

*Question & Answer Sheet
16 Bulge Road, Devens, MA*

Project Mustang

A. Contact Information

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B. Site Name and Address / Site Owner Information

Name and Address: Red Tail Heights, 16 Bulge Road, Devens, MA 01434

Owner: MassDevelopment.

Ownership Overview: MassDevelopment is an economic development agency for the Commonwealth of Massachusetts. Red Tail Heights is one of the several land offerings within MassDevelopment's larger redevelopment of the former Devens Army Base. Below is a link to the Devens community website which describes Devens in greater detail (www.devenscommunity.com).

A Devens Marketing Brochure is attached as an appendix to the Question & Answer Sheet. The Marketing Brochure describes many of the development advantages that Devens can offer to Project Mustang.

c. Site Description

Size: 25.4 acres (1,106,424 Square Feet or 10.12 Hectares)

Allowable Uses: Research & Development, Lab, Light Manufacturing, Office

Build-out Potential: The site can accommodate Project Mustang's 150,000 square foot requirement and can accommodate future expansion requirements.

Existing Building Size: Not applicable.

Past Uses: Prior to MassDevelopment's ownership, Red Tail Heights served as a multifamily housing area for the U.S. Army. All housing units have been removed and the site is clear and ready for development.

Adjacent Site Uses: The nearest commercial facility is the Red Tail Golf Club which abuts Red Tail Heights. The Red Tail Clubhouse is located approximately 0.5 miles away. Within one mile is Bristol-Meyers Squibb's Global Center for Biologics, a 1,000,000+ SF state-of-the-art biologics research and manufacturing facility. There are no retail or agricultural abutters and the closest homes are approximately 0.5 miles away.

Site Overview: Red Tail Heights is a commercial land development parcel that is mostly cleared and flat and can accommodate up to 250,000 square feet in a single-story manufacturing building. All utilities are present at the site. Red Tail Heights is located adjacent to the Red Tail Golf Course, which is one of the premier 18-hole golf courses in Massachusetts. In addition to Red Tail Golf Course, Devens is home to numerous restaurants, hotels, 100+ business, and accommodates over 6,000 employees on a daily basis.

An information sheet for Red Tail Heights and a conceptual site plan have been attached as appendixes to the Question & Answer Sheet.

Proximity to Cities/Towns, Highways, Airports, etc.: Red Tail Heights is located approximately two miles away from Route 2, an east-west four-lane highway that provides access directly into Cambridge, Massachusetts. The site is also located approximately five miles away from Interstate-190, seven miles away from Interstate-495, and 15 miles away from Interstate-95. Devens is

G. Existing Site Analysis and Studies

Red Tail Heights is subject to an Activities and Use Limitation which accommodates commercial and industrial uses. MassDevelopment will provide any available site analysis and studies should Project Mustang elect to pursue its project at Devens. An overview of existing site documentation is below:

Survey: A survey has not been prepared for Red Tail Heights.

Environmental Assessment: Red Tail Heights is subject to an Activities and Use Limitation that accommodates commercial and industrial uses.

Geotechnical Soil Survey: No geotechnical soil survey has been completed at Red Tail Heights.

Flood Plain and Wetlands Impact on the Site: Red Tail Heights is in a minimal flood plain area and it does not have any wetlands.

Historical Use and Archaeological Studies of the Site: Red Tail Heights was a multifamily residential area for the US Army. The site has no known historical significance warranting archeological study.

Endangered or Rare Species on or Near the Site: The site falls within a Massachusetts Fish and Wildlife Department estimated priority habitat, which will require project consultation with the department.

Traffic Flow Impacting the Site: Access to Red Tail Heights is from Bulge Road, a two-lane road that is shared with an access road to Red Tail Golf Club.

H. Education and Industry Infrastructure

Local and Regional Industry

Devens is home to over 100 companies and 6,000 employees. It is ideally located at a cross-roads of large employment bases of both blue-collar and white-collar employees. Over the past five years, Greater Boston recorded the largest employment growth out of the top life science clusters in the United States. Life science job growth outpaced overall job growth at a clip of nearly four-to-one last year. Research and development jobs continue to be the main driver, increasing by more than nine percent year-over-year for the second consecutive year as Boston remains a powerhouse in drug discovery.

Despite the tight labor market, the local ecosystem of world class universities and hospitals provides a steady pipeline of research scientists for the local life science market to continue its robust growth.

Figure 1: Greater Boston Life Science Scorecard

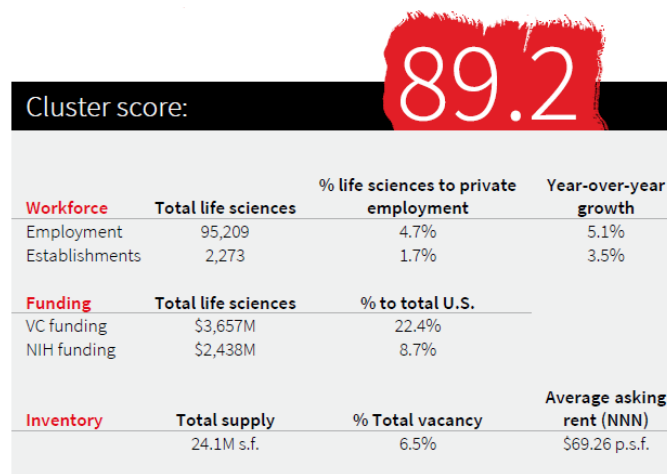
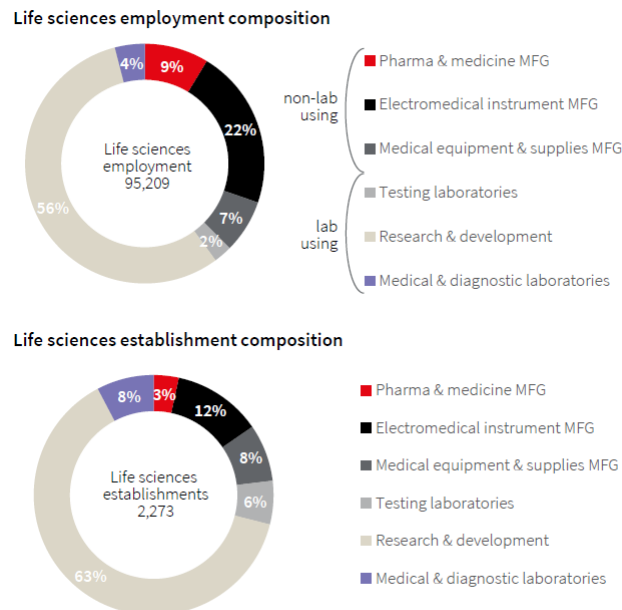


