

# Medical Center of the Americas Foundation

## Strategy Report

July 2019



MEDICAL CENTER  
OF THE AMERICAS  
FOUNDATION



Grant Thornton



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# Summary of Recommendations

## TO BOLSTER THE REGION

- Design a cohesive regional biomedical message
- Establish a project management function
- Develop marketing plan for biomedical industry
- Promote existing biomedical success
- Promote symbiotic relationship between Juarez and El Paso
- Attract complimentary manufacturing capabilities
- Promote existing manufacturing expertise
- Improve border efficiency

## TO INVIGORATE INDUSTRY

- Educate community stakeholders on Life Sciences industry
- Increase awareness of biomedical employment
- Leverage Fort Bliss capabilities and resources
- Attract biomedical headquarters
- Prioritize biomedical engineering growth at UTEP
- Promote the region to retain and attract talent
- Redesign local educational programs
- Nurture region's innovation capabilities

## TO ACCELERATE ENTREPRENEURSHIP

- Raise awareness of resources
- Incentivize development of biomedical industry



# Executive Summary

The Medical Center for the Americas Foundation's (MCAF) vision is to develop the Paso del Norte region into a leading biomedical cluster, creating job opportunities for residents and promoting economic prosperity. This region along the US-Mexico border boasts access to two global markets, a cadre of academic research institutions, favorable real estate and utility costs and an emerging med-device industry. Enhancing the life sciences cluster in El Paso/Juarez is a win-win, for locals and for medical product manufacturers.

MCAF has worked with key stakeholders and industry consultants at Grant Thornton LLP to develop a strategy that advances the life sciences industry cluster in Paso del Norte. While the Paso del Norte region traditionally encompasses El Paso, Texas, Las Cruces, New Mexico, and Ciudad Juarez, Mexico, the findings in this report will focus on El Paso, Texas and Ciudad Juarez, Mexico due to the predominance of and access to key stakeholders from these geographic areas.

This effort follows an initiative undertaken 10 years ago, beginning in 2009, to attract medical device and diagnostic companies to El Paso/Juarez.

MCAF's intent is to build on the original goal – to capitalize on opportunities to grow the life sciences industry locally – and identify directions for further biomedical industry growth. To achieve this Grant Thornton interviewed key stakeholders in El Paso and Juarez; compiled information on manufacturing, the region, culture, capital, talent, access to health and infrastructure; and developed recommendations to address biomedical industry growth.

This report summarizes the current state of the region's biomedical industry, outlines recommendations to grow the presence of medical device and diagnostic companies in the region, and details next steps for implementation. The recommendations focus on aligning and promoting the region's biomedical strengths, developing, supporting, and attracting talent and resources to support the industry's growth, and fostering biomedical entrepreneurship.

# Introduction

## Life Sciences in the El Paso – Juarez Region

The life sciences industry has been a growing presence in the El Paso-Juarez region over the past decade. Life sciences companies have stimulated the regional economy by attracting investment, increasing exports, creating jobs and generally improving quality of life in the area. In 2007, the average hourly wage at a medical device manufacturer in the US was \$32.67, compared to an average hourly wage across all US manufacturers of \$25.73<sup>1</sup>. As medical device jobs are generally high paying compared to other jobs, the Regional Economic Development Corporation (REDCo, now the Borderplex Alliance) solicited a report from the Fluor Corporation designed to boost life sciences development and attract additional, higher paying jobs in the region, encompassing El Paso, Texas and Ciudad Juarez, Mexico.


Fluor produced a set of recommendations designed to drive the life sciences sector in El Paso-Juarez. Given that the region's medical device and diagnostics industry was already growing in 2009 (16 companies had sites here), Fluor proposed expanding presence in this category, leveraging several existing resources in El Paso-Juarez for the industry, including:

- **Existing academic research institutions** (Foster School of Medicine at Texas Tech University Health Sciences Center, University of Texas at El Paso and New Mexico State University Biology Labs) that could be leveraged in partnerships with med-device companies;
- **The William Beaumont Army Medical Center** with experience in clinical trials of medical devices being studied for applications in the military;
- **A small but bustling industry cluster** around contract sterilization and disposable medical devices;
- **Available start-up funding** from Camino Real Angels (a nonprofit investment group) and the Texas Emerging Technology Fund (ETF);
- Strong private/public healthcare partnerships; and
- **Access to two global markets** – the United States and Mexico.

Since the report's inception, regional dynamics have included the desire to attract a shortlist of large medical device companies (500+ employees) to the region. In the past decade, several new med-device companies have moved into the region, including Becton Dickinson and Medtronic.

