

The logo consists of a dark blue square with the text "ARIZONA'S BIOSCIENCE ROADMAP" in white, uppercase, sans-serif font, centered within the square.

ARIZONA'S
BIOSCIENCE
ROADMAP

A solid teal horizontal banner spanning the width of the slide.

BIOSCIENCES IN ARIZONA

2024 Performance Review

Mitch Horowitz and Ryan Helwig, TEconomy Partners LLC

April 22, 2024

The background of the slide features a complex network of glowing, interconnected lines in shades of blue, purple, and magenta, resembling a microscopic view of biological tissue or a molecular structure.

What Is Arizona's Bioscience Roadmap?

- 20-year plan to bring Arizona to competitiveness in Biosciences
- Commissioned by the Flinn Foundation, tracked by TEConomy Partners
- **Goals:** Economic strength and diversity; access to health innovations for Arizonans
- **Focus:** Leverage research strengths and build critical mass of firms

Vision for Arizona in 2025

“Arizona is **globally competitive** and a **national leader** in the biosciences in such fields as precision medicine, cancer, neurosciences, bioengineering, diagnostics, and agricultural biotechnology.”

“It excels in offering a **deep talent base**, a critical mass of **entrepreneurs and enterprises**, and **clinical excellence** to turn discovery into firms, products, and talent.”

Source: Second Decade Roadmap, available at www.flinn.org

Summary of 2024 Performance Review

- Overall, Arizona has **a strong report card in 2024 with significant gains in most all major metrics** over the latest 2- to 3-year period since 2020.
- **In jobs**, non-hospital biosciences employment growth has accelerated, growing rapidly through the pandemic and its recovery, while hospital jobs have remained flat.
- **Wage growth** in AZ, both in the biosciences and private sector, has been significant and likely reflective of, in part, cost pressures.
- Additional growth highlights for AZ in its innovation ecosystem include:
 - **NIH funding** has increased at a rapid rate since 2020—3X faster than national growth
 - **VC funding** increased in 2023, showing resilience amidst national declines
- One area showing mixed results is **university technology transfer**, though Biosciences remains a key driver of university commercialization overall.

Defining the Biosciences in Arizona

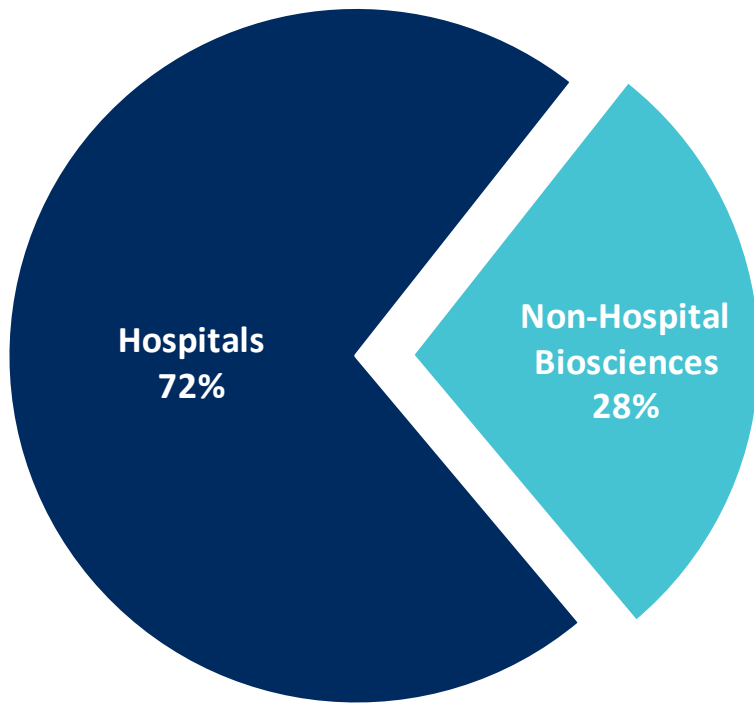
- Agricultural Feedstock & Industrial Biosciences
- Bioscience-Related Distribution
- Pharmaceuticals & Diagnostics
- Medical Devices & Equipment
- Research, Testing & Medical Labs
- Hospitals



