



TEconomy/BIO

**The Value of Bioscience Innovation in Growing Jobs and Improving Quality of Life 2016**

**Massachusetts**

Massachusetts is home to a large, highly specialized, and growing bioscience industry with diverse strengths. The state is a national leader in the biosciences in industry size, concentration, and in the performance of its innovation ecosystem. Massachusetts’ bioscience industry employed more than 81,000 in 2014 across 2,227 business establishments. The state has a nearly two times greater concentration in bioscience jobs compared to the national average (location quotient is 1.95) and is considered to have a specialized employment concentration in three of the five major industry subsectors—research, testing, and medical labs; medical devices; and drugs and pharmaceuticals. Four of the five major industry subsectors have increased employment in recent years, contributing to Massachusetts’ 4.7 percent overall job growth since 2012. The state is among the top tier of states in the size and concentration of its bioscience and biomedical research complex with academic and other research institutions receiving more than \$2.4 billion in NIH funding in 2015. Massachusetts bioscience companies have received nearly \$9.5 billion in venture capital investments since 2012 and its inventors have been issued 10,777 bioscience patents over this same period. Venture capital investments in state bioscience companies have increased sharply in recent years.

**Bioscience Performance Metrics**

Summary of State Performance in Selected Bioscience-related Metrics

Metric	Massachusetts	United States	Quintile
<b>Bioscience Industry, 2014</b>			
Bioscience Industry Employment	81,495	1,655,680	I
Bioscience Industry Location Quotient	1.95	n/a	I
Bioscience Industry Establishments	2,227	77,283	I
<b>Academic Bioscience R&amp;D Expenditures, FY 2014</b>			
Bioscience R&D (\$ thousands)	\$1,515,537	\$38,873,926	I
Bioscience Share of Total R&D	47%	61%	IV
Bioscience R&D Per Capita	\$224	\$122	I
<b>NIH Funding, FY 2015</b>			
Funding (\$ thousands)	\$2,424,537	\$22,869,746	I
Funding Per Capita	\$357	\$71	I
<b>Bioscience Venture Capital Investments, 2012–15 (\$ millions)</b>	\$9,475.7	\$48,742.10	I
<b>Bioscience and Related Patents, 2012–15</b>	10,777	101,026	I

State ranking figures for bioscience performance metrics are calculated as quintiles, where:

top quintile – I II III IV V – bottom quintile

For source notes, see end of State Profile.



**Massachusetts**

Industry Subsector	Massachusetts		United States	
	2014	2012–2014 Change	2014	2012–2014 Change
<b>Agricultural Feedstock &amp; Chemical</b>				
Establishments	12	-2.9%	1,811	2.2%
Employment	187	-11.9%	77,545	1.5%
Location Quotient	0.10		n/a	
Direct-Effect Employment Multiplier	16.4		18.4	
Total Employment Impact	3,080		1,432,125	
Average Annual Wage	\$74,239	27.0%	\$80,640	6.3%
<b>Bioscience-Related Distribution</b>				
Establishments	480	0.3%	37,833	2.8%
Employment	8,499	1.6%	452,325	2.3%
Location Quotient	0.74		n/a	
Direct-Effect Employment Multiplier	3.0		3.0	
Total Employment Impact	25,358		1,358,820	
Average Annual Wage	\$115,031	11.2%	\$90,458	6.2%
<b>Drugs and Pharmaceuticals</b>				
Establishments	83	12.2%	3,301	8.0%
Employment	9,989	11.5%	293,353	3.2%
Location Quotient	1.35		n/a	
Direct-Effect Employment Multiplier	11.5		11.0	
Total Employment Impact	115,243		3,242,627	
Average Annual Wage	\$143,683	23.3%	\$117,524	10.3%
<b>Medical Devices and Equipment</b>				
Establishments	291	0.7%	7,636	5.5%
Employment	20,903	1.5%	349,045	-0.1%
Location Quotient	2.37		n/a	
Direct-Effect Employment Multiplier	4.6		4.6	
Total Employment Impact	96,087		1,596,802	
Average Annual Wage	\$104,351	3.3%	\$79,537	5.1%
<b>Research, Testing, and Medical Laboratories</b>				
Establishments	1,361	10.1%	26,702	10.2%
Employment	41,917	5.6%	483,412	3.4%
Location Quotient	3.43		n/a	
Direct-Effect Employment Multiplier	3.6		3.1	
Total Employment Impact	149,794		1,554,719	
Average Annual Wage	\$136,027	10.3%	\$97,485	6.8%
<b>Total Bioscience Industry</b>				
Establishments	2,227	6.6%	77,283	5.7%
Employment	81,495	4.7%	1,655,680	2.2%
Location Quotient	1.95		n/a	
Direct-Effect Employment Multiplier	5.3		5.5	
Total Employment Impact	435,886		9,185,094	
Average Annual Wage	\$126,509	10.6%	\$94,543	7.2%
<b>Total Private Sector</b>				
Establishments	224,833	3.7%	8,937,672	2.7%
Employment	2,929,728	3.6%	116,018,300	4.4%
Average Annual Wage	\$64,756	5.3%	\$51,148	4.3%