Figure 2: Greater Boston Life Science Employment Breakdown



There are many schools in close proximity to Devens with programs specific to the interests of biologics/gene therapy companies including the following:

- Harvard University
- MIT
- Boston University
- Worcester Polytechnic Institute
- Northeastern University
- Boston College
- Tufts University
- UMass Amherst
- UMass Lowell
- Brandeis University

Of particular interest to area life science companies is Mount Wachusett Community College's (MWCC's) Biotechnology/Biomanufacturing degree and certificate programs which are offered at MWCC's Devens campus. These programs have received a gold endorsement from the Massachusetts Life Sciences Education Consortium (MLSEC). The MLSEC is an initiative convened by MassBio and the MassBioEd Foundation to facilitate partnerships between the life sciences industry and higher education in order to more effectively match graduating students with the jobs companies seek to fill. MWCC has proven to be an excellent job training partner for Bristol-Meyers Squibb and other Devens life science companies. MassDevelopment can arrange a meeting with MWCC to see how these programs can benefit Project Mustang.

MassBio's 2019 Industry Snapshot, a report enumerating the Boston area's top standing in the field of life sciences, is attached as an appendix.

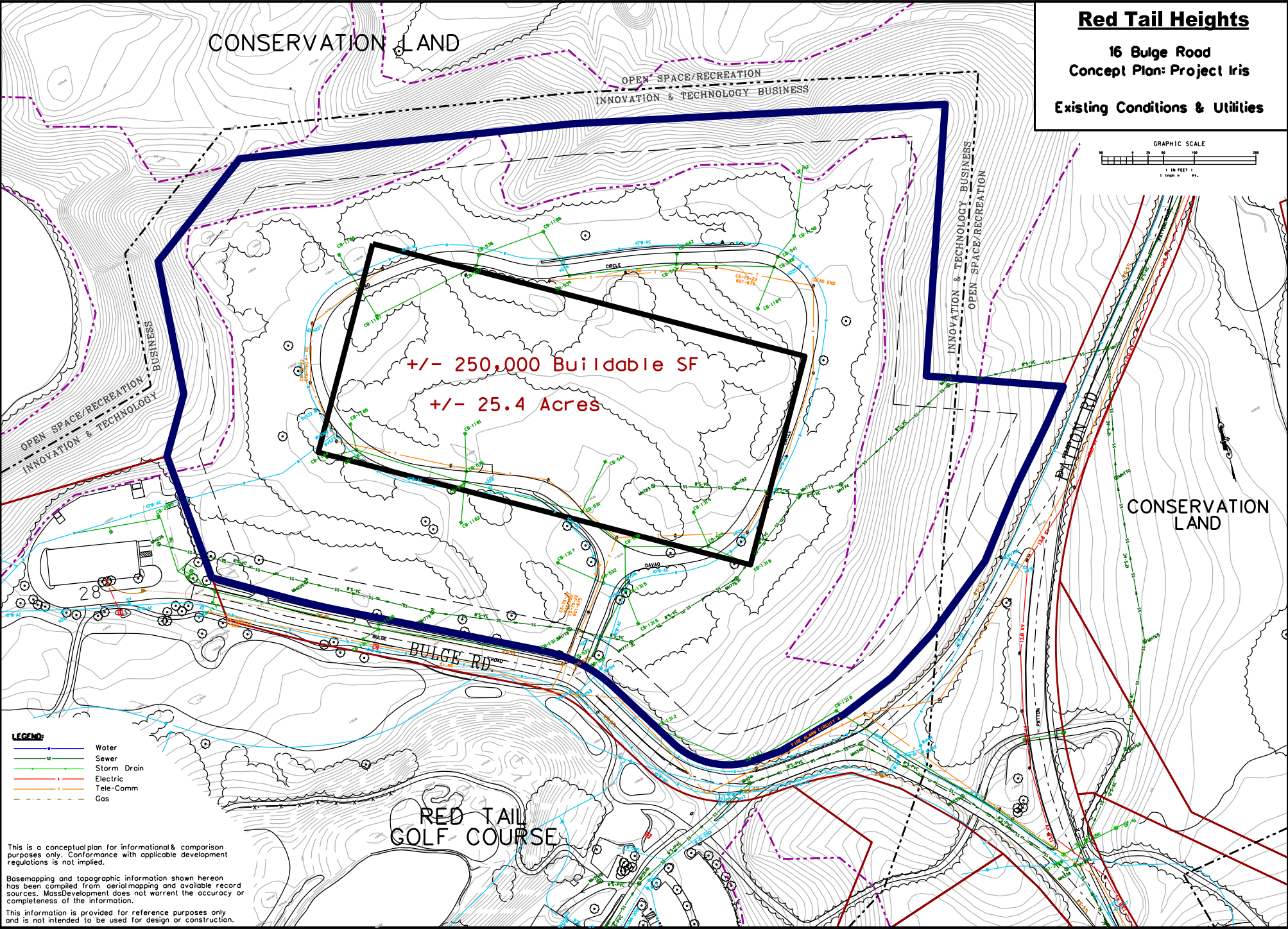
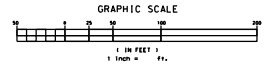
Appendices

1. 16 Bulge Road Conceptual Site Plan
2. 16 Bulge Road Information Sheet
3. Devens Marketing Brochure
4. MassBio's 2019 Industry Snapshot

Red Tail Heights

16 Bulge Road Concept Plan: Project Iris

Existing Conditions & Utilities



- LEGEND:**
- Water
 - Sewer
 - Storm Drain
 - Electric
 - Tele-Comm
 - - - Gas

This is a conceptual plan for informational & comparison purposes only. Conformance with applicable development regulations is not implied.

Basemapping and topographic information shown herein has been compiled from aerial mapping and available record sources. MassDevelopment does not warrant the accuracy or completeness of the information.

