of sanitary products to create end products made of recycled materials. By strategically planning these partnerships, stakeholders across the industry sector can work with suppliers who prioritize the ecosystem and bring value to the state. This is especially important in highly populated areas that are prevalent in Nevada such as event centers and casinos where the demand for these products is consistent. An opportunity exists for Nevada to establish itself a leader in the recycling industry by capitalizing on the growing demand for eco-friendly solutions, especially in the state's Healthcare industry sector. By doing so, the state can bolster its reputation and contribute to the wider goal of promoting a greener future while closing significant gaps across the sector's value network and supply chain.

As previously identified, there exists a value gap in the in-vitro diagnostic industry and commodity area. It may be beneficial to explore potential partnerships with current suppliers or establish other types of relationships. A proposed strategic planning initiative that would incentivize suppliers of in-glass testing solutions would be to improve access to necessary resources, such as petri dishes, testing tubes, and other diagnostic items, could increase the likelihood of laboratories relocating to or sourcing from Nevada. It is worth noting that Uline, a key corporate partner of the University of Nevada, Reno College of Business, manufactures test tube materials for in-vitro diagnostics and has a significant manufacturing and distribution presence in Nevada. This is an opportunity for an internal partnership to be forged and leveraged to close an important value gap within the state.

3.3.d Building a True Value Network and Supply Chain for Nevada's Healthcare Industry Sector

Nevada's Healthcare industry sector plays an important role in the broader community and economic development of the state and for the state's local communities and regions. The ability of the value network and supply chain to succeed and create benefits for communities, regions, and end users of various healthcare products and services is a major economic development for the state, for these local communities, and for these regions. According to the Nevada Department of Employment, Training, and Rehabilitation, "The Health and Medical Services industry is key to Nevada to securing growth of a large, relatively stable base of economic activities and high-quality jobs in the state." To improve the overall value network of the state's Healthcare industry sector, existing processes across the sector must be optimized and stakeholders must be integrated to create additional efficiency, additional effectiveness in the delivery of healthcare products and services, and more value to local communities, entire regions, and to end users.

Some of the largest stakeholders present across the state's Healthcare industry sector are hospitals. Hospitals have an immediate effect on surrounding areas regarding various community and economic activities. Sunrise Hospital and Medical Center, Renown Regional Medical Center, and Mountainview Hospital were all leading centers based on 2022 estimated proprietor income. Each medical center operates within its own closed supply chain, reaching different suppliers, and separate groups of patients and individuals in need of different healthcare products and services. The integration of some suppliers across these different hospitals and healthcare networks, especially with local suppliers operating within the state, would increase the overall

economic value and impact of the state's Healthcare industry sector. One large supplier of pharmaceuticals, medical products, and laboratory products and services is Cardinal Health. The company is headquartered in Ohio but has distribution centers located across the United States and across the globe. An enhanced partnership with Cardinal Health would help to create a stronger group of stakeholders across the state that could capture some of the value that is currently lost to producers and suppliers located outside the state. This could lead to improved processes and partnerships along the value network of the entire statewide Healthcare industry sector.

As the value network for Nevada's Healthcare industry sector is constantly growing and changing, there is room for significant improvement. The sector's supply chain is consistently affected in the winter and summer by weather and climate. Nevada can create a stronger supply chain by implementing warehouse facilities and distribution centers to hold crucial medical supplies and pharmaceuticals for those periods of time where supply chains are disrupted by natural events. Manufacturing of key products identified in the forward and backward linkages across the sector would be a keystone action in efficiency improvement. Molding the supply chain to protect against threats would optimize many processes that currently fall short in Nevada, especially distribution and a general lack of local supply for several healthcare related commodity areas.

3.3.e The Role of Strategic Planning for Nevada's Healthcare Industry Sector

Proper strategic planning of Nevada's Healthcare industry sector will require a long-term vision for the sector's value network and the development of new risk management practices that can be put into place and effectively executed when needed. To mitigate risks related to high RPCs among several healthcare related sectors and commodity areas, it may be beneficial to maintain a sufficient stockpile of critical healthcare goods and equipment to combat unanticipated disruptions across the value network and supply chain. As evidenced during the COVID-19 global pandemic, a major trade disruption, natural disaster, or future pandemic could negatively affect Nevada's hospitals and medical facilities due to a lack of in-state suppliers. If a rotating stock of essential health care supplies using a Last-in First-out (LIFO) inventory system is implemented by developing and employing strategically placed holding warehouses around the state, these issues and challenges could potentially be alleviated. Not only would the state be able to retain the essential supplies it needs in case of emergency, but it could also be able to provide essential supplies to rural healthcare facilities at a discounted price when perishable supplies near their expiration date.