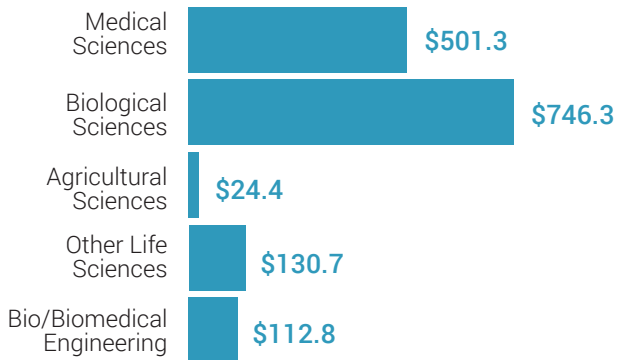
Note: U.S. employment metrics include Puerto Rico. Estimates of total impacts do not include Puerto Rico.



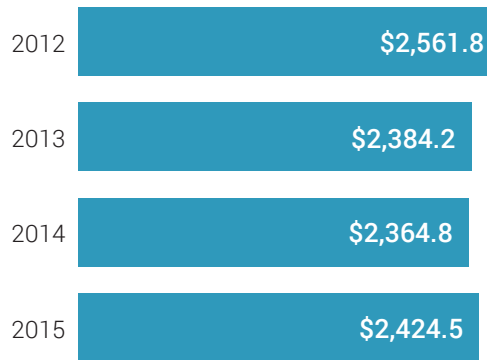
# Massachusetts

## Bioscience Research in Massachusetts

Bioscience Academic R&D Expenditures  
\$ Millions  
FY 2014

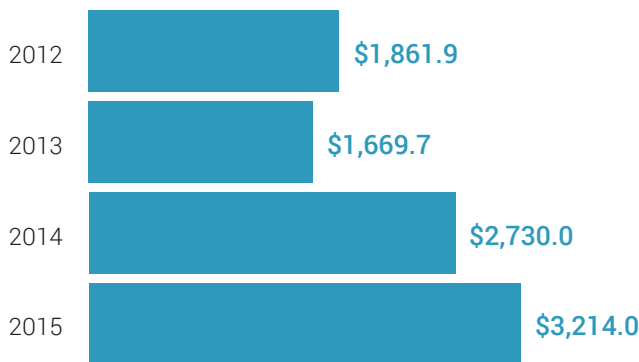


NIH Awards  
\$ Millions  
FY 2012-2015

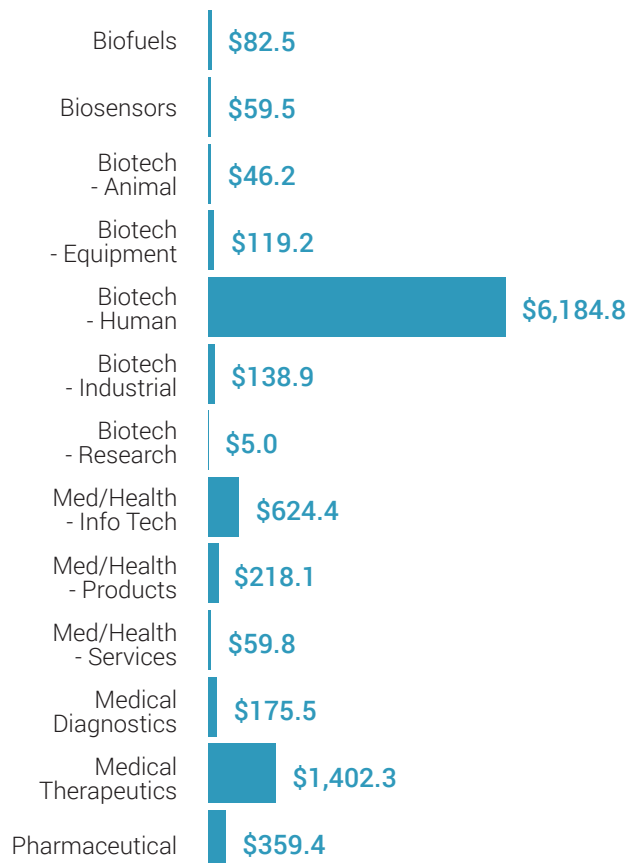


## Bioscience Venture Capital in Massachusetts

Bioscience-Related Venture Capital Investments  
\$ Millions  
2012-2015



Bioscience-Related Venture Capital Investments by Segment  
\$ Millions  