This information is provided for reference purposes only and is not intended to be used for design or construction.

Why Devens?

The transformation of the former 4,400-acre military base into a state-of-the art business community presents unique opportunities for companies:

**Cost-Saving
Development & Operations**

- Competitively priced land
- Commercial infrastructure including
 - Competitive utility rates
 - No personal property tax

One-Stop Permitting

- 75-day maximum
- Single regulatory authority for all local permits

**Assistance with Financing
Options & Tax Incentives**

- Predevelopment assistance
- Loans and loan guarantees
- Tax-exempt financing

Workforce Friendly

- 1000+ acres of open recreation space
 - 18-Hole Red Tail Golf Club
 - Mirror Lake & Waterfront Beach
 - Hiking, biking, walking, and running trails
- Hotels and conference center
- Restaurants and services



Red Tail Heights is beautifully situated in Devens with elevated views of the Red Tail Golf Club; nearby walking trails exist around Mirror Lake; and is close to downtown hotels, restaurants, and other amenities. The site presents an ideal build-to-suit for corporate needs.

Property Type:

- R&D
- Lab
- Light manufacturing

Size:

- 25 acres

Description:

- Level, cleared lot
- Abuts Red Tail Golf Club
- Located two miles from Route 2
- Can accommodate a building(s) of up to 250,000 SF

Utilities:

- Sewer
- Water
- Electric
- Natural gas
- Telephone

Property Notes:

- Overlooks Red Tail Golf Club's 18th fairway and clubhouse
- Just 35 miles west of Boston
- Surrounding Devens community has been carefully planned to create a unique pro-business environment
- Diverse, highly skilled workforce
- Workforce housing/excellent schools

Join Leading-Edge Companies in Devens

- Bio-Techne
- Bristol-Myers Squibb
- Johnson Matthey Fine Chemicals
- Laddawn
- Jabil/Nypro Healthcare
- Quiet 3PF
- Response Microwave
- SMC Limited
- Waiteco Machine

DEVENS



M A S S A C H U S E T T S



THE PLACE TO GROW YOUR BUSINESS



DEVENSBUSINESS.COM

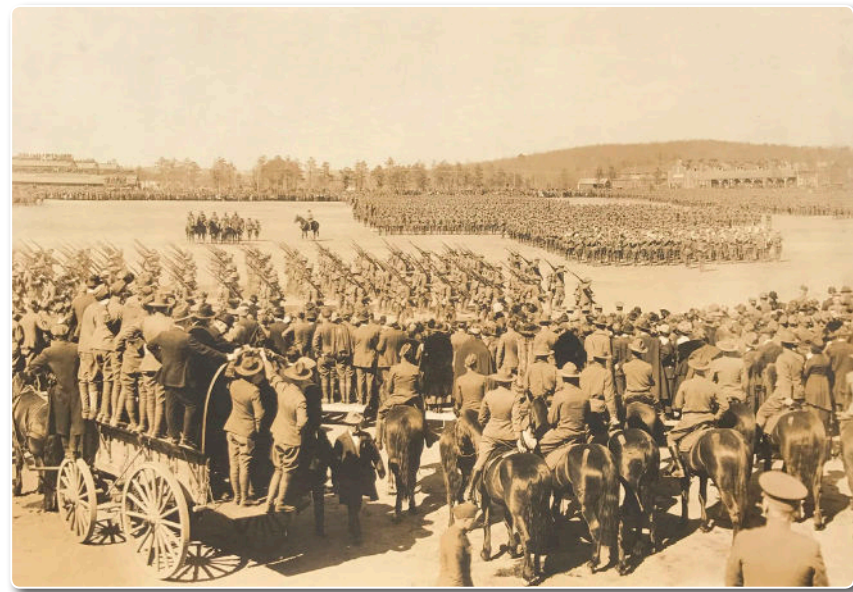
DEVENS

MASSACHUSETTS

CHOOSE DEVENS

Devens, Massachusetts is a world-class destination for companies seeking a flexible and affordable environment built for growth. The 4,400-acre community features more than 100 businesses and organizations that collectively employ over 5,000 workers. Devens is located near Boston and Worcester with convenient access to Route 2 and Interstate 495. The community is now linked to the MBTA Commuter Rail by a daily, regional shuttle service.

Devens is a nationally-recognized model for military base reuse. In just two decades, Devens has evolved into a hub of economic activity featuring innovative businesses and a robust community that contributes \$2.5 billion to the Massachusetts economy each year.



Final Review of the 26th Division, Camp Devens, 1919

Welcome
to



DEVENS
MASSACHUSETTS

CELEBRATING
100 YEARS
1917 - 2017

The Devens Grill



KEY BENEFITS



Shovel-ready sites with quick and efficient 75-day or less permitting.



Prime accessibility and a highly-skilled workforce.



Financing capabilities that can help your company from predevelopment through construction and fit-up.



New shuttle service connecting Devens to MBTA Commuter Rail and surrounding towns.



