MASSACHUSETTS

TEConomy/BIO

Investment, Innovation and Job Creation in a Growing U.S. Bioscience Industry 2018

Massachusetts is among the national leaders in the bioscience industry with a large, highly specialized, diverse, and rapidly growing state sector. Bioscience firms in Massachusetts have grown their employment base by 8.9 percent since 2014 or twice the national growth rate. By 2016, the industry employed nearly 94,000 across 2,567 state establishments. All five industry subsectors contributed to the overall job gains. The bioscience industry is 113 percent more concentrated in Massachusetts compared with the national average (location quotient is 2.13). The state has a specialized employment concentration in three of the five subsectors, including: research, testing and medical labs; medical devices and equipment; and drugs and pharmaceuticals. Massachusetts is among the top tier of states in every key measure of its innovation ecosystem, and it is growing in important areas including in NIH funding awards, which reached $2.7 billion in FY 2017 and in venture capital investments which grew to reach $5.2 billion in 2017.

Bioscience Performance Metrics

Summary of State Performance in Selected Bioscience-related Metrics

Metric	Massachusetts	United States	Quintile
Bioscience Industry, 2016			
Bioscience Industry Employment	93,912	1,743,639	I
Bioscience Industry Location Quotient	2.13	n/a	I
Bioscience Industry Establishments	2,567	85,702	I
Academic Bioscience R&D Expenditures, FY 2016			
Bioscience R&D ($ thousands)	$1,723,143	$41,972,205	I
Bioscience Share of Total R&D	49%	62%	IV
Bioscience R&D Per Capita	$253	$130	I
NIH Funding, FY 2017			
Funding ($ thousands)	$2,716,744	$26,150,485	I
Funding Per Capita	$396	$80	I
Bioscience Venture Capital Investments, 2014-17 ($ millions)	$15,269.52	$66,168.62	I
Bioscience and Related Patents, 2014-17	11,699	102,862	I

State ranking figures for bioscience performance metrics are calculated as quintiles, where I = top quintile, III = middle quintile, and V = bottom quintile.
For source notes, see end of State Profile.

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Industry Subsector	Massachusetts		United States	
	2016	2014–2016 Change	2016	2014–2016 Change
Agricultural Feedstock and Industrial Biosciences				
Establishments	10	-16.7%	1,709	-3.2%
Employment	173	10.1%	68,027	-1.2%
Location Quotient	0.10		n/a	
Direct-Effect Employment Multiplier	5.77			
Total Employment Impact	998			
Average Annual Wage	$66,409	4.1%	$80,961	2.7%
Bioscience-Related Distribution				
Establishments	543	4.2%	39,149	3.8%
Employment	10,895	15.7%	469,640	3.7%
Location Quotient	0.92		n/a	
Direct-Effect Employment Multiplier	2.24			
Total Employment Impact	24,372			
Average Annual Wage	$120,535	1.3%	$93,677	2.7%
Drugs and Pharmaceuticals				
Establishments	89	7.2%	3,754	13.7%
Employment	10,264	2.8%	299,113	2.0%
Location Quotient	1.35		n/a	
Direct-Effect Employment Multiplier	5.75			
Total Employment Impact	59,002			
Average Annual Wage	$123,737	-13.9%	$113,815	-3.2%
Medical Devices and Equipment				
Establishments	288	-1.0%	8,083	5.9%
Employment	21,378	2.3%	359,293	2.9%
Location Quotient	2.35		n/a	
Direct-Effect Employment Multiplier	2.87			
Total Employment Impact	61,408			
Average Annual Wage	$110,724	6.1%	$84,746	6.5%
Research, Testing and Medical Laboratories				
Establishments	1,637	15.7%	33,007	13.1%
Employment	51,202	11.9%	547,566	8.2%
Location Quotient	3.69		n/a	
Direct-Effect Employment Multiplier	2.76			
Total Employment Impact	141,571			
Average Annual Wage	$154,264	7.8%	$106,942	5.5%
Total Bioscience Industry				
Establishments	2,567	10.5%	85,702	7.7%
Employment	93,912	8.9%	1,743,639	4.4%
Location Quotient	2.13		n/a	
Direct-Effect Employment Multiplier	3.06			
Total Employment Impact	287,352			
Average Annual Wage	$136,941	4.6%	$98,961	3.1%
Total Private Sector				
Establishments	239,386	6.5%	9,243,034	3.4%
Employment	3,062,706	4.5%	120,884,570	4.2%
Average Annual Wage	$68,082	5.1%	$53,354	4.3%