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<sup>1</sup> US Bureau of Labor Statistics



In June 2016, the Cardwell Collaborative was established. To date, Cardwell has supported more than 30 tech start-ups and entrepreneurs in El Paso-Juarez.

In the same year, the BIO El Paso-Juarez (BIO-EPJ) nonprofit was launched, and today brings together representatives from industry, government, the nonprofit world, and academic institutions to work jointly on medical device innovation. BIO-EPJ is responsible for leading marketing efforts toward the medical device and diagnostics industry which has led to increased business opportunities within the cluster and the interest of a gamma sterilization company to install a new location in the region.

These accomplishments provide a strong rationale for exploring additional dynamics and identifying drivers for future growth.

## *What is the current state of the region's biomedical industry?*

The medical device industry in the El Paso-Juarez region is positioned for growth. The global medical device market is expected to increase to \$796 billion by 2030<sup>2</sup> due to the prevalence of acute and chronic diseases, an aging population, increasing global healthcare expenditure, and increasing development of and access to medical devices. Three of the world's top five global medical device companies have manufacturing or contract manufacturing locations in the El Paso – Juarez region. There are dozens of other ecosystem participants such as component suppliers, validation and compliance specialists, and clean room consultants.

Medical device manufacturing facilities are highly concentrated in assembly, cardiovascular access devices, peripheral access devices, respiratory devices, and select stenting options. While the diversity is promising, it is worth noting that the global top 5 medical device areas of growth (in vitro diagnostics, cardiology, diagnostic imaging, orthopedics, and ophthalmic) are underrepresented in the region.<sup>3</sup>

While the presence of regional manufacturing capabilities is a primary driver, other factors have greatly supported the growth of the region's biomedical industry: the addition of new buildings and programs related to the Life Sciences sector at the University of Texas at El Paso (UTEP), the addition of new hospitals and a medical university to the region, and the development of entrepreneur support venues such as the Cardwell Collaborative. These serve as a reminder of

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<sup>2</sup> *International Trade Administration, SelectUSA, Accessed May 2019*

<sup>3</sup> *BusinessWire, Global Medical Device Market 2018 – 2022, businesswire.com, Accessed April 2019*

how investment and dedication to growth improves opportunity and accessibility to high quality care and innovation.

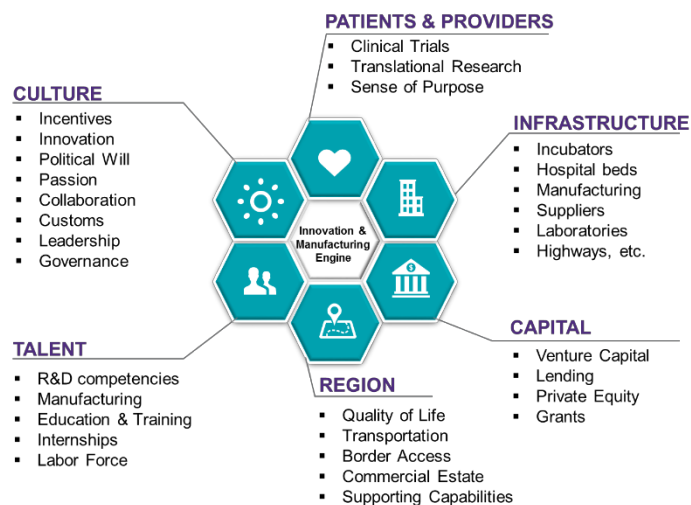
El Paso and Juarez are in an ideal position to take advantage of the global growth in the medical device industry by further developing existing manufacturing capabilities and targeting specific areas that support innovation.

## How does Bio-EPJ compare to other biomedical clusters?

Biomedical clusters have delivered considerable positive economic impact for regions.<sup>4</sup> A biomedical cluster is the geographic concentration of participants of a specific industry.<sup>5</sup> Thriving biomedical clusters in the United States have been able to combine high standards of talent within a local network of universities and health systems, strong quality of life metrics to attract and retain talent, partnerships opportunities, infrastructure and branding to support the growing industry, a strong base of manufacturers, suppliers and decision-makers, and access to ample funding. Based upon the diversity and concentration of cluster elements, BIO-EPJ is in early development.