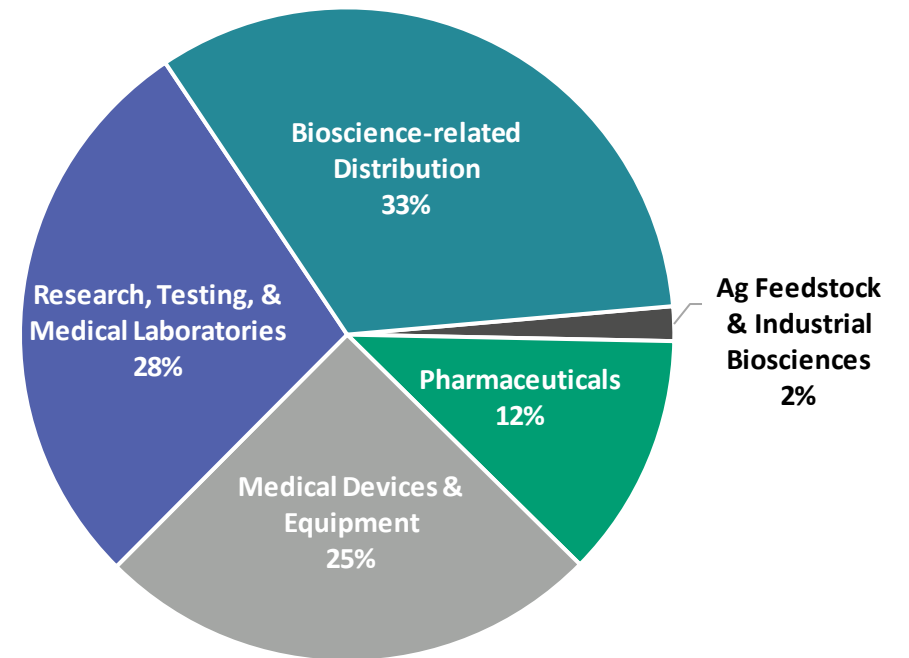
Metric: Jobs

Composition of Bioscience Industry in AZ, 2022

138,000 Total AZ Biosciences Jobs

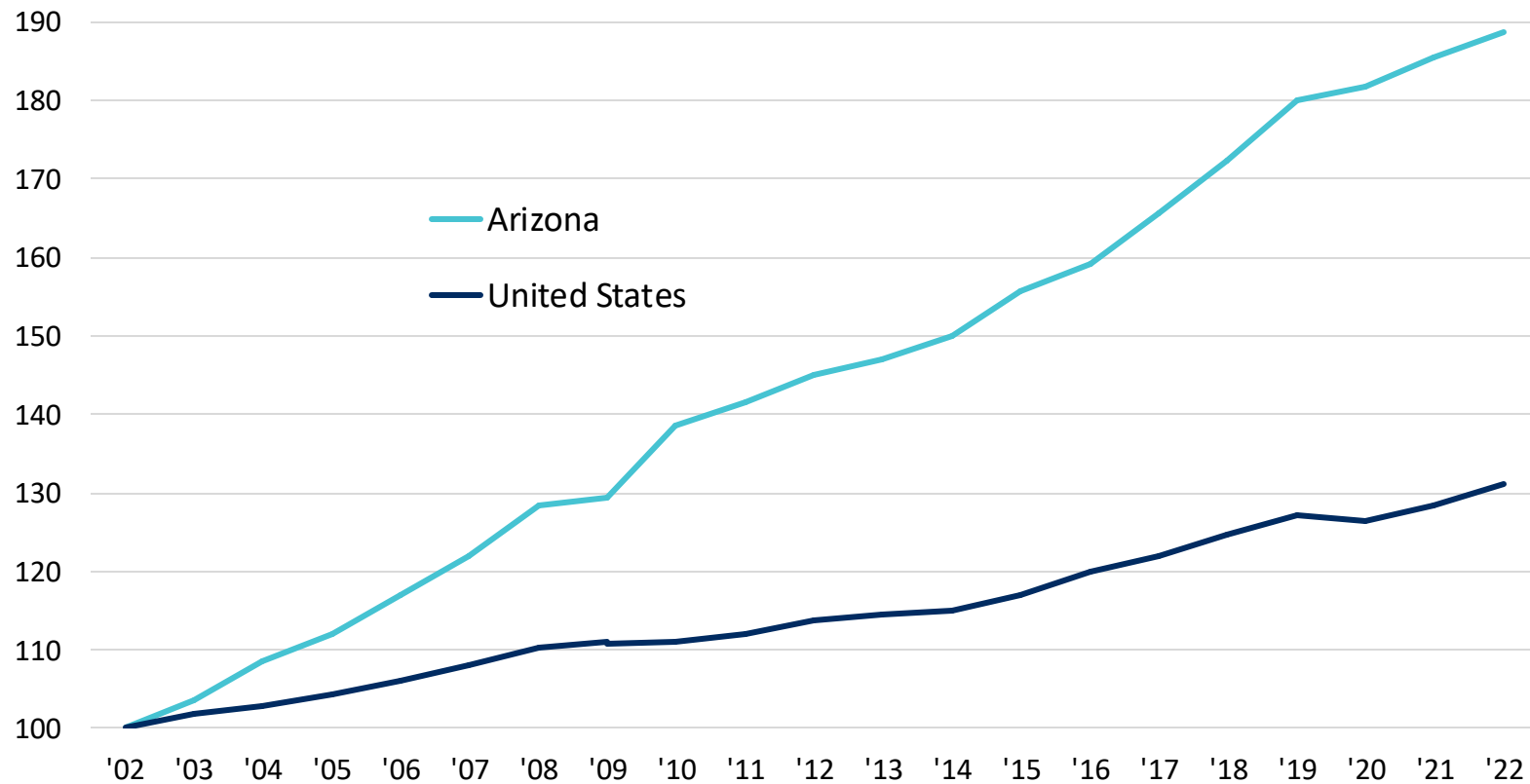


39,000 AZ Non-Hospital Biosciences Jobs



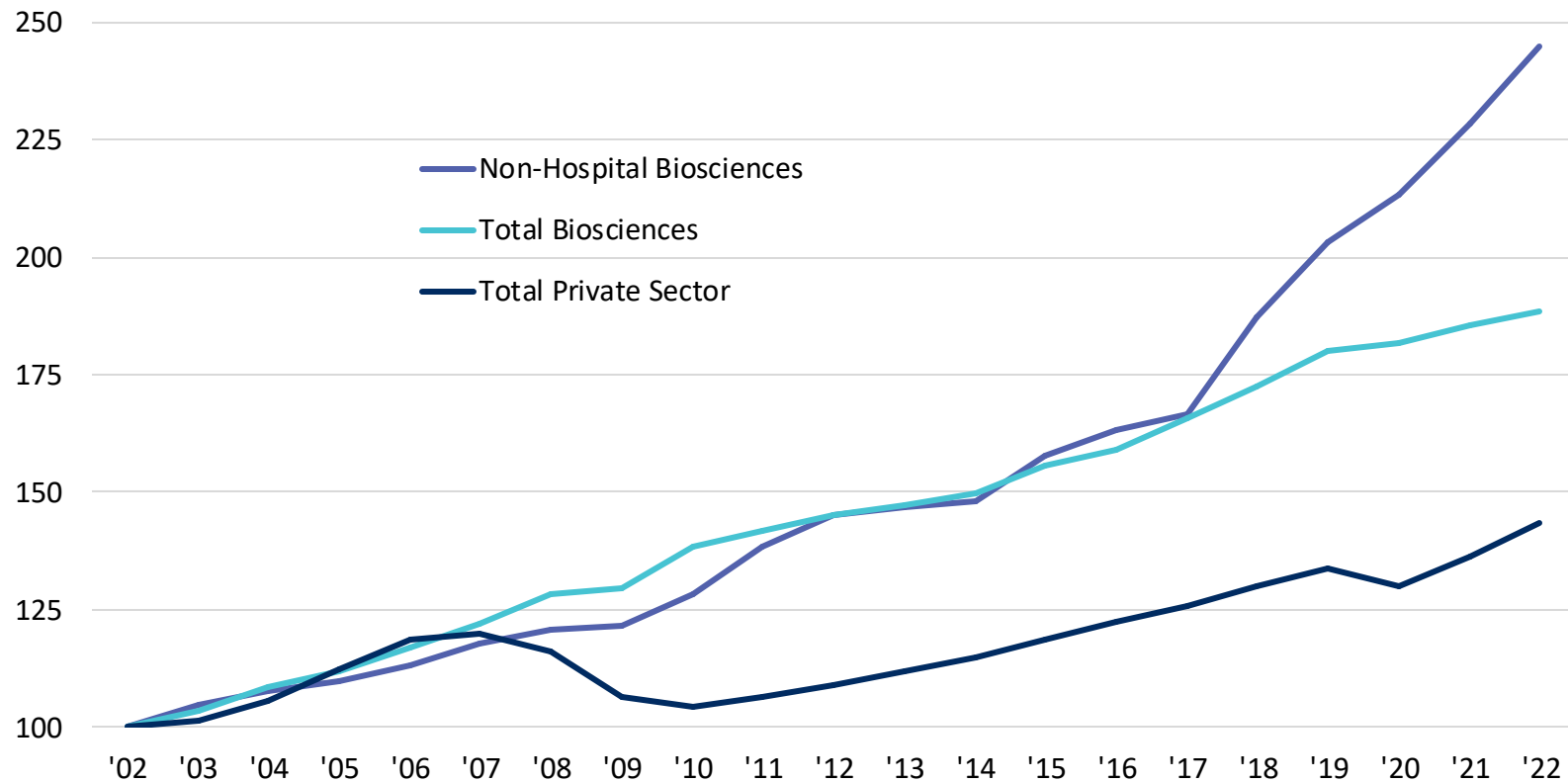
Metric: Jobs

AZ & U.S. Bioscience Industry Employment: 2002-2022



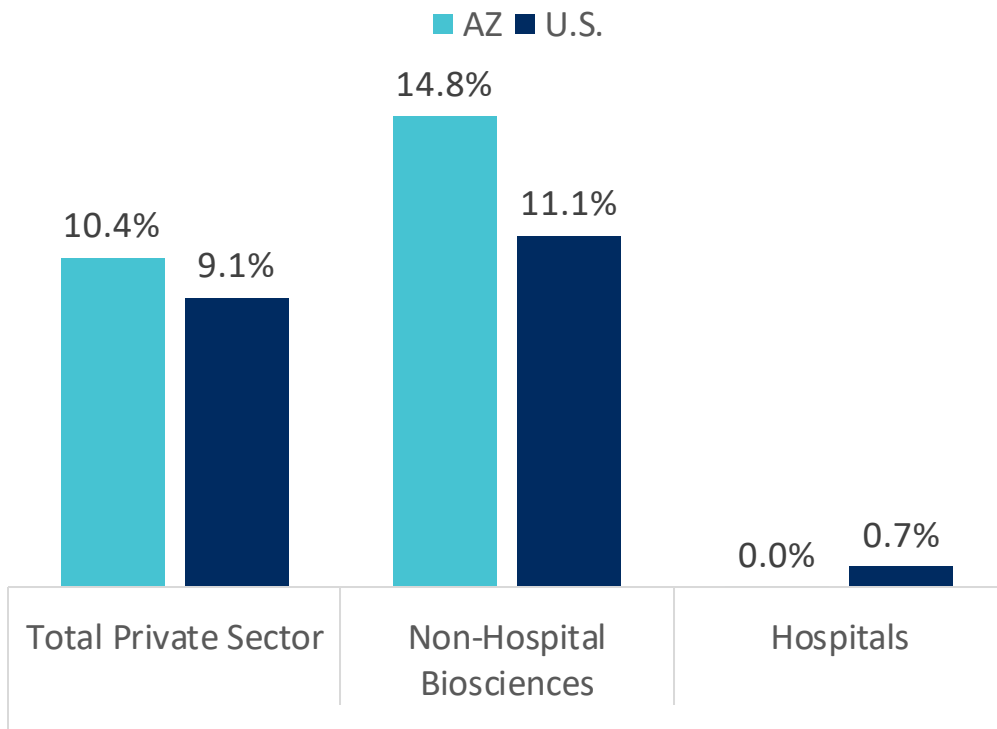
Metric: Jobs

Arizona Employment Trends: 2002-2022

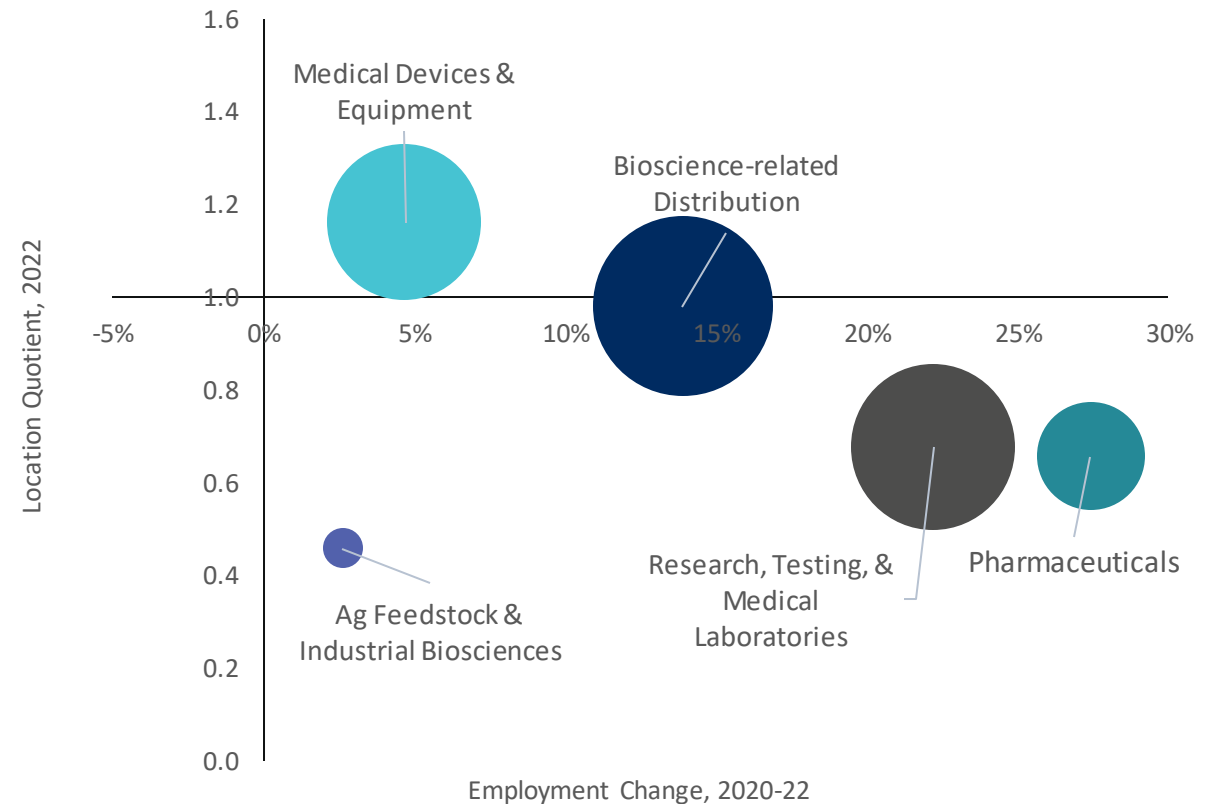


Industry Employment Growth Comparison: Recent Trends

Employment Change, 2020-22



Subsector Performance, 2020-22

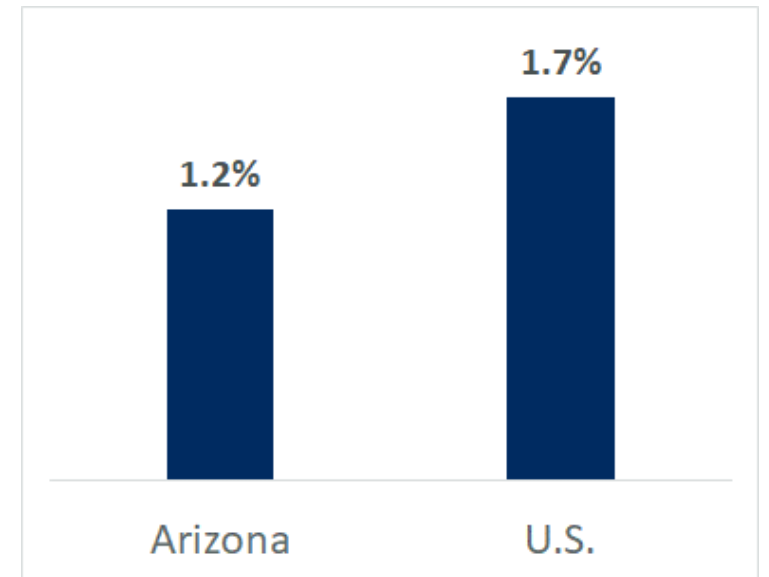


Metric: Industry Job Postings

