Economic Development Planning, Summary 22

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Title: Growing Northern Arizona’s Bioscience Sector: A Regional Roadmap

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Source: Battelle Technology Partnership Practice, of Columbus, Ohio

Authors: Battelle Technology Partnership Practice

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Sector: Bioscience, including medical devices, diagnostic technologies, infectious diseases, environmental and ecological systems, and muscle physiology

Summary: Northern Arizona is an important contributor to the state’s bioscience sector, particularly in the area of medical devices. With medical-device maker W.L. Gore accounting for much of the sector’s employment, the region needs to build on medical devices and hospitals to expand its bioscience base. It should also look to develop a stronger supply chain of medical device makers. Northern Arizona University, TGen North and the U.S. Geological Service are among the region’s research assets.

Four strategies are outlined to leverage the region’s assets to grow its bioscience sector: Improve the business climate for bioscience industry development and growth; build the region’s research base in key platforms and facilitate commercialization of research findings; build the region’s bioscience talent pool; and build an entrepreneurial culture that supports bioscience entrepreneurs and emerging bioscience companies.
**Geographic impact:** Northern Arizona, particularly Flagstaff and Prescott.


**Major challenges:** Flagstaff’s high cost of housing and worker shortages, the small research base at Northern Arizona University, lack of an entrepreneurial support infrastructure, and high schools failing to graduate enough students with sufficient STEM skills to make a successful transition to college-level programs.

**Progress to date:** In 2012, on the 10th anniversary of Arizona’s renewed commitment to bioscience, Battelle Technology Partnership Practice examined how much progress the state had made in bioscience. Among its findings: Flagstaff remains highly specialized in medical devices and equipment, with more than 15 times the national employment concentration. Employment is growing at a rapid pace, with five companies in the medical devices/equipment sector employing 2,452 people, a 152 percent increase since 2002. Flagstaff has a specialized hospitals subsector with 47 percent greater concentration of hospital jobs relative to the national average. Its two hospitals employ 2,620, a 6 percent increase since 2002.

Also, the Northern Arizona Center for Entrepreneurship and Technology Incubator opened in Flagstaff, offering such amenities as fully equipped laboratory space to encourage the formation of new companies. NAU opened graduate allied health programs at the Phoenix Biomedical Campus. In 2012, the city of Flagstaff received a $4 million federal grant to help build a new accelerator facility next door to the NACET incubator, with plans to attract start-up companies.

**Major implications:** Bioscience offers Northern Arizona the very real potential to become a world leader in medical devices and home to a cluster of bioscience companies. It can become a key driver of the region’s economy, providing well-paying jobs and creating more companies. Research by Northern Arizona University and TGenNorth has the potential to spin off new companies. One of the region’s biggest strengths is W.L. Gore and Associates, which has established Flagstaff as a leader in medical devices and is one of Flagstaff’s biggest employer. The attractive quality of life in Flagstaff and Prescott is an important asset in their bid to bring more bioscience researchers and companies to the region.

**Opportunities for alignment:** There is a clear-cut opportunity for medical-device companies to function as W.L. Gore’s supply-chain partners. Other opportunities may exist for bioscience firms and researchers in Northern Arizona to collaborate with biotechnology companies, healthcare institutions and universities in greater Phoenix and Tucson, both of which are centers of biotechnology. The region should
look to grow its research base around two key platforms: diagnostics technology and environmental technology. These platforms build upon the area’s core research competencies – infectious diseases, environmental and ecological systems, and muscle physiology – and can be sources of innovative technologies and products.

**Background:** In 2002, public and private leaders in Arizona pledged funding and other resources to position Arizona as a leading center for the biosciences. Since the publication of Arizona’s Bioscience Roadmap, significant progress has been made in creating an environment supportive of the biosciences in Arizona. Key to the effort is building infrastructure around selected technology platforms, growing a critical mass of bioscience firms, and fostering a business climate and environment supportive of the biosciences.

With this regional bioscience roadmap, which complements the statewide effort, attention is turned toward northern Arizona and the challenges and opportunities it faces in building on key bioscience areas. The region is home to Northern Arizona University and a number of established bioscience firms, notably W.L. Gore, and a small base of start-up and emerging companies.

**Northern Arizona’s bioscience industry**
Northern Arizona is an important part of the state’s bioscience industry sector, showing strong growth in employment from 2001 to 2005. A particular strength is the medical device subsector, due to the Flagstaff firm of W.L. Gore.

In 2005, more than 5,500 people in Coconino and Yavapai counties were employed by 37 bioscience or bioscience-related businesses. In Flagstaff, nearly 4,200 were employed across 12 of these businesses. Between 2001 and 2005, bioscience employment in Flagstaff grew three times faster (19.5 percent) than that of the nation. The fastest growing bioscience subsector in Flagstaff is medical devices and equipment, attributable to W.L. Gore, a global biomedical company.

For its part, Prescott accounted for 1,300 bioscience jobs, with employment growing by 12 percent between 2001 and 2005. During that time period, the number of bioscience firms in Prescott increased to 25 from 18. Hospitals accounted for 86 percent of the bioscience jobs in Prescott, compared to 70 percent of the bioscience jobs in Flagstaff.

Bioscience workers in northern Arizona do considerably better than their counterparts in the overall private sector, earning nearly $20,000 more per year, or about $45,000 on average.

**Research strengths and assets**
Northern Arizona’s research and development base is growing rapidly, but remains small. The R&D base grew to more than $16 million in fiscal 2005, up from $6 million in fiscal 1997. Growth was driven by the biological sciences. By comparison, Southern Arizona’s bioscience R&D base was $255 million in fiscal 2004.
The quality of bioscience research being conducted at NAU is high as demonstrated by NIH awards. NIH funding increased to $2.6 million in 2005, up from $1.4 million in 2001. The 20 percent annual increase in funding was double the national increase in NIH funding.

Northern Arizona has a research base in environmental biology, as reflected by $8.1 million in National Science Foundation funding and a high rate of publications and citations.

The region has a number of unique assets, which it can leverage to build its bioscience base. These assets include a growing base of medical device companies and health care institutions, such institutions as NAU, U.S. Geological Society and TGen North, proximity to Phoenix and potential partnerships with firms there, Coconino Community College and Yavapai College, and an attractive quality of life. Challenges to building the base include Flagstaff’s high cost of housing and worker shortages, small research base at NAU, lack of entrepreneurial support infrastructure, and high schools failing to graduate students with sufficient STEM skills.

**Strategies and actions**

Specific strategies to leverage the region’s assets to grow its bioscience sector over a five-year period include:

- **Improve the business climate in Arizona for bioscience industry development and growth.** Invest in incubators, technology parks, and transportation. Find creative ways to make housing more affordable. Diversify the bioscience industry sector by growing the base in medical devices by attracting bio-manufacturing operations, and building a research, testing and medical labs industry base.

- **Grow the region’s research base around two key platforms: diagnostics technology and environmental technology.** These platforms build upon the area’s core research competencies and can be sources of innovative technologies and products.

- **Build the region’s bioscience talent pool.** Approaches include building a stronger base of NAU graduate students, expand health science programs throughout Northern Arizona and the state, and form a Northern Arizona Science Education Initiative to create a science talent pipeline.

- **Build an entrepreneurial culture that supports bioscience entrepreneurs and emerging bioscience companies.** Provide business mentoring, expand networking and encourage the reformation of the Forest Angels Group to help companies gain access to capital.