A forward-thinking strategy for maximizing the potential of the 13 identified healthcare related industries with low RPC's involves enhancing educational initiatives to bolster the skills of the state's existing workforce and to build the workforce needed to support the closure of these identified gaps as new business businesses are created or attracted to the state and as existing business are retained and expanded. For example, the sanitary products industry requires expertise in chemical engineering to manufacture paper products by combining wood pulp and specialized polymers. By prioritizing this field of study and technical skill, the state and the industry itself can begin to address any issues surrounding the retention of chemical engineers from the state's universities and other institutions of higher education. The in-vitro diagnostics

industry and commodity area also faces challenges due to the need for scientists to analyze samples in petri dishes to detect and test diseases and bacteria. By focusing on laboratory education and research across the state's universities and other institutions of higher education, the state's Healthcare industry sector can capture greater value for potential partners in operating across the sector's broader value chain.

It is recommended that stakeholders operating across all parts of the state's Healthcare industry sector work to create stronger strategic partnerships among themselves and among new potential stakeholders. Partnering with suppliers or distributors to build new facilities in Nevada would help better focus on other risk reduction methods such as warehouse storage. The rural nature of much of the state creates challenges for several companies across various healthcare related sectors and commodity areas as they attempt to enter the state's Healthcare industry sector. But better planning and logistic research will unveil the best areas to construct and operate these new facilities. Strategic partnerships with companies such as Cardinal Health, Henry Schein and McKesson would improve and diversify some of the supply chain issues the state's Healthcare industry currently faces. Further diversification of companies and strategic partnerships across the sector and among the various healthcare related sectors and commodity areas would protect the state from disruptions to the sector's value network and supply such as weather, mass events, or unanticipated shortages.

It is further important to identify those potential opportunities to close identified gaps in the state's Healthcare industry sector's value network and supply chain that are too costly or are simply not practical. Some of these opportunities, given current industry standards and trends, include pharmaceuticals, sterile equipment or goods, and organic chemicals required for testing. Currently, Nevada's biopharmaceutical sector generated an estimated \$4.3 billion in total economic output and employed over 15,000 individuals. However, not all of this economic and employment benefit is captured within the state and fails in comparison to Minnesota's own biopharmaceutical sector that generated an estimated \$16.9 billion in total economic output. This discrepancy between the overall economic impact of Nevada's biopharmaceutical sector and Minnesota's biopharmaceutical sector may be due to the poor geographic location of Nevada to the chemicals or substances needed in creating products in this particular related healthcare sector and commodity area.

References for Section 3.0, White Paper for Part 2 *Development of a Comprehensive Value Network and Supply Chain Map of the Healthcare Industry Sector in Nevada*

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4.0 Identification of Workforce Development Gaps in the Value Network of the Healthcare Industry Sector in Nevada

This section of this University Center for Economic Development technical report presents an edited version of the initial white paper developed for Part 3, *Identification of Workforce Development Gaps in the Value Network of the Healthcare Sector in Nevada*. Part 3 of this analysis of the value network and supply chain of Nevada's Healthcare industry sector included the following elements:

- Development of a 'workforce' overlay using the results of Part 2 of this project to assess and evaluate the current workforce availability and to identify workforce development 'gaps' needed to support the closing of identified gaps in the broader value network and supply chain of Nevada's Healthcare industry sector utilizing data accessed through the Office of Workforce Innovation's Nevada P-20 to Workforce Research Data System (NPWR).
- Completion of a county-by-county assessment of existing workforce characteristics across the state of Nevada to determine current workforce capabilities and identify individuals already in the 'pipeline' in terms of existing enrollment in related education, training, and professional development programs.
- An identification of existing and possible linkages between the value network and supply chain of Nevada's Healthcare industry sector and directly and indirectly related industry and occupations sectors from a workforce availability and development perspective. This identification considers differences between the state's urban metropolitan communities and the state's more rural non-metropolitan communities.
- An identification and assessment of existing importing and exporting elements of Nevada's Healthcare industry sector in terms of workforce availability and development issues in relation to the results of Part 1 and Part 2 of this comprehensive examination of the value network and supply chain of Nevada's Healthcare industry sector.