Leading Companies, In-Demand Roles in Non-Hospital Bio Sector

- Examined latest 2 years of “unique” online job postings by Arizona Non-Hospital Bioscience companies
 - Nearly 28,000 new postings by AZ employers from March 2022 through March 2024
 - Represents 1.2% of total state job postings during this period

Bioscience Industry Share of Total Job Postings



Note: Excludes small number of agbiosciences industry job postings.

Source: TEconomy Partners' analysis of Lightcast JPA Database, 2024.1 data set.

Metric: Industry Job Postings

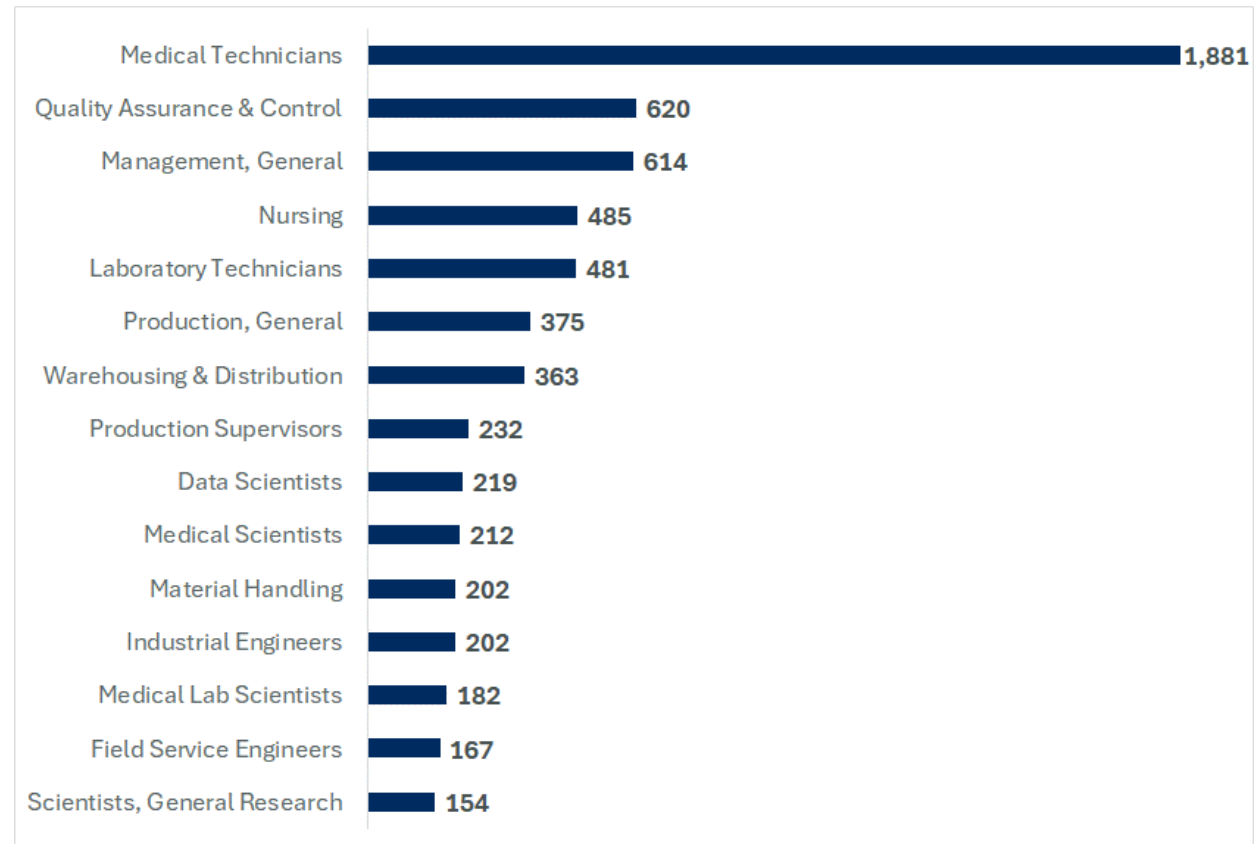
Leading Companies, In-Demand Roles in Non-Hospital Bio Sector

Who's Hiring?