Biomedical clusters' rely on the confluence of multiple resources and capabilities:

### Innovation Framework



<sup>4</sup> Brookings, *The New 'Cluster Moment': How Regional Innovation Clusters Foster the Next Economy*, Accessed June 2019

<sup>5</sup> Brookings, *The New 'Cluster Moment': How Regional Innovation Clusters Foster the Next Economy*, Accessed June 2019

While all of the elements are represented in BIO-EPJ, depth is extremely limited in some areas. The table below illustrates a resource assessment of comparable bio-medical clusters in the United States.

| Cluster       | Talent & Labor Force | Collaboration, Partnership & Networking | Leadership & Governance | Access to Innovation | Infrastructure & Real Estate | Branding & Marketing | Value Chain | Funding | Business & Local Climate |
|---------------|----------------------|---|-------------------------|----------------------|------------------------------|----------------------|-------------|---------|--------------------------|
| BIO-EPJ       |                      |   |                         |                      |                              |                      |             |         |                          |
| Boston, MA    |                      |   |                         |                      |                              |                      |             |         |                          |
| San Diego, CA |                      |   |                         |                      |                              |                      |             |         |                          |
| Warsaw, IN    |                      |   |                         |                      |                              |                      |             |         |                          |
| Philadelphia  |                      |   |                         |                      |                              |                      |             |         |                          |
| NYC, NY       |                      |   |                         |                      |                              |                      |             |         |                          |
| Houston, TX   |                      |   |                         |                      |                              |                      |             |         |                          |
| Chicago, IL   |                      |   |                         |                      |                              |                      |             |         |                          |

Work in progress  
 Medium  
 Strong

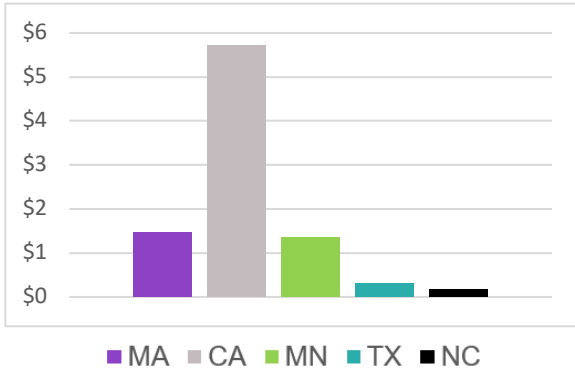
BIO-EPJ has the benefit of two unique economic centers: Juarez and El Paso. In Mexico, the state of Chihuahua has produced more industrial engineering, mechanical engineering, electronic engineering, and technology graduates than the state of Baja California, which is home to the high-performing San Diego-Tijuana cluster.<sup>6</sup> The state of Chihuahua also attracts the highest amount of Direct Foreign Investment in medical devices, and Juarez is the second largest exporter of medical devices in Mexico following Tijuana.<sup>7</sup>

<sup>6</sup> Instituto Nacional de Estadística y Geografía (INEGI)

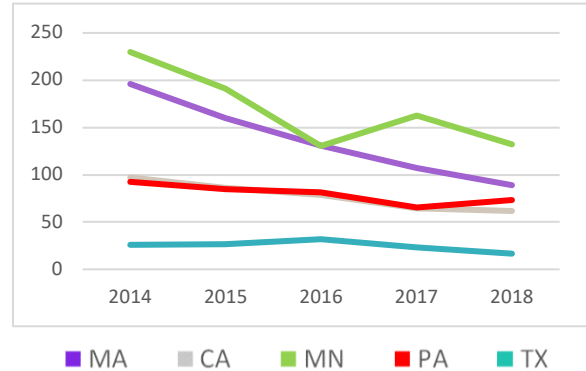
<sup>7</sup> ProMexico



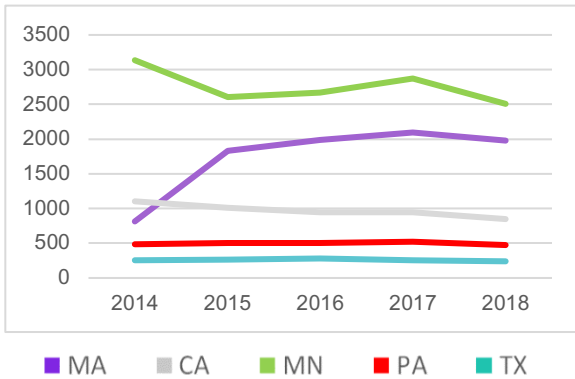
**Top 5 States: VC funding (2017, \$ Billions)**



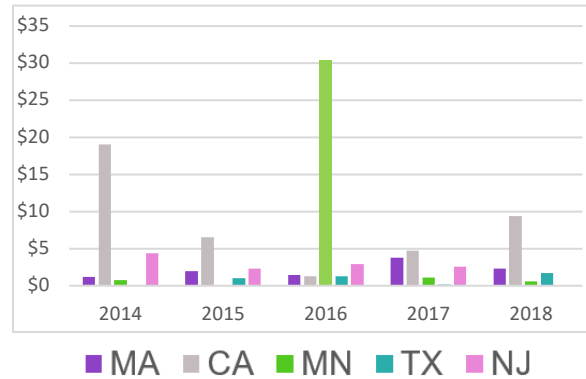
**510(k) Approvals normalized for GDP (2014-2018)**