2012-2015

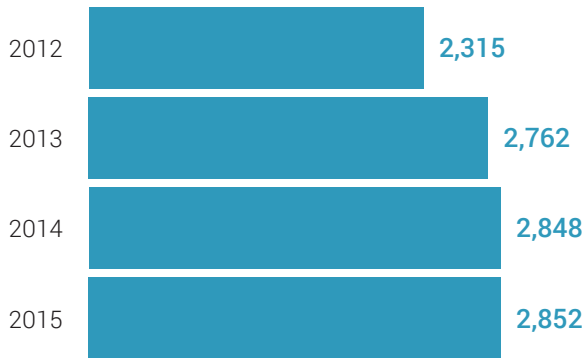




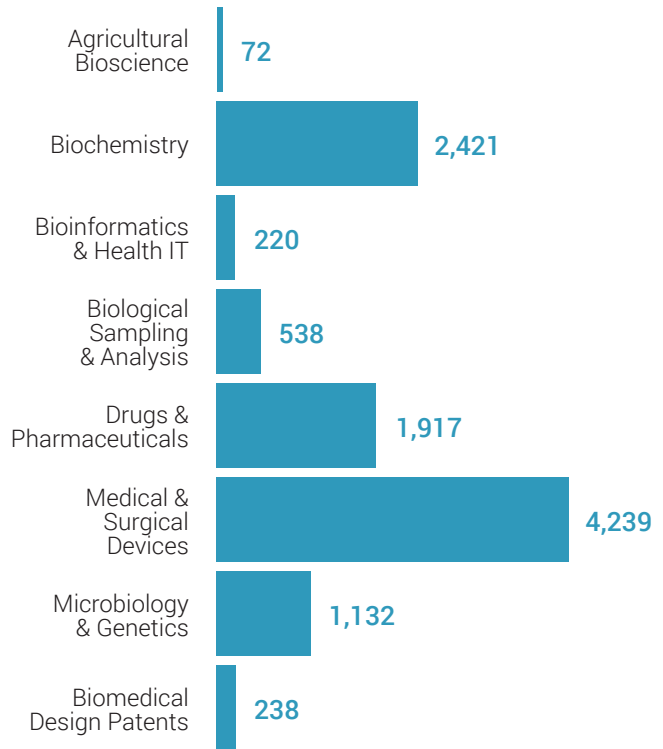
### Massachusetts

## Bioscience Patents in Massachusetts

Bioscience-Related U.S. Patents  
2012-2015



Bioscience-Related U.S. Patents by Segment  
2012-2015



### Source Notes

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

**Employment Multipliers:** IMPLAN Group, LLC 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:** Thomson Reuters Thomson ONE venture capital database.

**Patents:** U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database.

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