*Includes those with 400+ Unique Postings
in Descending Order*

- Abbott Laboratories
- Sonora Quest
- Labcorp Drug Development
- Johnson & Johnson
- W.L. Gore & Associates
- Sonora Quest Laboratories
- Dexcom
- Caris Life Sciences
- West Pharmaceutical Services
- Roche
- Medtronic
- Icon
- Stryker
- Canon Medical Systems USA
- Takeda Pharmaceutical Co.
- IQVIA
- BD

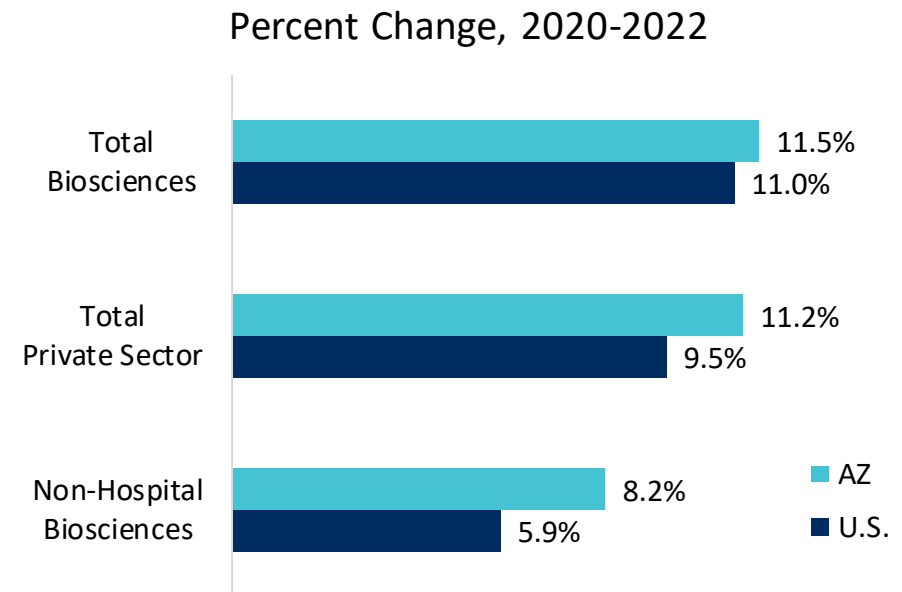
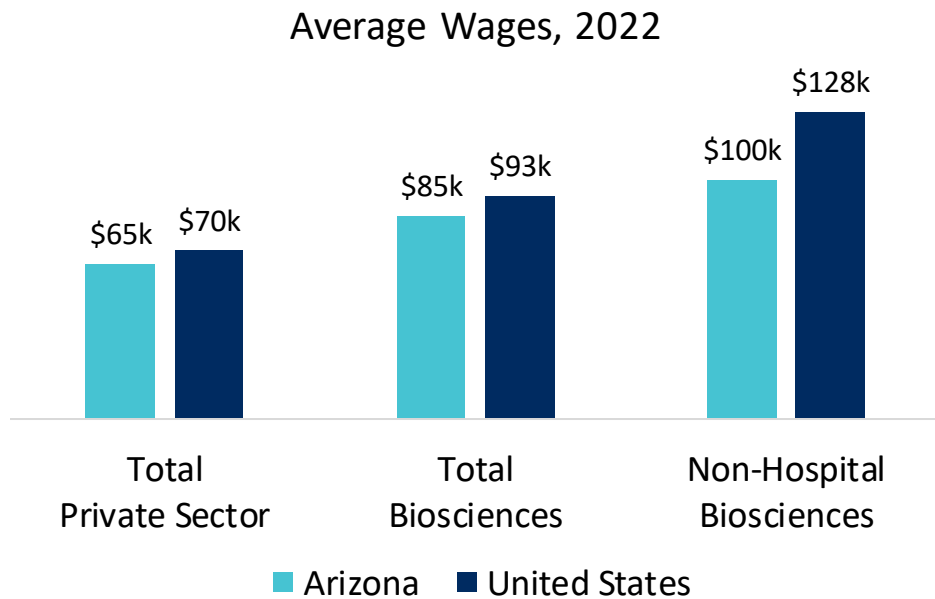
Leading Technical & Production-Related Job Titles in AZ Non-Hospitals Bioscience Industry
Job Postings, March 2022-March 2024



Note: Lightcast limits information on job titles and corresponding numbers of postings to the top 1,000, limiting the ability to provide comprehensive totals by categories.
Source: TEconomy Partners' analysis of Lightcast JPA Database, 2024.1 data set.

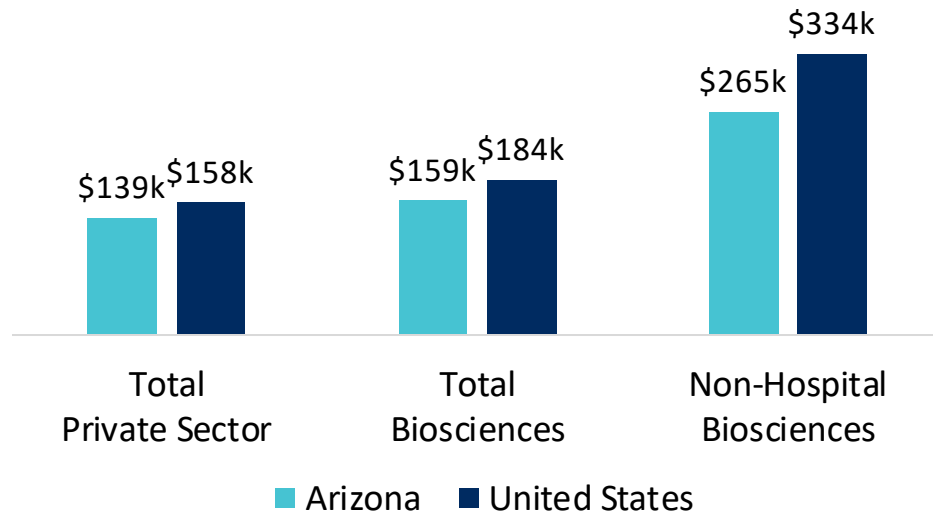
Metric: Wages

Bioscience Wages and Growth: 2020-22

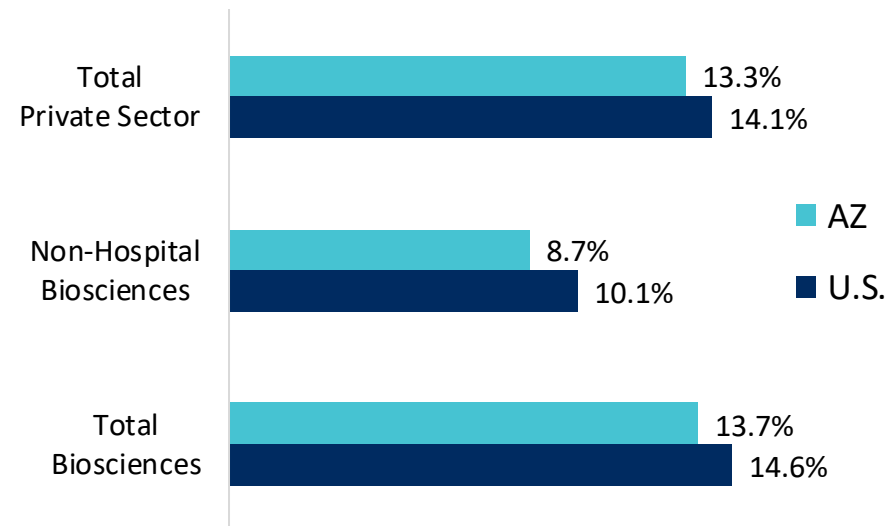


Metric: Gross Regional Product per Worker Industry Productivity Totals and Trends, 2020-22