**Patent Approvals Normalized for GDP 2014-2018**



**Medical Device Acquisitions (Deal Value in Billions)**



El Paso is home to 75 Life Science and medical device sector establishments, providing over 1000 jobs.<sup>8</sup> These professional, scientific and technical services jobs represent some of the highest paying occupations in the city.<sup>9</sup> Additionally, Texas is among the most competitive biomedical regions in the US, in terms of access to venture capital funding for medical devices,<sup>10</sup> 510(k) approvals,<sup>11</sup> medical device patent approvals,<sup>12</sup> and medical device acquisitions.<sup>13,14</sup>

BIO-EPJ has fundamental capabilities and resources to grow into a leading global biomedical cluster despite deficiencies in a number of areas.

<sup>8</sup> Workforce Solutions Borderplex

<sup>9</sup> Data USA

<sup>10</sup> Pitchbook

<sup>11</sup> FDA 510(k) Database

<sup>12</sup> US Patent and Trademark Office

<sup>13</sup> CAP IQ

<sup>14</sup> ProMexico

## *What is needed to achieve full potential?*

The findings analysis defined 3 key performance objectives for cluster development, based on input from interview participants:

1. The region is defined by quality, value and innovation
2. The biomedical ecosystem is enriched and collaborative
3. Entrepreneurship is an achievable reality

Within these objectives, the research team identified 9 goals and developed 30 recommendations which were then prioritized against 4 criteria:

- alignment to MCAF and Bio-EPJ strategy
- availability of resources needed, e.g., number of additional staff or new entity creation
- financial investment required
- impact on the medical device industry in the region, e.g., jobs creation, medical device GDP contribution to the region and/or impact on local wages.

Each recommendation was ranked low, medium, or high for each criterion. Final scores were calculated using a weighted average to reach a percentage score, with 100% being the highest possible score. Recommendations were identified as 'High priority' when the final score reached 70% or higher, 'Medium priority' when scores were between 50% and 70%, and 'Low priority' for scores lower than 50%

# Findings

## Manufacturing

The region's greatest strength is Juarez's reputation for high quality, leading-practice manufacturing. At the same time, there is a lack of influencers/decision makers from the largest medical device companies in the region. This leads to a "distance effect" that isolates the region from research and development investment. The lack of corporate headquarters in the region is a multi-faceted challenge with far reaching implications.

Research and Development activities are typically concentrated at or near headquarters. Evidence of strong R&D centers is the presence of independent design firms that support the product license holders. The one design / engineering firm listed in El Paso does not list medical device manufacturers among its clients.<sup>15</sup>

Supplementary services for a corporate structure, such as contracts review, intellectual property expertise, and regulatory and quality experts are also lacking, which is a challenge for smaller medical device businesses that exist but would be a compounding challenge for the relocation of a corporation.

While the distance between manufacturers and suppliers and their corporate entities is a challenge, an equally impactful key finding is the power of Juarez's manufacturing reputation. The maturity of Juarez's manufacturing capabilities in other industries such as automotive and aeronautic industry is attractive for manufacturers in the medical device space for the transferable manufacturing technology.


Juarez lower-cost labor has been a catalyst for establishing a manufacturing footprint in the region. After establishing a local presence, it is common to see manufacturing companies broaden the value chain locally through the development of manufacturing process optimization. A natural evolution would be to co-locate Research and Development activities and increase presence in innovative areas of the value chain, first by initiating pilot sites. The well-established manufacturing infrastructure in Juarez is impressive and attractive. Seeking opportunities to attract research and development infrastructure to the region could ultimately promote existing strengths and create more value added growth.

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Juarez's reputation as a manufacturing epicenter can attract additional biomedical industry manufacturers but may limit the region to an industry of production instead of innovation

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<sup>15</sup> *Prod Design & Analysis INC*, <http://www.prod-design.com/>



Additionally, medical device manufacturing in Juarez is notably limited to assembly of cardiovascular access devices, peripheral access devices, respiratory devices, and select stenting options. Some regional manufactures are beginning to develop more sophisticated components. However, these limited capabilities are in stark contrast to the broader capabilities in manufacturer's portfolios and larger global trends such as digital technology, software, and device connectivity.

El Paso's contribution to the biomedical cluster rests in complimentary capabilities such as distribution and warehousing. Specifically, the existing sterilization facilities for Juarez's medical device manufacturers are located in El Paso and the neighboring Santa Teresa. While El Paso is home to Cardinal Health and Becton Dickinson, growth of El Paso's manufacturing industry may be most appropriate in growth of more complex value added complimentary services. Our findings suggest that manufacturing in plants in El Paso is neither cost-effective nor opportunistic, given the mutual desire of both regions to minimize direct competitiveness.