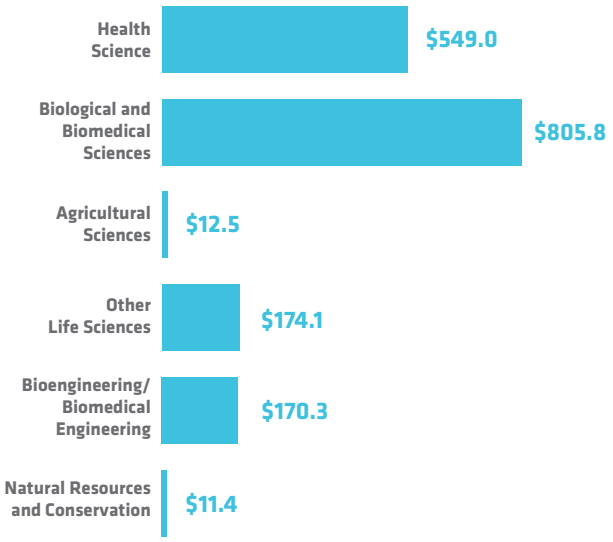
Note: U.S. employment metrics include Puerto Rico.

Bioscience Research in Massachusetts

Bioscience Academic R&D Expenditures

$ Millions

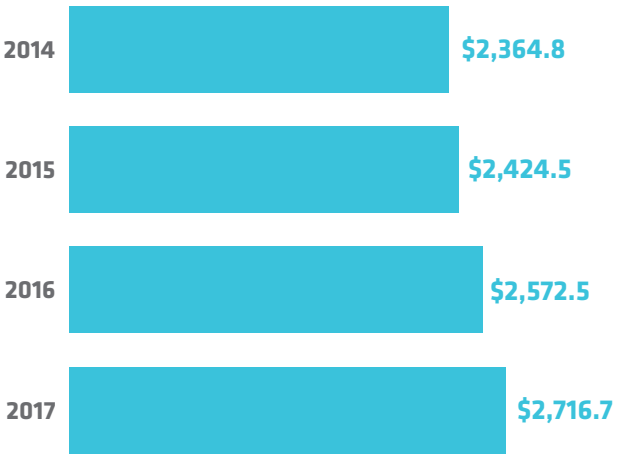
FY 2016



NIH Awards

$ Millions

FY 2014-2017

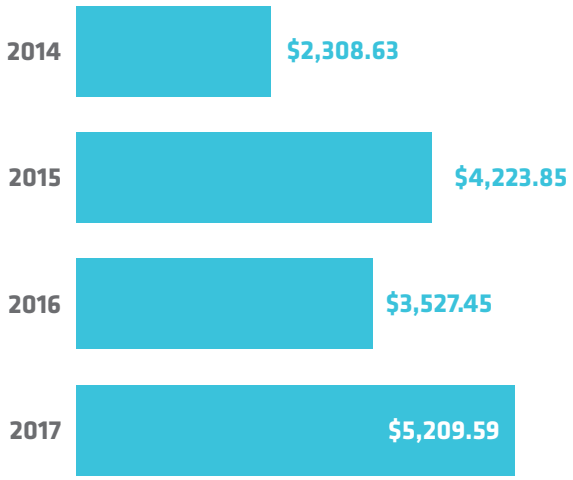


Bioscience Venture Capital in Massachusetts

Bioscience-Related Venture Capital Investments

$ Millions

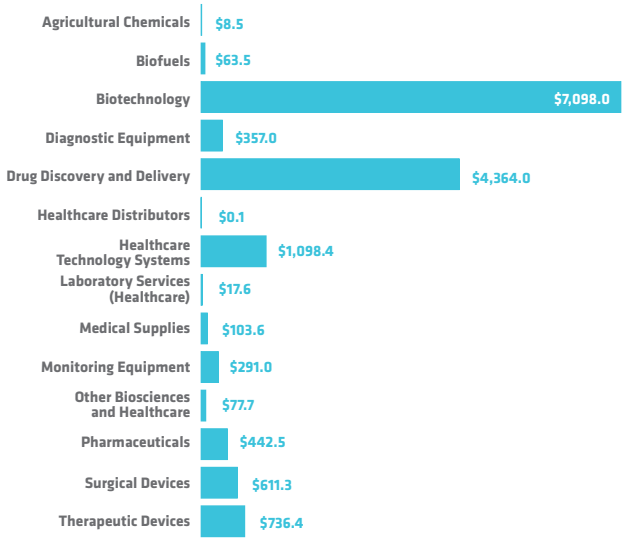
2014-2017



Bioscience-Related Venture Capital Investments by Segment

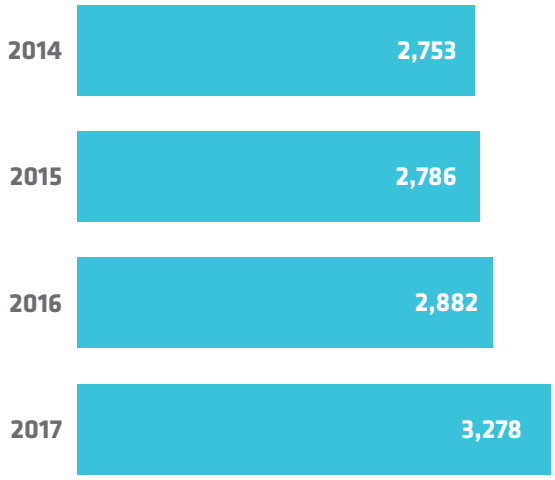
$ Millions

2014-2017

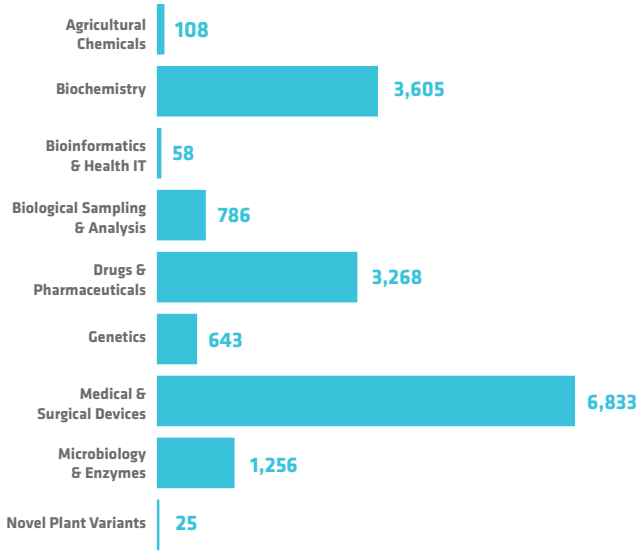


Bioscience Patents in Massachusetts

Bioscience-Related U.S. Patents
2014-2017



Bioscience-Related U.S. Patents by Segment
2014-2017



Source Notes

Employment, Establishments and Wages: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW), enhanced file from IMPLAN.

Employment Multipliers: IMPLAN state-level Input/Output models.

Academic R&D Expenditures: National Science Foundation (NSF) Higher Education Research and Development (HERD) Survey.

NIH Funding: National Institutes of Health, NIH Awards by Location & Organization (summary information within RePORT database).

Venture Capital: PitchBook Data, Inc.

Patents: U.S. Patent & Trademark Office data from Clarivate Analytics' Derwent Innovation patent analysis database.

For a more detailed discussion of the data and methodology used, please see the Appendix to the full national report.

TECONOMY PARTNERS LLC

Bio Biotechnology Innovation Organization

25 YEARS OF INNOVATION