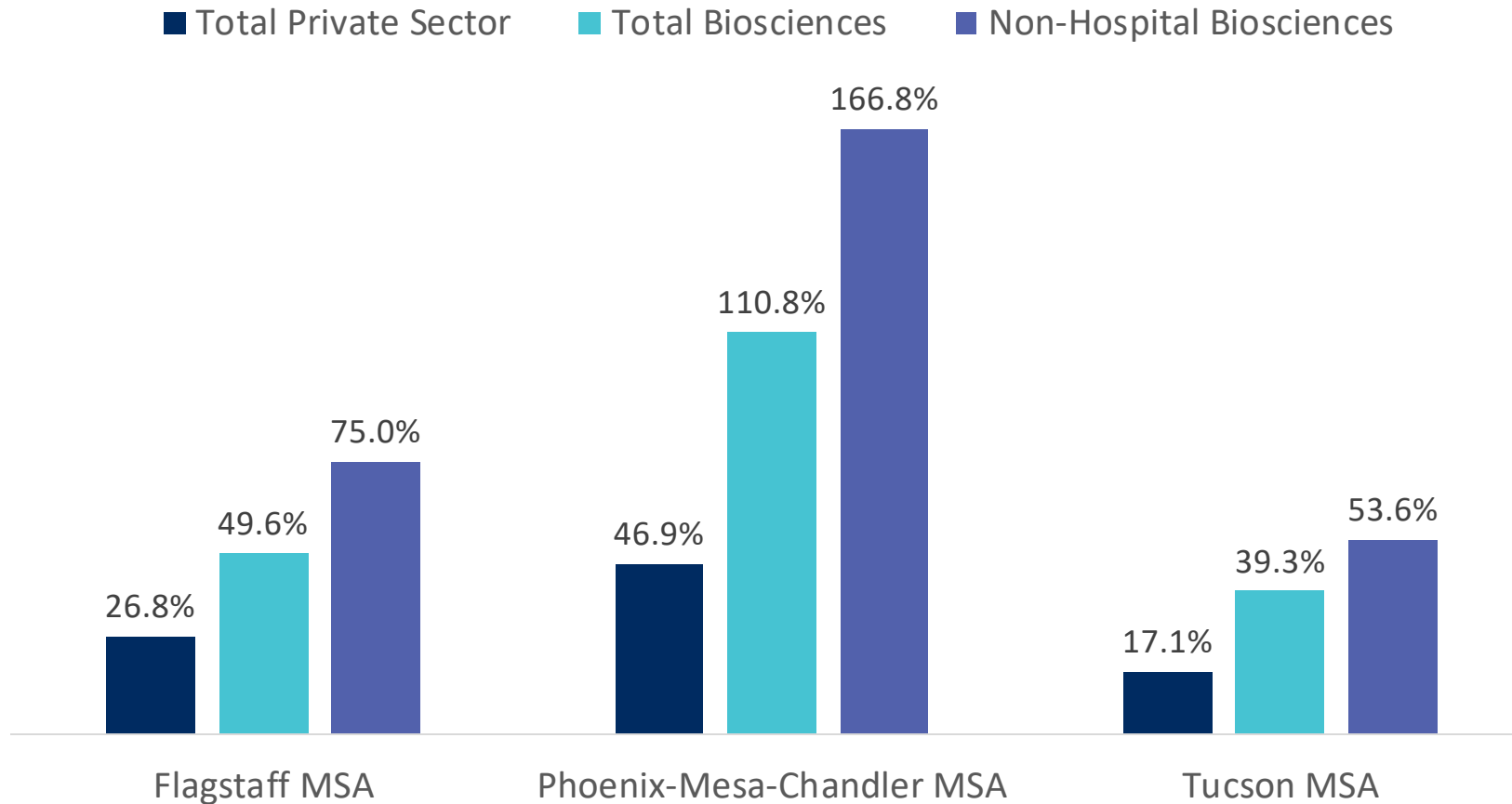
GRP per Worker, 2022



Percent Change in Productivity, 2020-2022



Regional Industry: Employment Growth, 2002-22



Bioscience Industry: Regional Strengths Based on Location Quotients

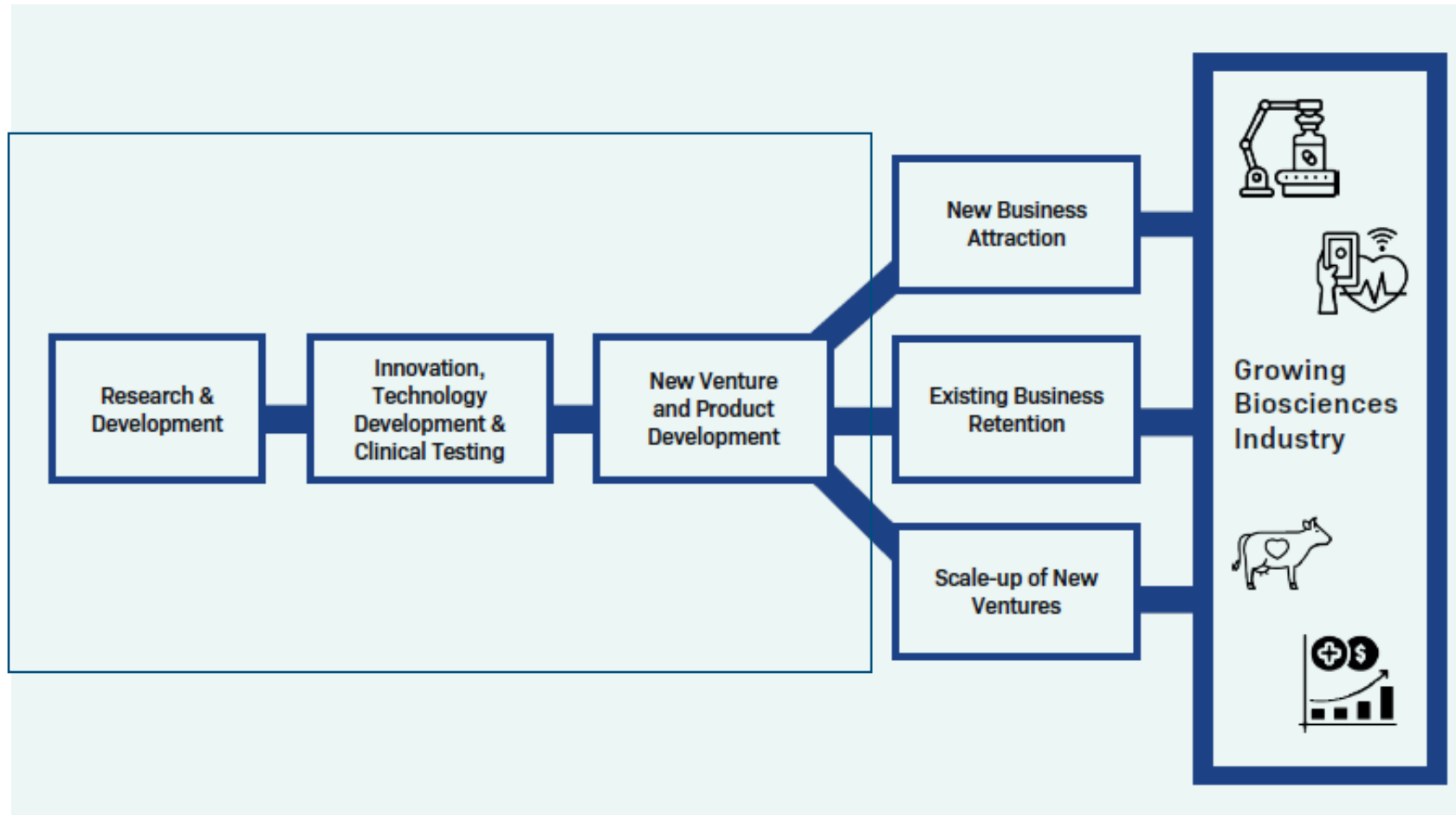
Industry Subsector	Arizona	Flagstaff MSA	Phoenix-Mesa-Chandler MSA	Tucson MSA
Agricultural Feedstock & Industrial Biosciences				
Bioscience-related Distribution			○	
Medical Devices & Equipment	○	●		●
Pharmaceuticals				
Research, Testing, & Medical Laboratories				
Hospitals		●		●
Total Biosciences		●		○

- LQ = 1.2+
- LQ = 1.0-1.2

Location Quotient (LQ) measures the concentration of industry employment in a region relative to the national average.