## Region

The Norte del Paso region is diverse with its blend of Southwestern United States culture and Mexican heritage. Additionally, the region's geographic location is appealing to access continental markets and comprises a key strength.

In Juarez, safety is a consideration for those travelling to the region, which presents concerns when recruiting potential employees, business partnerships, and regional investments. While crime rates have markedly improved since the economic collapse of 2008 – 2012, the effect of this time period on the city's safety is still felt by the hundreds of thousands of jobs lost when businesses fled the area.<sup>16</sup> Juarez's negative reputation, as portrayed by the media, limits growth and prosperity in the region.

Other areas of volatility include political conflicts which can create significant operational challenges in the movement of people, goods and services across the border. Such challenges limit accessibility to resources and opportunities for collaboration. In the first half of 2019, movement of goods was considerably slowed due to diversion of immigration and customs resources from ports of entry to address the influx of migrants from Central America. This has had both an unpredictable and consequential impact on Juarez's reputation as a cost-effective place to build medical products. Furthermore, Juarez has historically been construed as a source of cheap, manual labor. The perpetuation of this association limits the ability to attract more complex medical device technologies.

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<sup>16</sup> Alfredo Corchado, *Ctiy Journal, Across the Divide*, Accessed June 2019

**Current volatility in El Paso and Juarez significantly limits growth. The threat of tariffs, violence, political whims, and the migrant crisis all impede the growth of the biomedical cluster.**

El Paso has been listed as the 6th safest city in the nation, with consistently lower rates of violent crimes than similarly sized cities or cities with similar economic and immigrant demographics.<sup>17,18,19</sup> In addition, El Paso is known for its quality of life. Local culture is centered on a strong family unit enhanced by traditional Mexican family values and affordable cost of living. El Paso is juxtaposed with Juarez's past reputation as the world's most dangerous city.<sup>20,21,22</sup>

A central key finding to both El Paso and Juarez is the belief that a symbiotic relationship will lead to mutual success. The proximity of the two cities provides an opportunity to capitalize on the larger regional border population, job interdependence, and favorable legislative structures such as the Free Trade Zone. However, these benefits are also believed to exist in the border city of Tijuana and San Diego which is more well-known for biomedical industry and innovation.

El Paso is home to Fort Bliss, the second largest military installation in the United States. The base is a key differentiator for the region. The Texas Comptroller estimated that the Fort Bliss contributed \$23.13 billion to the Texas economy in 2017, and generated 48,298 direct jobs. The Army is continuously testing and evaluating new technical capabilities, and this military skillset is deemed highly transferrable to the medical device industry. The 500 soldiers retiring from Fort Bliss every month represent a potentially significant asset for the development of the medical device industry locally.

In addition to human talent, Fort Bliss offers powerful medical infrastructure on base. For example, the William Beaumont Army Medical Center, could foster cross-utilization of resources with private network hospitals that could nurture the expansion of medical capabilities in El Paso and indirectly foster clinical trials opportunities.

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<sup>17</sup> *Neighborhood Scout, El Paso, TX Crime Rates, Accessed June 2019*

<sup>18</sup> *US News, El Paso, Texas Crime Rate & Safety, Accessed June 2019*

<sup>19</sup> *Rebecca Edwards, The 10 Safest and Most Dangerous Metro Cities in America for 2019, Accessed June 2019*

<sup>20</sup> *Sam Quinones, National Geographic, Once the World's Most Dangerous City, Juarez Returns to Life, Accessed June 2019*

<sup>21</sup> *Ed Vulliamy, The Guardian, Life and Death in Juarez, the World's Murder Capital, Accessed June 2019*

<sup>22</sup> *James C. McKinley Jr., The New York Times, Two Sides of a Border: One Violent, One Peaceful, Accessed June 2019*

## Talent

Maquiladoras are factories in Juarez that operate under tariff programs between the US and Mexico). They are a key influence on how Mexican universities tailor their curricula to meet specific industry needs. While engineering quality appears to be consistent and appropriate for industry needs, gaps in “technical” English, leadership, collaboration, and other “soft skills” were routinely mentioned. Additionally, improving the proficiency and experience of incoming professors was a noted, as professors who lack industry experience could not prepare students for regulatory requirements and other industry specific topics. The open communication and adaptability of the university system is enabling universities to correct for deficits to the benefit of graduating students, professors, and current workers who are returning for further education and training.