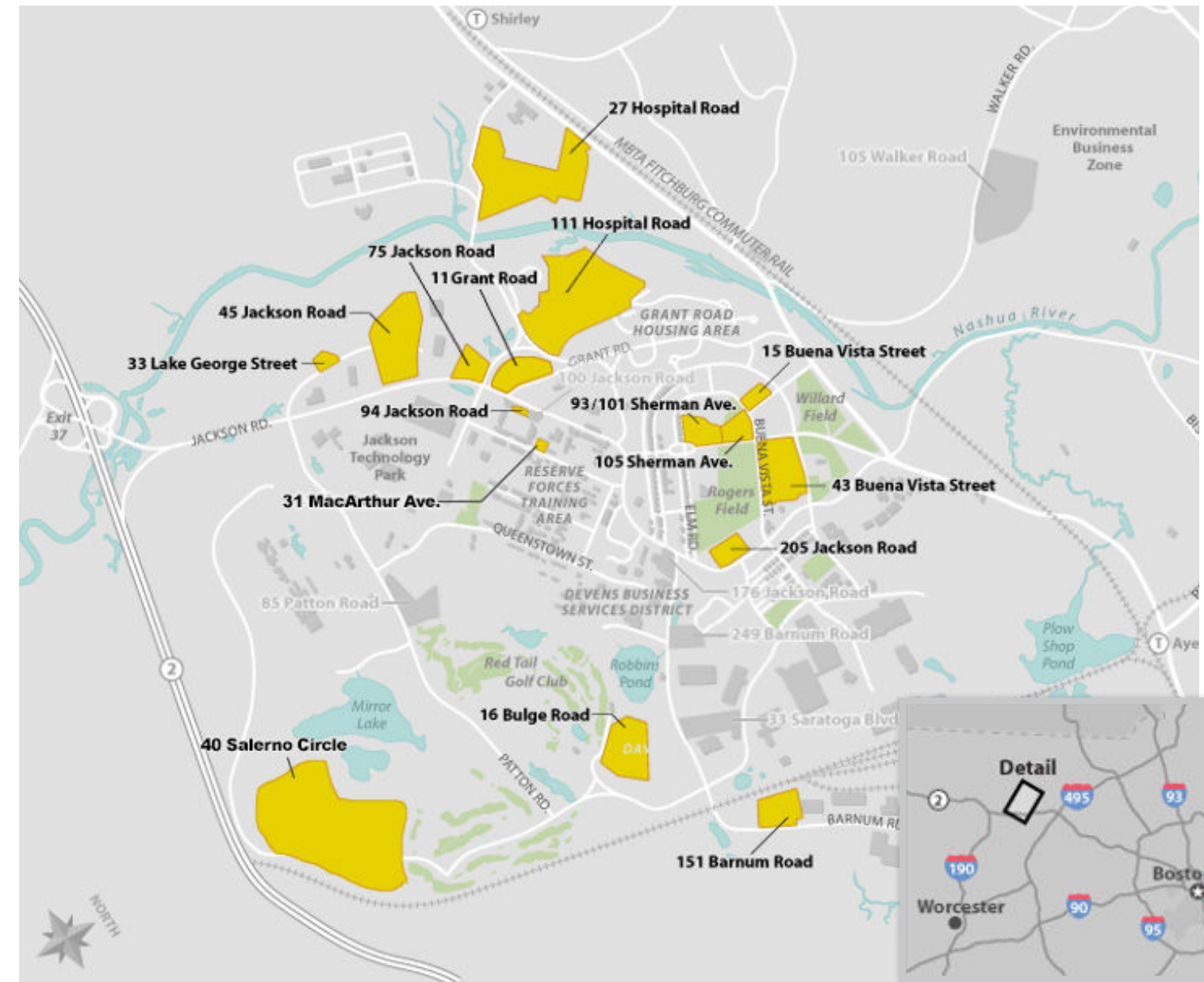
High capacity utilities and competitive tax rates.



DEVELOPMENT OPPORTUNITIES RANGING FROM 10,000 – 1.2 MILLION SQ FT

ADDRESS	ZONING	APPROXIMATE ACRES	ALLOWED FAR
31 MacArthur Ave *	Office, R&D, IM	0.7	.50
33 Lake George Street	Office, R&D, IM, Academics	2.0	.50
15 Buena Vista Street †	Office, R&D, Academics	6.0	1.00
93/101 Sherman Avenue †*	Office, R&D, Academics, Artist Studios	4.5	1.00
105 Sherman Avenue †	Life Science, Office, R&D	5.0	1.00
151 Barnum Road	Life Science, Office, R&D, IM	5.0	.60
205 Jackson Road	Life Science, Office, R&D, Academics	5.0	1.00
11 Grant Road	Life Science, Office, R&D	9.0	.50
75 Jackson Road	Life Science, Office, R&D, IM Under Agreement	12.1	.50
43 Buena Vista Street (Vicksburg Square) †*	Office, R&D, Academics	16.0	1.00
16 Bulge Road	Life Science, Office, R&D, IM	18.5	.50
45 Jackson Road	Life Science, Office, R&D, IM Under Agreement	22.3	.50
27 Hospital Road	Retail, Commercial, Conference, Institutional, Lodging, Office	30.5	.35
111 Hospital Road	Biomanufacturing, Life Sciences, Office, R&D, IM Under Agreement	46.0	.50
40 Salerno Circle **	Office, R&D, IM	80.0	.50

† Historic District
 * Existing buildings
 ** Needs site preparation. Estimate one year from purchase and sale



UTILITY SPECIFICATIONS

The community's robust utility infrastructure is maintained locally by Devens Utilities with a focus on reliability and affordability.

Municipal Gas	30 miles of National Grid pipeline
Municipal Electric	4 substations with redundant 69kV available
Municipal Water	4.85 million gallons a day of clean well water available
Municipal Sewer	4.65 million gallons a day capacity at state-of-the-art treatment plant
Telecom	Verizon or Comcast high-speed fiber available

Utility rate sheets available upon request

AMENITIES

NEW **EMERSON GREEN** RESIDENTIAL NEIGHBORHOOD.

REGIONAL SHUTTLE SERVICE CONNECTING TO MBTA COMMUTER RAIL AND SURROUNDING TOWNS.

DOWNTOWN **DEVENS COMMON** WITH HOTELS, CONFERENCE CENTER, RESTAURANTS AND CAFÉS, SERVICES, AND MORE.

MOUNT WACHUSETT COMMUNITY COLLEGE ON SITE FOR EMPLOYEE TRAINING.



Red Tail Golf Club

OUTDOOR **RECREATIONAL AMENITIES** INCLUDING:

- 18-HOLE RED TAIL GOLF CLUB
- PDGA DISC GOLF COURSES
- LACROSSE, SOCCER, SOFTBALL FIELDS
- DESIGNATED BIKE LANES
- HIKING TRAILS
- MIRROR LAKE AND THE NASHUA RIVER FOR CANOEING, KAYAKING, FISHING AND PADDLEBOARDING



Laddawn Inc.

A photograph of two men in a canoe on a calm lake, surrounded by trees with autumn foliage. The scene is captured from behind the men, looking towards the water.