Utilizing the Office of Workforce Innovation's Nevada P-20 to Workforce Research Data System (NPWR), education, employment, and existing workforce data from the Nevada Department of Employment, Training, and Rehabilitation, the Nevada Department of Education, and from the Nevada System of Higher Education were used to complete the various elements of Part 3 of this project. This effort generally included Career Technical Education graduation data, Nevada System of Higher Education enrollment and degree/program completion data, and data combining Career Technical Education and Nevada System of Higher Education enrollment, completion, and graduation data for certificate and degree programs with a relatively strong tie to the state's Healthcare industry sector and to directly and indirectly related industry sectors and commodity areas.

Following the identification of gaps present across the value network and supply chain of Nevada's Healthcare industry sector performed in Part 2 and summarized in Section 3.0 of this University Center for Economic Development technical report, further investigation was completed for the workforce requirements needed to close those gaps. The main source of data utilized for this analysis was compiled by the Office of Workforce Innovation's Nevada P-20 to Workforce Research Data System. This program provides a view of the existing workforce in Nevada along with the workforce that is currently enrolled across the various institutions of the Nevada System of Higher Education system and the Career Technical Education system. This approach looks at how well-equipped the state of Nevada and each of the eight regional economic development authorities are in terms of their available workforce should action be taken to address the gaps in the value network through targeted business creation, attraction, retention, and expansion efforts. This preparedness was considered for both the short-term and the long-term.

4.1 Evaluating Existing Workforce Characteristics for each Regional Economic Development Authority

An analysis of relevant workforce characteristics for each of the eight individual regional economic development authorities operating throughout the state of Nevada is presented in this subsection. This analysis is specifically focused on workforce characteristics that would directly enable, or potentially inhibit, the ability of each individual regional economic development authority to successfully implement specific business creation, attraction, retention, and expansion efforts designed to close identified gaps in the value network and supply chain of Nevada's Healthcare industry sector.

4.1.a Churchill Fallon Development Authority

The Churchill Economic Development Authority consists of Churchill County with the region's single largest population center being the City of Fallon. This region has an estimated total population of 25,843 total individuals. The Churchill Fallon Development Authority's region does not currently have any medical supply manufacturing presence, meaning that all goods and services used by firms operating throughout the region's own Healthcare industry sector must be imported from outside of the county. The largest healthcare related commodity needs for this region are diagnostic and dental laboratory services with an estimated total regional demand of \$591,253, curtains and linens with an estimated total regional demand of \$153,795, and sanitary paper products with an estimated total regional demand of \$172,752.

4.1.b Economic Development Authority of Western Nevada

The Economic Development Authority of Western Nevada, which includes only Washoe County, encompasses a diverse range of industries. The regional healthcare related value network and supply chain gaps and workforce opportunities are significant for the Economic Development Authority of Western Nevada region. Washoe County has an estimated total population of 469,745 total individuals with the City of Reno, the region's largest population

center, having an estimated total population of 273,445 total individuals. The Economic Development Authority of Western Nevada region plays a vital role in stimulating and supporting economic diversification and growth across most of northern Nevada, including counties located outside the established territorial boundaries of the Economic Development Authority of Western Nevada. With a focus on sectors such as real estate, insurance, manufacturing, and healthcare, there are many substantial opportunities for workforce development and investment throughout Washoe County and throughout the Economic Development Authority of Western Nevada's region. Various existing and potential future changes in the region's workforce composition can and have had a ripple effect, positively impacting the closure of gaps in the state's Healthcare industry sector's value network and supply chain in other areas of the state. Moreover, the region's industry growth and innovation have the potential to stimulate exports to neighboring states like Arizona, California, Idaho, Oregon, and Utah, contributing to broader economic expansion and regional collaboration.