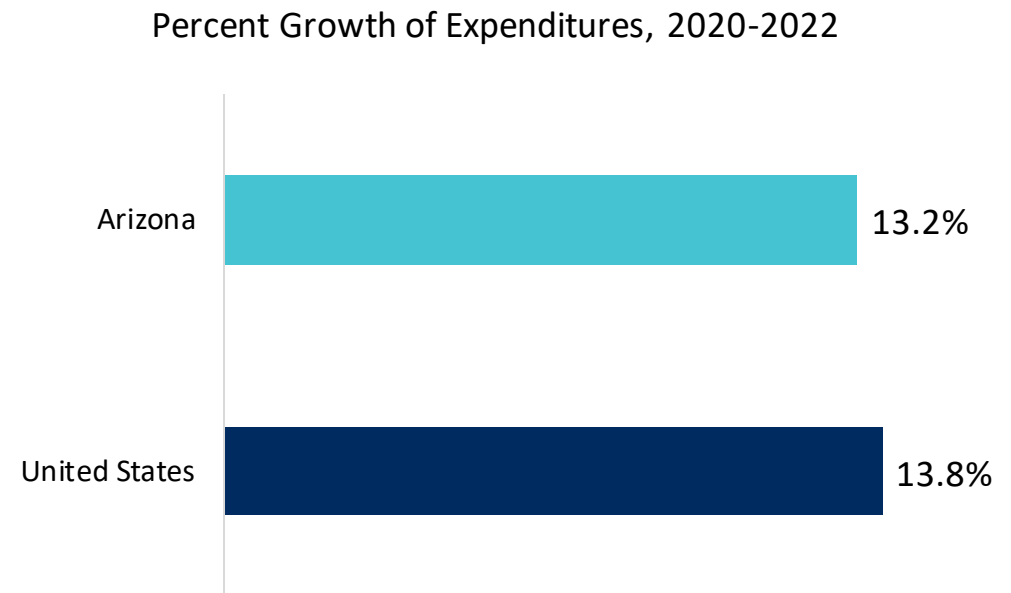
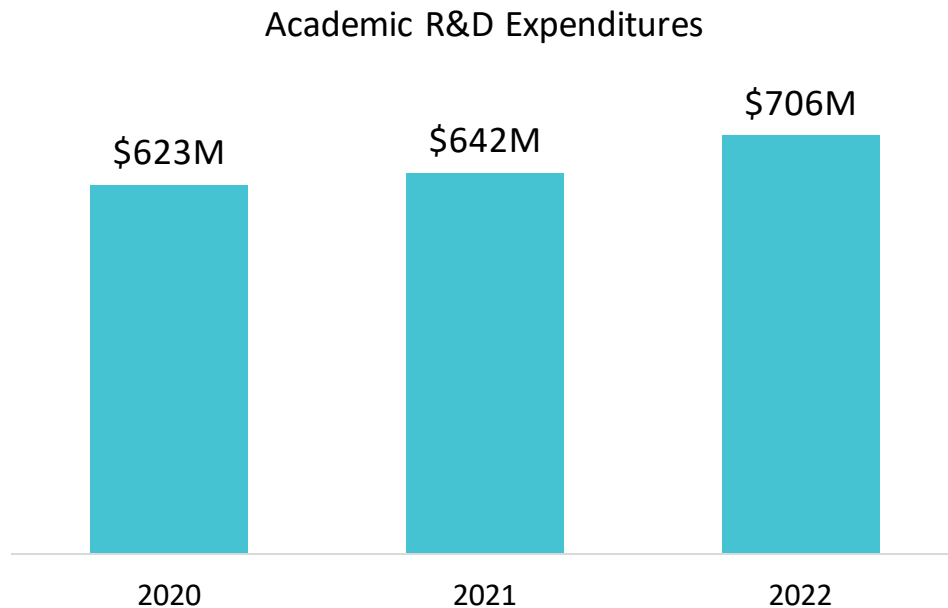
An LQ of 1.2 or greater is considered a “specialized” concentration.

The Innovation Ecosystem Enabling, Driving Bioscience Industry

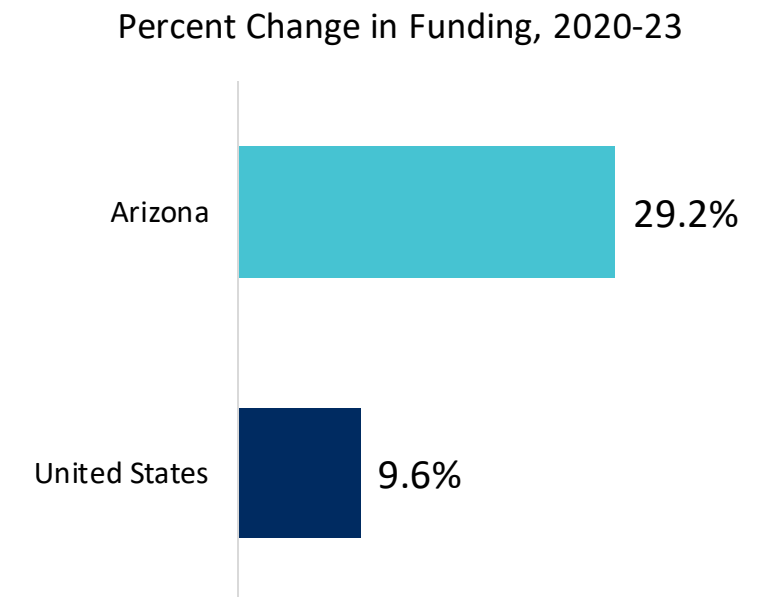
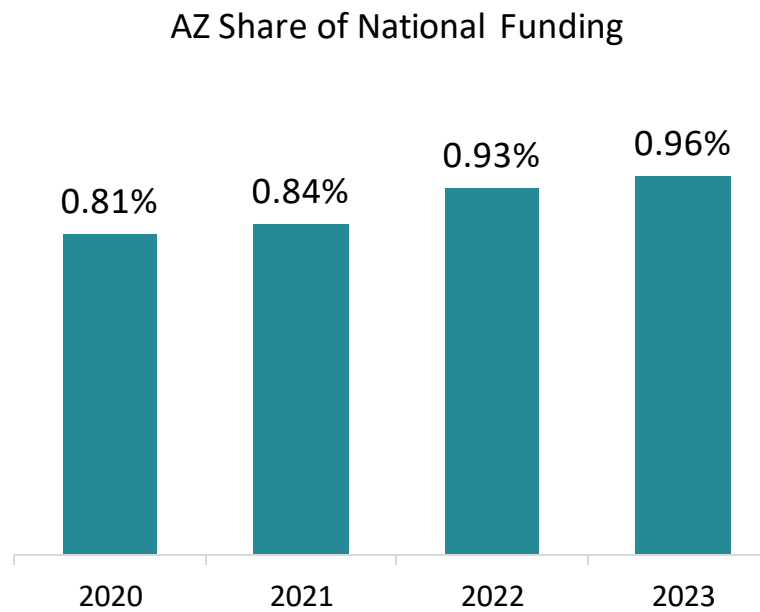
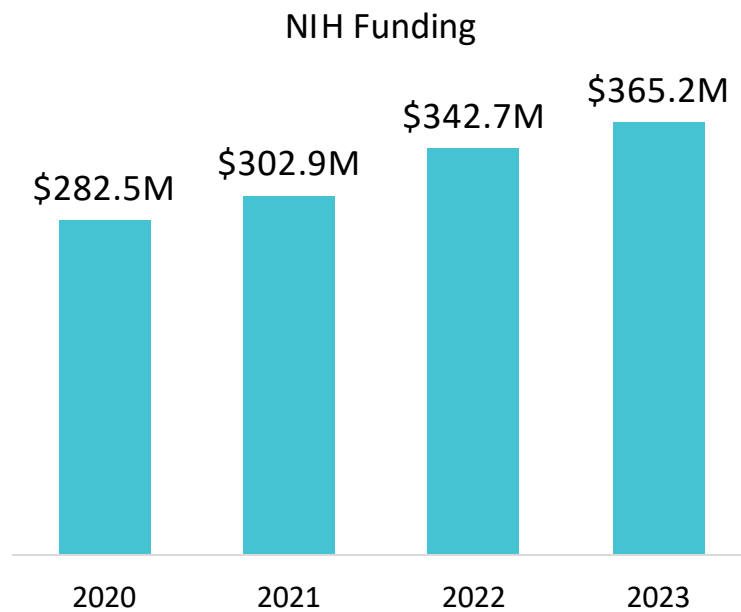