DEVENS

M A S S A C H U S E T T S

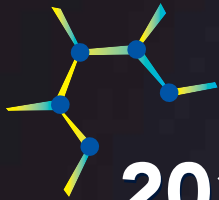


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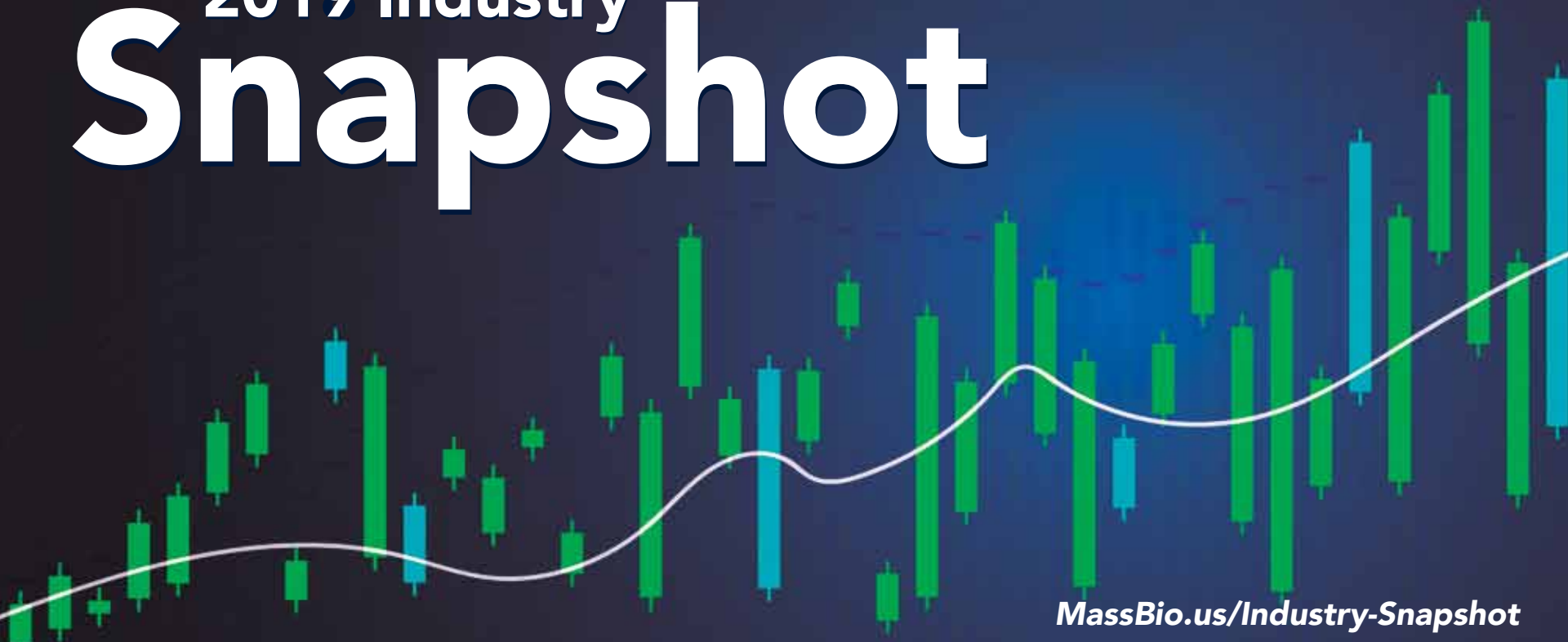
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2019 Industry Snapshot



MassBio[®]

MASSACHUSETTS BIOTECHNOLOGY COUNCIL



with support from

Evaluate 



2019 Industry Snapshot

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Industry Employment

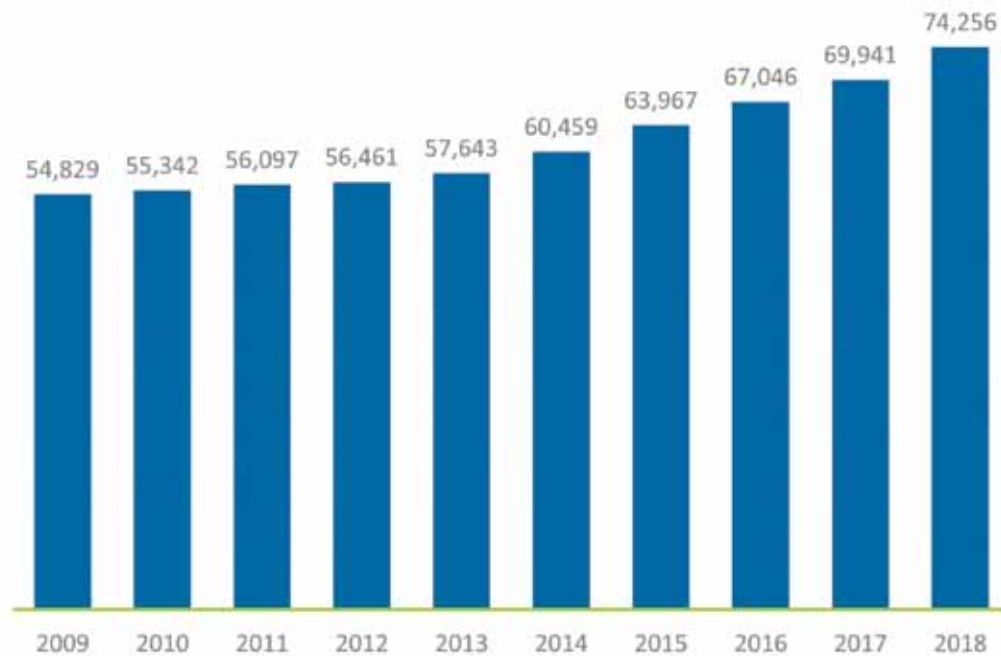
Massachusetts Biopharma Industry Employment



Industry Employment

Industry jobs grew by **35%** in the last 10 years adding close to 20,000 jobs.

The industry grew at its fastest rate year-over-year in over a decade at **6.4%**.



35% growth over 10 years

Source: Privately owned companies, U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

10 and 1 Year Employment Biotech Research & Development



Industry Employment

Massachusetts biotech R&D jobs have grown by **47%** in the past 10 years.