Large commodity gaps in in-vitro diagnostic substances, biological products (except diagnostic), and surgical equipment manufacturing, totaling an estimated \$564,000,000, were identified for the Economic Development Authority of Western Nevada's region. It is important to note that the gaps identified in each of these three commodity areas share several key workforce requirements and required skills. Industry specific leakages for hospitals, physicians' healthcare, and medical practitioners throughout Washoe County and throughout other parts of northern Nevada continue to experience insufficient staffing levels, leading to longer wait times for patients, reduced access to healthcare services, and increased strain on existing medical personnel. Workforce shortages in the region's Healthcare industry sector continued to impede the region's capacity to attract and retain businesses and residents, as access to quality healthcare plays a pivotal role in community well-being and broader economic development efforts. Using existing workforce data available through the Nevada P-20 to Workforce Research Data System to evaluate the region's current workforce availability and to identify workforce development gaps, it is essential to understand the nature of each related commodity area and its specific labor requirements to support closing the gaps in the broader value network and supply chain.

4.1.b.1 Biological Products (Except Diagnostic)

The biological products (except diagnostic) commodity area had an RPC of 0.00 percent and a gross absorption rate of \$7,313,548.27 in Washoe County and for the Economic Development Authority of Western Nevada's region. This commodity area specifically encompasses the production of biological therapeutics, vaccines, and other medical products derived from living organisms and there are currently no individuals working in occupation sectors related to biological products in Washoe County. However, there are related occupation sectors where there is measurable currently employment throughout Washoe County, including 26 total individuals employed as biologists/biotechnologists, 49 total individuals employed as biomedical technicians/microbiologists, 49 total individuals employed as pharmaceutical and medicine engineers, and two individuals employed as quality assurance/regulatory compliance specialists. Despite this existing workforce presence, the specialized nature of the biological products commodity area and the stringent regulatory standards pose challenges, resulting in a shortage of skilled professionals with relevant expertise in the region.

To address workforce needs and bridge gaps in the broader value network and supply chain within this sector in Washoe County, effective utilization of available educational resources is crucial. Data from the Nevada System of Higher Education and for Career and Technical Education enrollment and graduation rates reveal promising enrollment figures, with an estimated 2,861 total students pursuing programs and certifications in biomedical and related studies and 35 total students pursuing in pharmacology and related studies. Additionally, 5,073 total students are concurrently enrolled in related programs, like chemistry (658 total students), pharmacology (35 total students), and biochemistry (133 total students) in just Washoe County just to highlight a few that are related to this industry sector. However, specific enrollment data for medical engineering and quality assurance programs was unavailable.

While enrollment numbers are substantial, analysis of completion data highlights several concerning trends. For example, only 258 total students completed biomedical and related studies programs and no students graduated in pharmacology and related studies. Similarly, completion rates are low in fields like chemistry (20 total students) and biochemistry (34 total students). Additional research of factors contributing to these relatively low completion rates, such as student transfers, dropout rates, or changes in course selections, is needed to better identify areas for improvement and enhancing student success in these programs. If current enrollment and completion remain constant, future workforce development efforts centered in Washoe County should focus on enhancing the quality of education and training in these fields, ensuring alignment with industry requirements, and promoting retention of skilled professionals. Fostering collaboration between the region's various educational institutions and industry stakeholders could facilitate practical learning experiences and job placement opportunities and further strengthen the region's available workforce in the biological products commodity area.

4.1.b.2 In-Vitro Diagnostic Substances

One of the largest commodity area gaps identified for the Economic Development Authority of Western Nevada region was in-vitro diagnostic substances. This commodity area includes the production of substances used for diagnostic testing outside of the body, such as pregnancy tests and blood glucose monitoring kits. The RPC for this commodity area was 0.00 percent, with no local demand being satisfied with any local production. The RSC for this commodity area was 3.24 percent, indicating substantial local/regional demand. Gross inputs for in-vitro diagnostic substances was an estimated \$48,706,099, reflecting the total economic value of this commodity area in Washoe County. Due to the absence of local production, the gross absorption was an estimated 0.00 percent, indicating that all goods and services consumed by firms from this commodity area were imported into the county.