The relationship between the El Paso universities and the industry at large stands in contrast to the collaboration between Juarez and the maquila industry. A large percentage of El Paso engineering students leave the region once completing their degrees for jobs in other areas of the United States. This may be attributed to a limited number of desirable jobs, limited awareness of local job opportunities, and/or misalignment between industry needs with entry-level skillsets.


The opportunity to develop deeper, more appropriate collaboration with Fort Bliss to acclimate military personnel to the Life Sciences industry jobs was a consistent discussion theme. There are ongoing interventions and programs to better connect military and civilian opportunity, as reflected by the launch of the BRIDGE program in March 2019. The program, a fellowship for transitioning soldiers, is still in a pilot phase. It offers them an opportunity to meet executives from across El Paso and connect in areas they are passionate about. However, utilization of the unique skillset of the military population can still be enhanced.



*Fort Bliss*

## Culture

The Maquiladora environment has helped foster a culture of excellence and innovation through the development of manufacturing processes that are faster, smarter, and cheaper. At the same time, we observed an increasing desire on the part of younger workers to develop career paths



that do not include traditional maquila work. The culture in Juarez is strongly characterized by a hard-working, passionate ambition to pursue innovation and entrepreneurship. Barriers to this ambition include a lack of internal knowledge in the foundational aspects of entrepreneurship (marketing, promotions, and sales). Further, those in established occupations, such as manufacturers and physicians, were unwilling to invest in advanced practices or technologies such as Industry 4.0 or integrating artificial intelligence into clinical applications.

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**There is a culture of hardworking, passionate ambition in Juarez that can directly feed into biomedical industry growth**

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Collaboration in the Bio-EPJ cluster is challenged by two prevailing mindsets. One supports sharing knowledge, best practices, and resources to support and promote biomedical industry growth. The other, owing in part to the fact that cluster participants are also competitors in the broader marketplace, seeks to limit that

knowledge which may give unbalanced advantage to participants.

El Paso's embrace of innovation is not as apparent as that observed in Juarez. Several interviews cited "low self-esteem" as a reason. But this too is changing. UTEP has a mission of serving the local community through increased accessibility and has achieved much success in improving accessibility while attaining national research top tier ranking. The installation of a new President in August 2019, widely connected with the military and business, may help develop a more business-oriented mindset.

Collaboration among participants in El Paso also is challenged by a lack of a unified approach or strategy across an abundance of organizations that, in principle, should be working seamlessly toward advancing El Paso's growth but which tend to work in silos and, at times, with overlapping initiatives. Competition for funding appeared to be a key reason for the minimal communication and coordination across stakeholders.



## Capital

Access to capital is framed by contrasts in the Paso del Norte region. Mexican business owners and entrepreneurs do not have access to loans in the US and are limited to predatory loans with high interest rates in Juarez.

The increased bankruptcy and anti-bribery regulations implemented by the United States in the last years have significantly slowed capital flows between the two countries and led to increased collateral and cash flow requirements, which is detrimental to the development of smaller entrepreneurs.

In terms of research, access to grants in Juarez does not compare favorably with what is available in the US.

While grant fluidity is limited, Juarez's collaboration with El Paso could allow for more access to capital for Juarez.

In El Paso, the financial ecosystem mainly consists of community banks. There is limited presence of national banks. Venture capital and angel investments are almost nonexistent since the local medical device market is still too limited in size to attract this type of funding.

## Patients and Providers

There is limited availability of physicians in hospitals and accessibility is currently insufficient to support innovation in Juarez. Pockets of medical technology expertise exist in Juarez, but access is limited to wealthy patients. Existing hospitals have limited structures to capture and collect data, including data that would characterize quality of care. Despite these challenges, medical tourism is currently being pursued in areas of cataract, bariatric, and cosmetic surgery. The close relationships among industry, universities, and hospitals are being promoted.


El Paso is an attractive location for clinical trials. The presence of specific conditions correlated with Hispanic patient populations provides untapped clinical opportunities. However, the value has not been fully recognized by private hospitals and physicians. Furthermore, local clinical trial capabilities such as the availability of Principal Investigators (PIs) and clinical trial coordinators locally are still insufficient for successful realization.

Fort Bliss medical talent and infrastructure have the potential to support clinical trials. Cross-training initiatives with local physicians and resource sharing with private hospital networks could



*Downtown El Paso*





contribute significantly to the development of medical capabilities in the region. Military and civilian partnership initiatives have been successfully implemented throughout the country, as demonstrated by recent collaboration agreements between the Military Health System and permanent civilian trauma institutions<sup>19</sup>. A similar model could be envisioned for the Paso del Norte region.

## Infrastructure

El Paso and Juarez have similar infrastructure profiles. The transportation network in both cities serves as a premier selling point, which includes a network of Class I roads and an airport providing accessibility from El Paso to most areas of the US. However, increasing the number of direct flights from El Paso is considered key to the region's development, and a taskforce has been established to study the opportunity.