State	2009	2017	2018	10 Year Change (09-18)	1 Year Change (17-18)
California	21,336	39,203	44,751	110%	14%
Massachusetts	26,759	35,768	39,365	47%	10%
Pennsylvania	13,565	13,413	15,099	11%	13%
New Jersey	9,086	12,976	14,822	63%	14%
North Carolina	6,778	8,578	10,468	54%	22%
Maryland	9,801	15,351	9,697	-1%	-37%
New York	3,706	8,856	9,680	161%	9%
Washington	2,737	7,149	7,962	191%	11%
Texas	4,456	5,437	5,556	25%	2%
Illinois	2,257	2,770	3,291	46%	19%

Source: Privately owned companies, U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

10 and 1 Year Employment Biopharma Manufacturing



Industry Employment

Employment at Massachusetts companies focused on biopharma manufacturing has grown by **6% since 2009**.

In the same period, the biomanufacturing jobs in the U.S. as a whole only grew by 1%

State	2009	2017	2018	10 Year Change (09-18)	1 Year Change (17-18)
California	43,035	52,125	46,693	9%	-10%
New Jersey	37,957	22,335	21,950	-42%	-2%
North Carolina	18,787	20,770	21,705	16%	5%
New York	20,971	20,435	21,531	3%	5%
Illinois	18,534	19,778	20,297	10%	3%
Pennsylvania	22,294	18,105	18,065	-19%	0%
Indiana	18,822	18,080	17,093	-9%	-5%
Puerto Rico	22,556	14,376	14,214	-37%	-1%
Texas	10,077	11,994	12,494	24%	4%
Massachusetts	9,581	10,072	10,148	6%	1%

Source: Privately owned companies, U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

Largest Biopharma Industry Employers in Massachusetts, 2018



Industry Employment

Takeda is now the **largest biopharma employer** in Massachusetts.

Rank	Company	Employees
1	Takeda	4,927
2	Sanofi	4,800
3	Biogen	2,400
4	Novartis	2,337
5	Pfizer	2,226
6	Vertex	1,741
7	MilliporeSigma	1,600
8	Charles River Laboratories	1,545
9	Quest Diagnostics	1,450
10	Parexel International	1,220
11	EMD Serono	1,047
12	AbbVie	1,020
13	Alkermes	823

Rank	Company	Employees
14	GE Healthcare Life Sciences	777
15	Anylam	754
16	bluebird bio	745
17	Moderna	640
18	Foundation Medicine	600
18	Merck	600
20	Sunovion Pharmaceuticals	590
21	SAGE Therapeutics	540
22	Amgen	500
23	Tesaro	435
24	AstraZeneca	400
25	Bristol-Myers Squibb	400

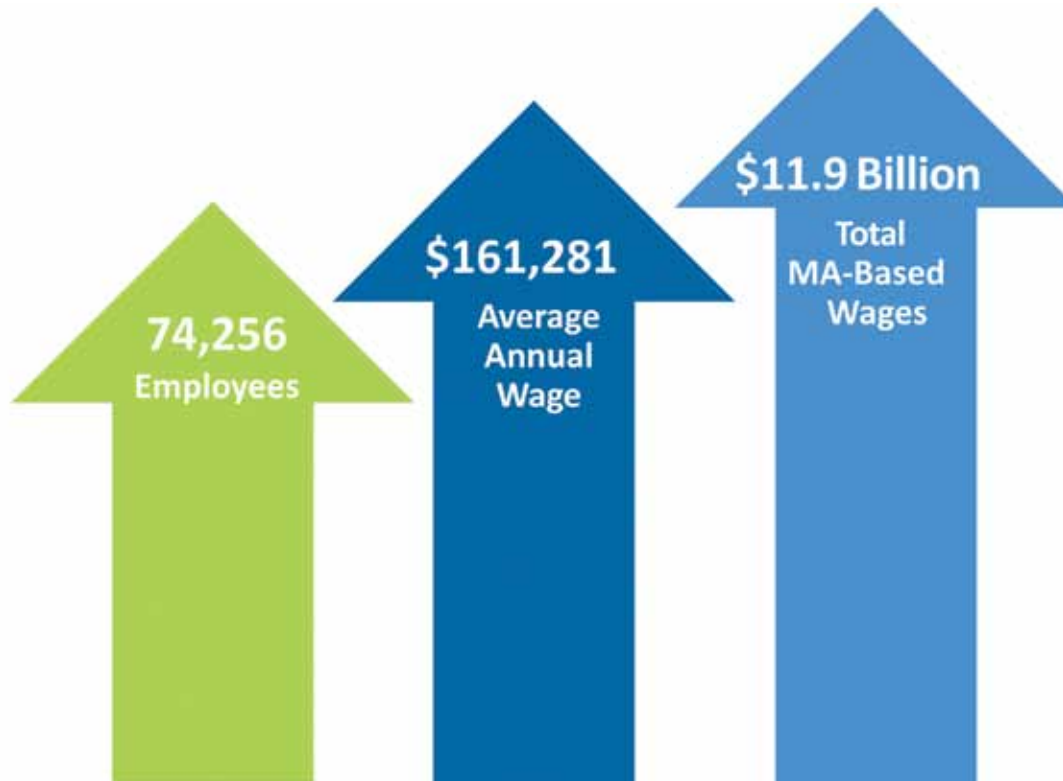
Sources: MassBio Membership Reports & Surveys; Boston Business Journal Book of Lists, 2018

Biopharma

Economic Impact, 2018



Industry Employment



Source: Privately sector, U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

Life Sciences Lab Inventory Growth



Over **12.4 million** square feet of commercial lab space has been added to Massachusetts in the last 10 years, an increase of **70%**.