For this commodity area, workforce development needs include chemists, biologists, engineers specialized in medical device manufacturing, quality control specialists, and regulatory affairs professionals. For the in-vitro substances commodity specifically, there are no existing workers for related occupation sectors in Washoe County. However, there are several individuals currently employed in various indirectly related occupation sectors, including three individuals employed as chemists/pharmacies and drug stores, 26 total individuals employed as biologists/biotechnologists, 16 total individuals employed as engineers specialized in medical device manufacturing, and two total individuals employed as quality assurance/regulatory

compliance specialists. For as significant of a leakage that is present in this commodity area, in-vitro substances in Washoe County, the region's current workforce is not yet capable of closing this gap as these positions require advanced degrees and specialized training, indicating a potential gap in the availability of qualified professionals throughout the region. Enrollment data from the Nevada System of Higher Education and for Career Technical Education programs does, however, indicate significant interest in biomedical and related studies, pharmacology, chemistry, and biochemistry. Completion rates in these program areas, however, raise concerns as just a small number of students have recently finished related biomedical programs and none have completed training in pharmacology. Enhancing education quality and aligning training and workforce development efforts with industry needs are key to creating and retaining skilled professionals and addressing workforce shortages to address leakages and close the gaps that are present in the supply chain for this specific commodity area. Addressing these gaps will require concerted efforts to enhance education quality and bolster completion rates in relevant fields.

4.1.b.3 Surgical Appliances and Supplies and Surgical and Medical Instruments

The commodity areas of surgical appliances and supplies combined with surgical and medical instruments for just Washoe County had an estimated total leakage of \$46,083,342.60 with an estimated RPC of 0.07 percent, indicating a significant lack of local production in both commodity areas for this region. This represents a significant gap within the Economic Development Authority of Western Nevada's region as the analysis reveals that, despite a consistent demand for surgical and medical instruments, the region does not produce sufficient amounts of products and services in both commodity areas locally. There is a significant opportunity to promote local production which would help capture additional economic value produced from the region's own Healthcare industry sector and decrease dependence on suppliers located outside of Washoe County. For both commodity areas, there is significant demand for a better prepared and trained workforce, including engineers specializing in medical device design and manufacturing, machinists, quality assurance specialists, and biomedical technicians.

Biomedical technicians are essential for maintaining and servicing medical equipment. This includes troubleshooting issues, performing preventive maintenance, and calibrating devices for optimal performance. Within the Economic Development Authority of Western Nevada's region, there were 49 total individuals working as biomedical technicians/microbiologists. Ongoing training is critical to ensure that individuals working in this occupation sector are kept up to date with medical technology advancements. The role of engineers specializing in medical device design and manufacturing is also essential for driving innovation and developing state-of-the-art medical technologies. These professionals are tasked with conceptualizing, designing, and overseeing the production process of medical devices to ensure compliance with stringent regulatory standards and meet the needs of healthcare practitioners and patients alike. However, only 16 total individuals were working in a related occupation sector, again illustrating the need for workforce development initiatives and educational programs to increase the number of workers with expertise in this area. Machinists are also essential, particularly in fabricating precise components. But only six total individuals working in Washoe County were working as machinists, highlighting the need for more skilled machinists across the county and region. Quality assurance/regulatory compliance specialists are particularly scarce across the Economic

Development Authority of Western Nevada's region, with just two total individuals working in this occupation sector. Other related sectors, like converted paper product manufacturing and pulp, paper, and paperboard mills, have an equally limited workforce with just three total individuals working in each occupation sector. Plastic product manufacturing had 13 total individuals employed, resin, synthetic rubber, and artificial and synthetic fibers manufacturing had zero total individuals employed, rubber product manufacturing had just one total individual employed, and textile furnishing mill had zero total individuals employed. The current workforce in the surgical equipment manufacturing area for all of Washoe County is not well-equipped to address the significant leakage that has emerged for the Economic Development Authority of Western Nevada's region in this specific area. Although there are professionals in indirectly related industries who could help, the existing workforce composition is insufficient to close the gap observed in this sector effectively.

Strategic solutions are needed to address workforce shortages in the Economic Development Authority of Western Nevada's region. This includes increasing enrollment in specialized programs for medical manufacturing engineers, machinists, and quality assurance specialists. Educational institutions should align with industry needs through partnerships with industry stakeholders and government agencies. Promoting training programs, offering incentives like scholarships and apprenticeships, and expanding professional development opportunities can attract and retain individuals in for each of these directly and indirectly related professions and occupations. Community outreach efforts can raise awareness about career opportunities and local production in healthcare.