Metric: Bioscience R&D

AZ & U.S. Bioscience Academic R&D: 2020-2022

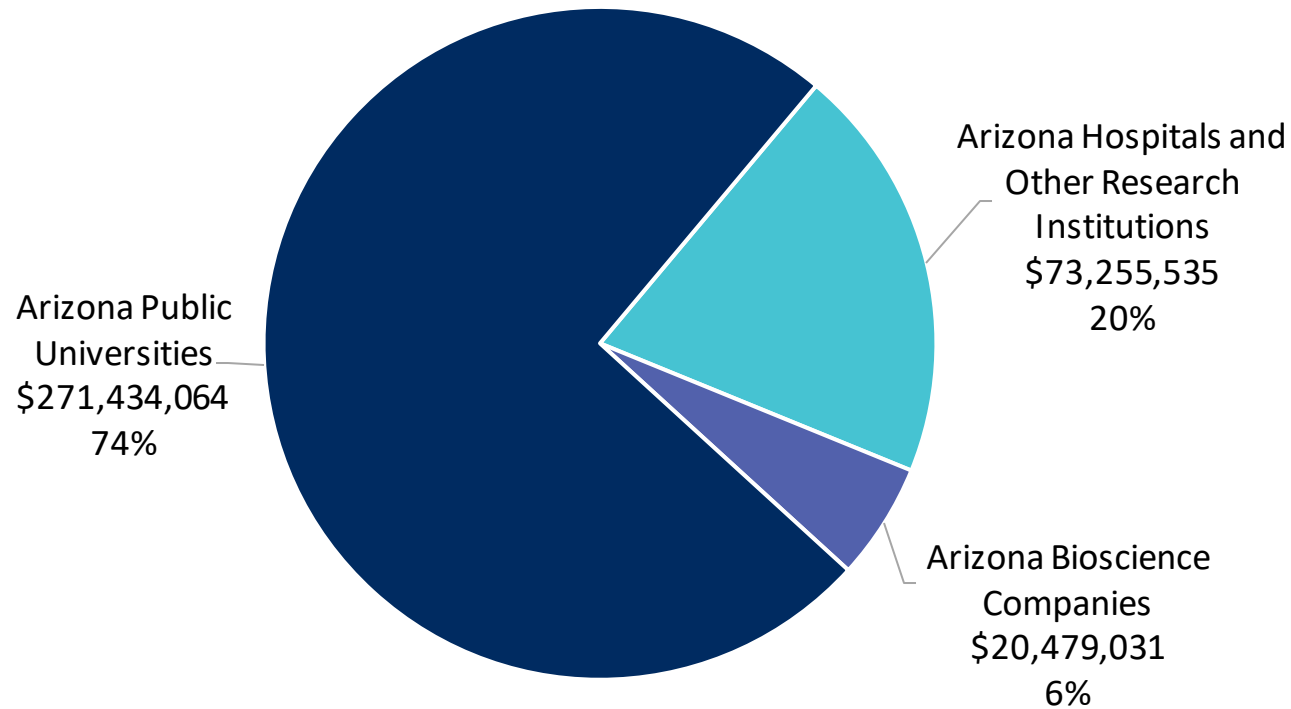


Metric: NIH Funding AZ & U.S. NIH Funding Trends



Metric: NIH Funding

AZ NIH Funding Distribution: FY 2023



Arizona's organizational makeup generally reflects the national distribution* of expenditures, where 71% of funds are granted to universities, 20% to hospitals and other research institutes, and 9% to companies

*Definitions of organization type as provided by NIH align closely, although not perfectly, with the customized designations for AZ organizations used in these analyses
Source: NIH *RePORT* database, and TEconomy Partners calculations

Metric: University Technology Transfer

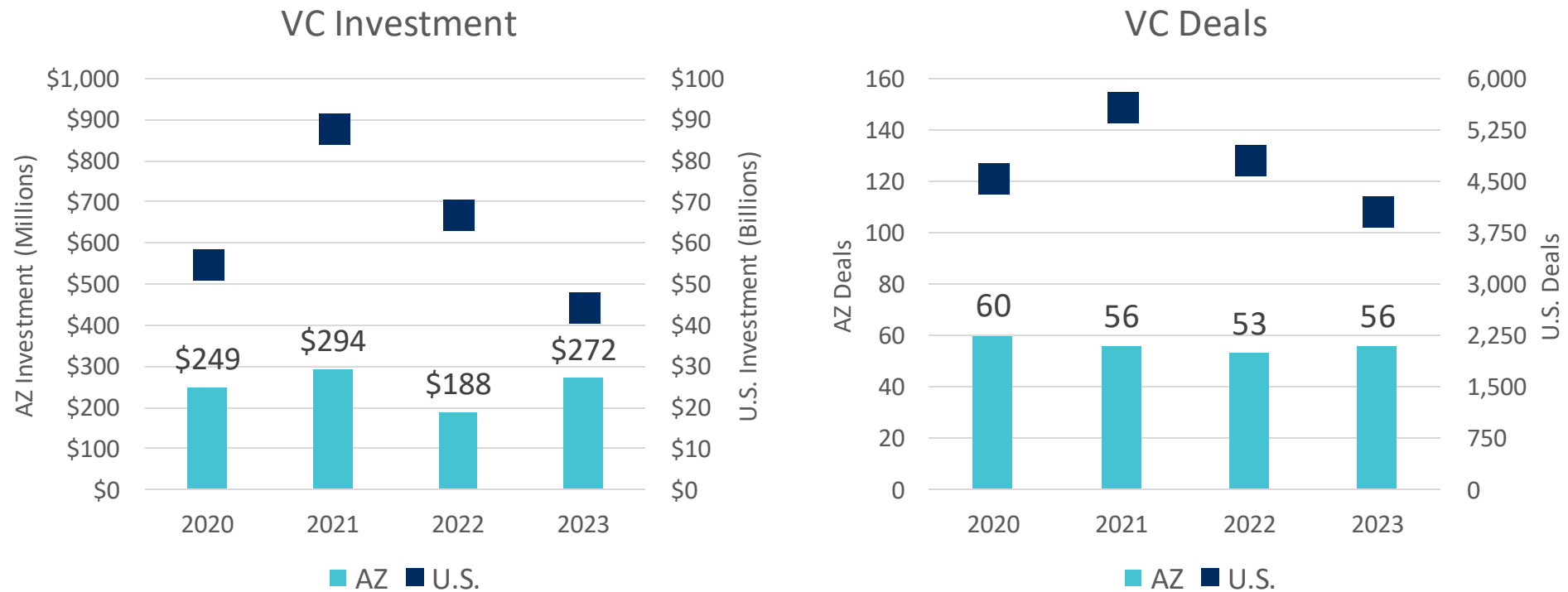
Key Tech Transfer Metrics	Total 2022-23	Change 2020-21 to 2022-23	Bio Share of Tech Transfer 2022-23
Invention Disclosures Received	548	-4%	42%
Total U.S. Patent Applications Filed	679	6%	51%
U.S. Patents Issued	253	8%	48%
Licenses & Options Executed	180	4%	48%
Adjusted Gross License Income Received	\$17.2M	29%	73%
Bioscience Startups from University IP	29	-44%	47%