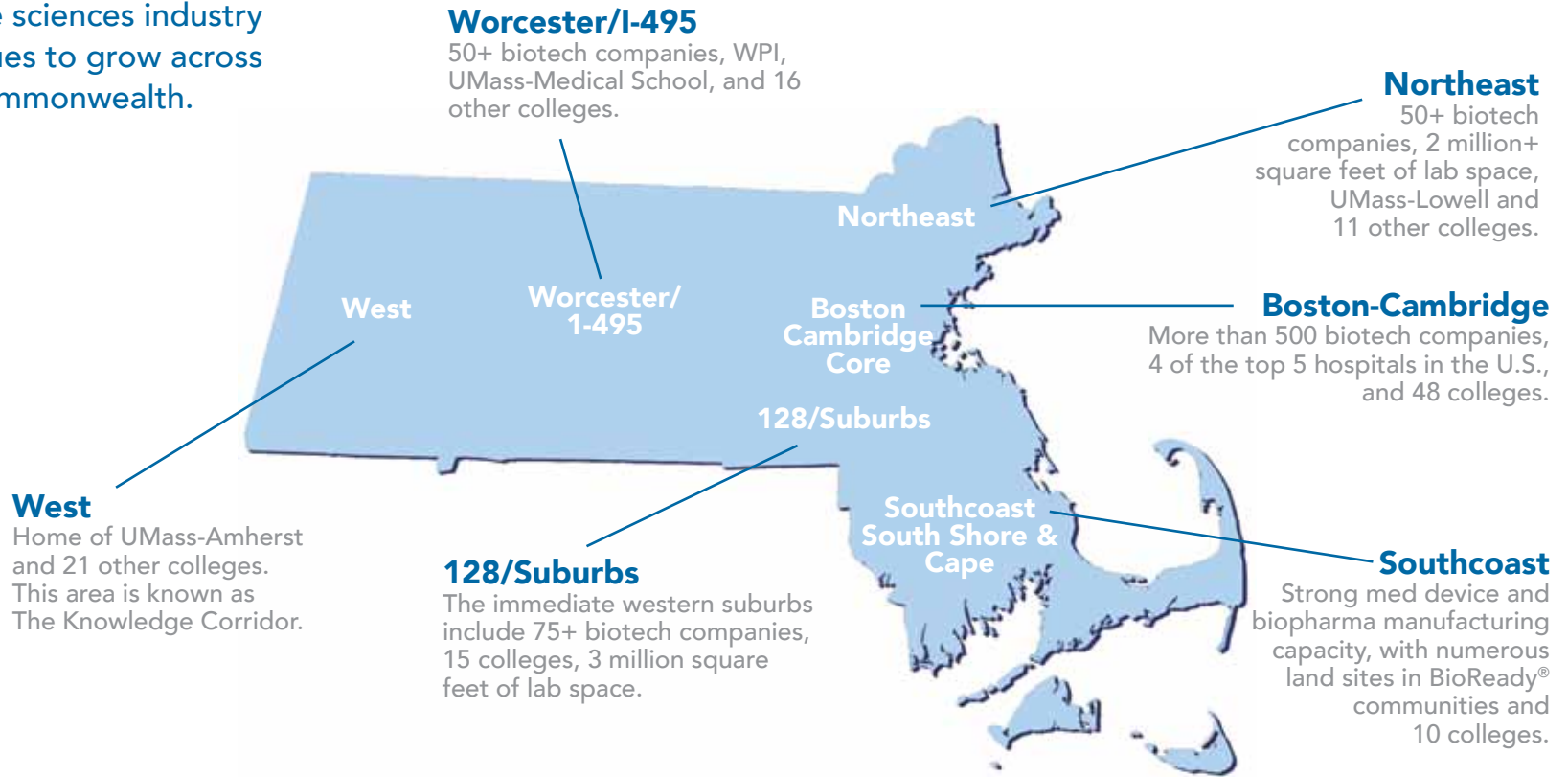
Sources: Colliers Meredith & Grew, Life Science Review, 2007-2015; CBRE 2016-2019

Industry Geography



Industry Employment

The life sciences industry continues to grow across the Commonwealth.



Source: MassBio Membership Reports



Investment in the Industry



Top NIH-Funded States: by Total Funding & Per Capita, 2018

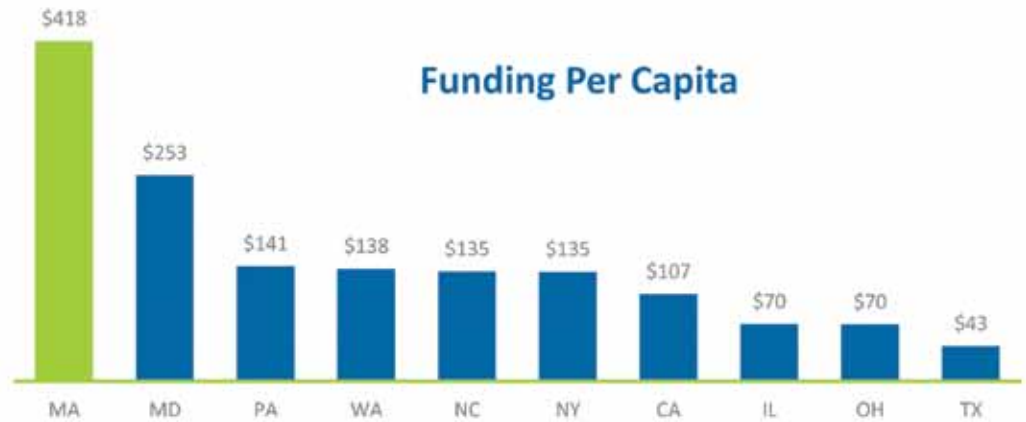


Investment in the Industry

More than 10%
of all NIH funding went to Massachusetts
organizations in 2018.

Total NIH Funding

State	Funding
California	\$4,243,446,496
Massachusetts	\$2,887,150,148
New York	\$2,632,652,693
Pennsylvania	\$1,810,217,516
Maryland	\$1,531,640,271
North Carolina	\$1,402,438,380
Texas	\$1,243,375,373
Washington	\$1,042,298,686
Illinois	\$895,375,844
Ohio	\$816,911,217
US	\$28,319,914,865



Source: NIH, Research Portfolio Online Reporting, U.S. Census Bureau

Top NIH-Funded Independent Hospitals, 2018



Investment in the Industry

Four of the top five NIH-funded independent hospitals are in Massachusetts.

Massachusetts receives 56% of all NIH funding to Independent Hospitals.