Both Juarez and El Paso are currently experiencing low vacancy rates in existing commercial buildings. Land is available for sale in the outskirts of El Paso but not in the city center. Neighboring cities, e.g., Santa Teresa and Horizon City, have become direct competitors to El Paso as they offer development incentives and rail-served land which is highly desirable to manufacturing companies looking to establish a local presence. Juarez does not suffer from similar challenges as land is available locally. Neither city has certified and developed clean room spaces for manufacturing, research, and development.

Local hospital networks are available in the region even though they are under-utilized due to the limited number of local clinical trials.

The Juarez educational network is well-known for building manufacturing skills, and multiple partnerships and collaboration initiatives exist between local universities and private industry. UTEP is also a critical educational asset. Although 15 university programs are directly relevant to the Life Sciences field in El Paso, the region does not offer a full curriculum in medical device development to leverage its talent. The lack of research space, appropriate faculty, and the absence of a dedicated biomedical engineering undergraduate program limit UTEP's ability to provide capable and competitive biomedical engineers to support a potential workforce. UTEP infrastructure could also be utilized for more commercialization and additional competitive research capacity. Overall, the utilization rate of educational resources could be increased, particularly in El Paso.

# Recommendations

The team identified 3 performance objectives as an overarching structure to align goals and recommendations, based on the feedback received across the interviews.

1. **'The region is defined by quality, value and innovation'** reflects the importance of quality, value and innovation to establishing a successful Life Sciences cluster. The team evaluated capabilities, infrastructure, quality of life, innovation, commercialization and talent. The Bio-EPJ cluster obtained a score of 2.85 on a scale of 0-5. The team identified 2 main goals and 11 associated recommendations to enhance the cluster's performance along those measures.
2. **'The biomedical ecosystem is enriched and collaborative'** emphasizes partnerships and collaboration as key success factors for growth. Evaluations of stakeholder representation, collaboration initiatives and talent, resulted in a score of 1.91 on a scale of 0-5 for BIO-EPJ cluster. The team identified 4 main goals and 13 associated recommendations to enhance the cluster's impact.
3. **'Entrepreneurship is an achievable reality'** highlights the importance of fostering a business-friendly climate to grow the ecosystem. Evaluation of infrastructure, funding, commercialization and talent, resulted in a score of 1.67 on a scale of 0-5 for BIO-EPJ cluster. The team identified 2 main goals and 6 associated recommendations.

# Implementation

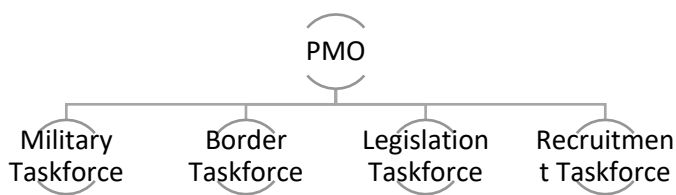
## Taskforce

To support effort successful implementation, the team designed a plan to help MCAF assess and decide on the resources, timelines and steps necessary to implement each recommendation.

Collaboration across the cluster is critical to foster the ecosystem’s growth. The implementation plan involves multiple local stakeholders, as their joint initiatives and efforts will be key. Importantly, organizations across the Paso del Norte region are included to increase harmonization and coordination between Juarez and El Paso and enhance the external message of unity. Organizations such as The Borderplex Alliance, Workforce Solutions Borderplex and Index Juarez are given responsibilities, as well as local universities’ representatives and city and military officials.

A project lead is assigned to each recommendation, as well as designated supporting partners. Skillsets and resources needed, as well as dedicated performance metrics and implementation timelines, are also identified for each recommendation.

Two organizational features will be key to help implement the plan:



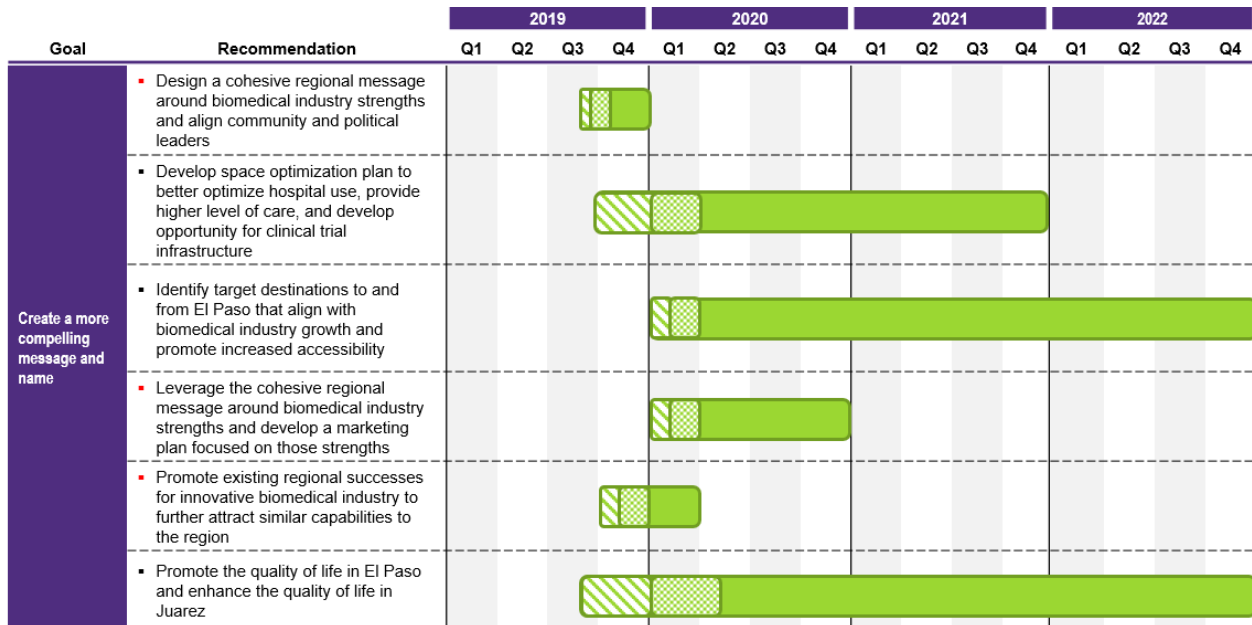
*PMO Structure*

1. Establishing a Project Management Office (PMO) function within MCAF, which will help the organization coordinate multiple initiatives and address the challenges of the implementation plan

2. Establishing task forces with appropriate representation to create regional cohesion and unify efforts. Overall, the creation of six taskforces is recommended to support the implementation.

## Timeline

The timeline for each recommendation is split in 3 phases for design, planning and execution. Overall, timelines span between the third quarter of 2019 and the end of 2021. 50% of the recommendations will be completed by the end of 2020 and 50% by the end of 2021.



Recommendation and Timeline Graphic



## Next Steps

The next steps for MCAF will be to analyze the key findings and prioritize recommendations, communicate the output to the community and mobilize potential taskforce participants, define an implementation plan and establish a Project Management Office (PMO).

Once MCAF and BIO-EPJ teams present the project findings and prioritized recommendations, the ecosystem participants will have the opportunity to actively contribute to enhancing the biomedical industry locally by enrolling in the taskforces suggested in the implementation plan and taking responsibility for their assigned roles. Local cohesion and alignment to the provided recommendations will be essential to a successful implementation.

The region possesses strong potential in the medical device field given its talent and manufacturing base and as a number of impressive initiatives have already been conducted since the Fluor report completion. The positive energy and willingness from both El Paso and Juarez to expand the cluster are also a major driver for success. Focusing on the weakness areas identified during the project and adding missing capabilities and skills to increase the medical device value chain will help the cluster reach a critical size and close the gap with leading clusters nationally.

# Acknowledgements

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*Grant Thornton would like to thank the MCAF team, in particular Emma Schwartz, Jackie Butler, Cecilia Varela and Jesus Carrillo, for providing a continuous support to this project, organizing the planning and interview sessions, and sharing their insights about the region.*

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## Approach

MCAF's objectives were to (1) establish a baseline for the regional industry and understand how it compares to other clusters and relates to industry trends, (2) identify challenges and opportunities for the cluster, and (3) create a roadmap for improving the cluster and growing its global competitiveness.

The approach included identifying findings, developing and prioritizing recommendations, prioritizing recommendations, and creating an implementation plan and roadmap.

Grant Thornton worked with MCAF to interview 51 cluster stakeholders, predominately in El Paso and Juarez in order to understand the current state of the BIO-EPJ biomedical cluster. The 5 main stakeholders included medical device manufacturers, suppliers, educational institutions, e.g., universities or community colleges, government representatives, non-profit organizations, as well as thought leaders and consultants present in the Paso del Norte region. Questions were customized to each participant and related to such topics as processes and products, people and talent, technology, location, partnership and future state/vision for the cluster.

## Authors

### Pat Shafer

pat.shafer@us.gt.com

### Marty Zuzulo

marty.zuzulo@us.gt.com

### Nina Premnath

nina.premnath@us.gt.com

### Segolene Balling

segolene.balling@us.gt.com

### Janeen Williams

janeen.williams@us.gt.com



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