4.1.b.4 Healthcare and Medical Staff Shortage

This gap focused on the disparity between the demand for hospital workforces and the shortage of medical staff available to fill these roles in Washoe County and throughout the Economic Development Authority of Western Nevada's region. Hospitals and medical facilities require a diverse range of professionals, including physicians, nurses, technicians, and administrative staff, to provide high-quality healthcare services to the community. Continued shortages in these essential roles have led to challenges in meeting patients' needs and compromising the quality and efficiency of healthcare delivery. This identified leakage also refers to the workforce shortages in hospitals and medical facilities and the broader economic and social impact that these shortages continue to have on the region's unique Healthcare industry sector. For all of Washoe County, just 80 total physicians were employed, 13 total skilled nurses were employed, and 49 total healthcare practitioners were employed, including dietitians, dentists, occupational therapists, and audiologists. The region's existing workforce also includes just four total individuals employed as administrative/support staff and 91 total individuals employed as doctors of dental medicine, serving a population size of 469,745 total individuals. Insufficient staffing levels result in longer wait times for patients, reduced access to healthcare services, and increased strain on existing medical personnel. Workforce shortages in the region's unique Healthcare industry sector hinder the region's ability to attract and retain businesses and additional population as access to quality healthcare is a crucial factor in community well-being and economic development.

To close these identified workforce shortage gaps for the Economic Development Authority of Western Nevada's region, leveraging additional federal funds could significantly close these gaps if local and regional stakeholders could apply these funds toward comprehensive recruitment campaigns targeting healthcare professionals and offering competitive salaries and benefits packages to attract top talent. Investing in infrastructure improvements for medical facilities and improved integration of technology could further enhance efficiency and productivity, alleviating some of the strain on existing staff. Using allocated funds to provide scholarships, tuition assistance, and loan forgiveness programs for individuals pursuing healthcare careers could incentivize more people to enter the field. Large, unforgivable student loans associated with the study of Science, Technology, Engineering, and Mathematics (STEM) curriculum is a primary driver dissuading further expansion of identified hospital and medical staff shortages across this region. By strategically allocating certain funds towards addressing workforce shortages in hospitals and medical facilities, the region could potentially enhance healthcare services while stimulating overall economic growth by creating new job opportunities and improving community well-being.

The Economic Development Authority of Western Nevada region plays a crucial role in driving economic growth in Nevada, focusing on diverse sectors like real estate, insurance, manufacturing, and healthcare. However, gaps in the region's existing Healthcare industry sector's value network and supply chain, notably in fields such as biological products, in-vitro diagnostic substances, and surgical equipment manufacturing, pose significant hurdles to capitalizing on emerging opportunities across the broader Healthcare industry sector. While there is an existing workforce with the prerequisite skills to close some of these gaps, these directly and indirectly related sectors and commodity areas lack the number of skilled professionals needed to effectively address these identified gaps. Although continued enrollment in relevant educational programs shows promise, completion rates are low, highlighting the need to improve educational quality and alignment with industry demands. Collaborative efforts between educational institutions and industry stakeholders are vital for enhancing workforce development. Shortages in healthcare staff compound the impacts of existing and emerging challenges, impacting both patient care and broader economic development efforts. Targeted approaches for recruitment, training, and staff retention are imperative to tackle these gaps and bolster the region's overall economic well-being.

4.1.c Las Vegas Global Economic Alliance

Including all of Clark County, the total workforce of the Las Vegas Global Economic Alliance region is the single largest current available workforce pool in the state with some of the greatest opportunities for future investment in that workforce to close identified gaps across the region's own Healthcare industry sector's value network and supply and throughout the value network and supply chain of the statewide Healthcare industry sector across Nevada. Recent changes, growth, and emerging trends in the makeup of this region's workforce makeup have been fueled by new innovations in workforce development that could potentially lead to new export opportunities to neighboring states such as Arizona, California, or Utah. The largest commodity gaps identified for the Las Vegas Global Economic Alliance region were biological products (except diagnostic), surgical appliances and supplies, and surgical and medical instruments. The estimated total economic value of these estimated gaps for these three commodity areas was an