Snapshot: Univ. Bio Startup Totals

Years	Totals
2022-23	29
2020-21	52
2018-19	32
2016-17	33

METRIC: VENTURE CAPITAL

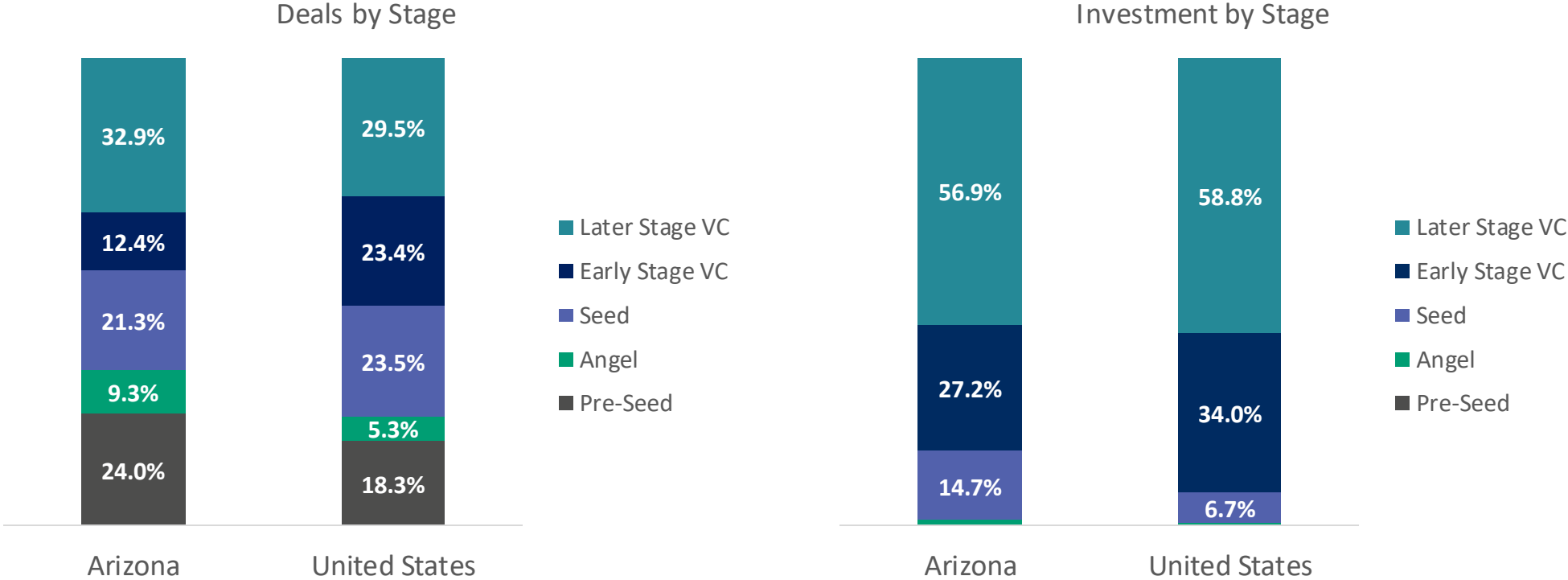
AZ & U.S. Bio Venture Capital: 2020-23



Source: PitchBook Data with TEconomy Partners Calculations

METRIC: VENTURE CAPITAL

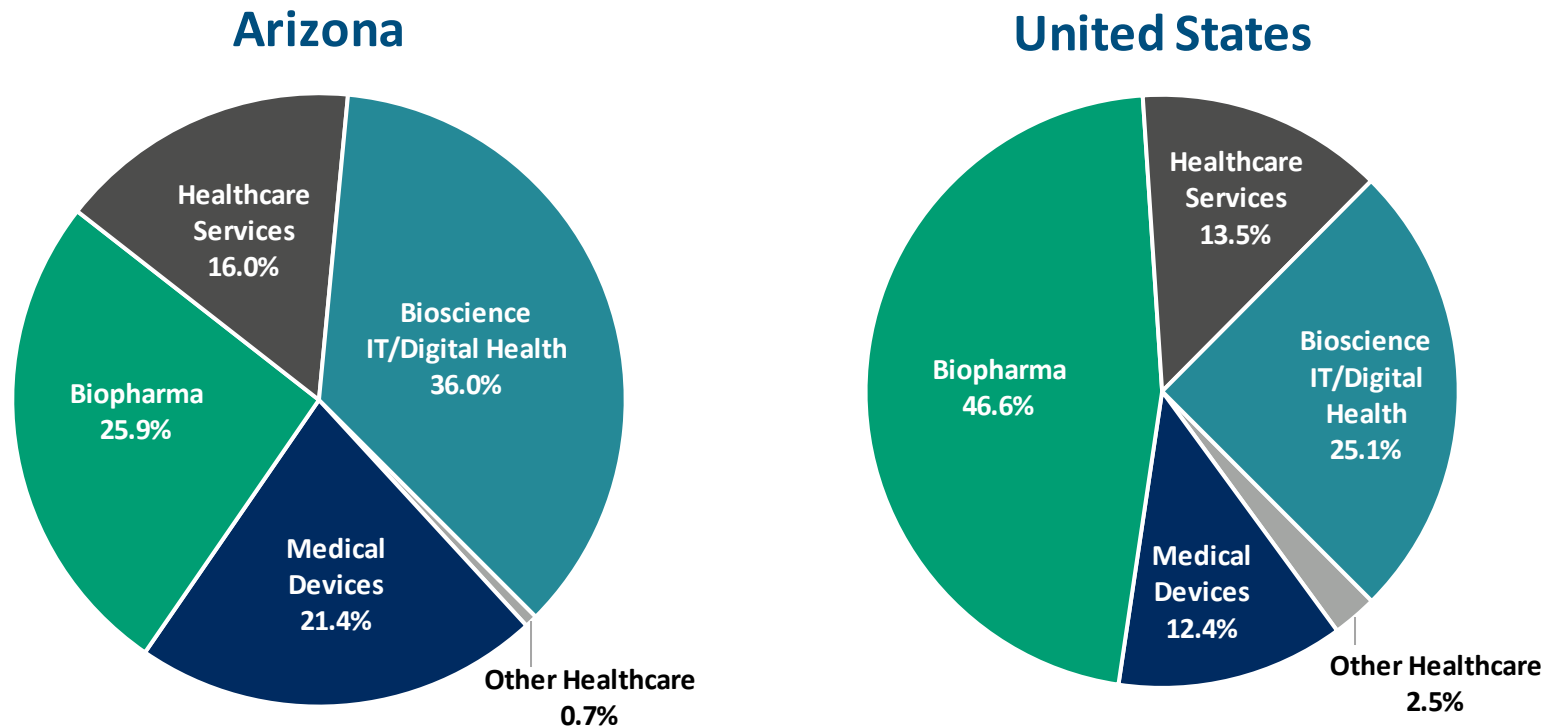
Venture Capital Deals and Investment by Stage, 2020-23



Source: PitchBook Data with TEconomy Partners Calculations

METRIC: VENTURE CAPITAL

Share of VC Investment by Bio-Related Segment, 2020-23



Source: PitchBook Data with TEconomy Partners Calculations

Summary of Bioscience Industry Metrics of Success:

Metrics	Growth in AZ Since 2020	AZ Growth Relative to U.S.
Bio Industry Job Growth	↑	↑
Bio Average Wages	↑	↔
University Bio R&D Expenditures	↑	↔
NIH Funding	↑	↑
Bio University Tech Transfer	↔	N/A
Bio Risk Capital	↑	↑

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A microscopic view of plant cells, likely from a leaf, showing a network of cell walls. The cells are illuminated with cyan and magenta light, creating a vibrant, glowing effect against a dark background. The cell walls are thin and form a complex, interconnected pattern.

BIOSCIENCES IN ARIZONA

www.flinn.org/progress

Biosciences Industry Overview

	<u>Establishments</u>		<u>Employment</u>				<u>Gross Regional Product</u>		<u>Productivity</u>	
Industry Subsector	AZ, 2022	AZ Growth, 2020-22	AZ, 2022	AZ LQ, 2022	AZ Growth, 2020-22	U.S. Growth, 2020-22	AZ, 2022 (\$ in Billions)	AZ Growth, 2020-22	AZ, 2022	AZ Growth, 2020-22
Total Biosciences	3,651	24.7%	138,409	0.91	3.8%	3.6%	\$22.021	18.0%	\$159,102	13.7%
Non-Hospital Biosciences	3,350	25.0%	39,118	0.84	14.8%	11.1%	\$10.371	24.8%	\$265,126	8.7%
Bioscience-related Distribution	2,027	16.5%	12,907	0.98	13.9%	9.4%	\$4.694	27.9%	\$363,707	12.3%
Research, Testing, & Medical Labs	986	48.8%	11,014	0.68	22.2%	16.9%	\$1.561	42.5%	\$141,729	16.6%
Medical Devices & Equipment	203	22.7%	9,805	1.16	4.7%	6.6%	\$2.645	9.1%	\$269,746	4.2%
Pharmaceuticals	117	24.1%	4,725	0.66	27.4%	9.5%	\$1.212	39.2%	\$256,506	9.3%
Ag Feedstock & Industrial Biosciences	17	-4.3%	668	0.46	2.6%	0.9%	\$0.259	6.2%	\$388,108	3.4%
Hospitals	301	21.6%	99,292	0.94	0.0%	0.7%	\$11.650	12.4%	\$117,332	12.4%
Total Private Sector	203,252	21.6%	2,689,674	1.00	10.4%	9.1%	\$373.921	25.0%	\$139,021	13.3%