Organization	City	State	Awards	Funding
Massachusetts General Hospital	Boston	MA	906	\$465,776,958
Brigham and Women's Hospital	Boston	MA	560	\$388,928,321
Vanderbilt University Medical Center	Nashville	TN	491	\$269,892,304
Dana-Farber Cancer Institute	Boston	MA	228	\$172,449,395
Boston Children's Hospital	Boston	MA	344	\$167,075,825
Children's Hospital of Philadelphia	Philadelphia	PA	236	\$145,610,804
Beth Israel Deaconess Medical Center	Boston	MA	240	\$128,148,819
Cincinnati Children's Hospital Medical Center	Cincinnati	OH	290	\$120,876,156
St. Jude's Children's Research Hospital	Memphis	TN	117	\$92,105,597
New York State Psychiatric Institute	New York	NY	113	\$63,361,395
Cedars-Sinai Medical Center	Los Angeles	CA	143	\$63,195,585
Seattle Children's Hospital	Seattle	WA	112	\$47,077,137
National Jewish Health	Denver	CO	60	\$41,511,120
Roswell Park Cancer Institute Corporation	Buffalo	NY	66	\$37,884,585
Boston Medical Center	Boston	MA	79	\$34,824,666
Rhode Island Hospital	Providence	RI	67	\$29,973,204
McLean Hospital	Belmont	MA	71	\$29,212,777
Henry Ford Health System	Detroit	MI	44	\$28,807,855
California Pacific Medical Center Research Institute	San Francisco	CA	12	\$28,580,332
Massachusetts Eye and Ear Infirmary	Boston	MA	52	\$24,738,160
Children's Hospital of Los Angeles	Los Angeles	CA	41	\$22,295,828
Tufts Medical Center	Boston	MA	41	\$20,654,118

Please note: NIH lists university-operated hospitals separately.

Source: NIH, Research Portfolio Online Reporting

Top MA NIH-Funded Higher Education & Research Institutes, 2018

Investment in the Industry

Massachusetts centers of Higher Education and Research Institutes received **\$1.28 billion in 2018.**

Organization	Awards	Funding
Harvard Medical School	387	\$208,813,296
University of Massachusetts Medical School	345	\$160,982,250
Boston University Medical Campus	284	\$140,229,291
Harvard School of Public Health	178	\$125,227,087
Broad Institute, Inc.	89	\$120,715,260
Massachusetts Institute of Technology	247	\$113,534,157
Harvard University	151	\$79,310,611
Tufts University Boston	131	\$57,680,765
Boston University (Charles River Campus)	143	\$50,625,100
Northeastern University	89	\$37,859,153
University of Massachusetts Amherst	89	\$29,509,799
Brandeis University	78	\$26,392,393
Boston College	44	\$18,597,050
Whitehead Institute for Biomedical Research	35	\$14,681,320
Joslin Diabetes Center	35	\$14,563,515

Source: NIH, Research Portfolio Online Reporting

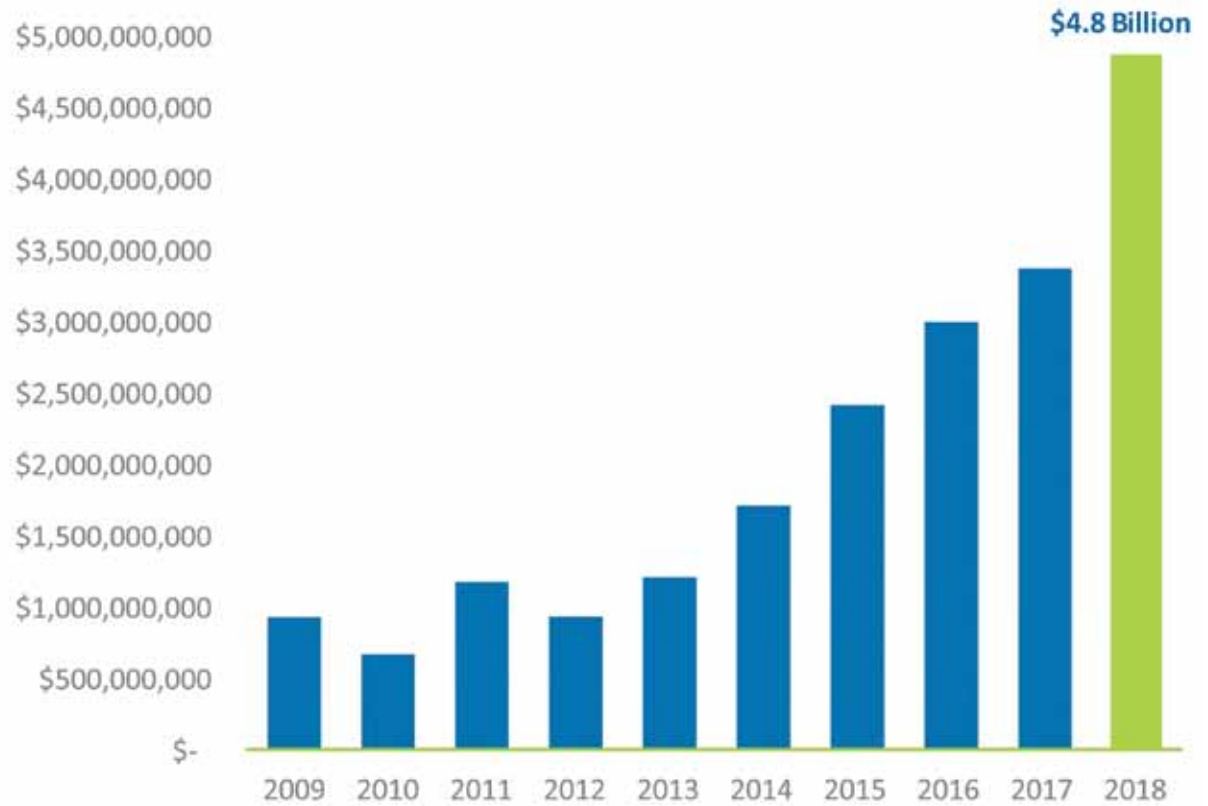
Venture Capital Investment: Biopharma



Investment in the Industry

Venture capital investment in Massachusetts biopharma companies was **\$4.8 billion** in 2018.

In the first two quarters of 2019, Massachusetts biopharma companies raised just under **\$1.5 billion**.



Top Venture Capital Financings in Massachusetts, 2018



Investment in the Industry

Moderna raised the largest financing round in 2018, totaling **\$500 million**, followed by Relay Therapeutics at **\$400 million**.

Company	Financing (\$ million)	Investment Round
Moderna	500	Series Undisclosed
Relay Therapeutics	400	Series C
Cerevel Therapeutics	350	Series Undisclosed
TCR2 Therapeutics	125	Series B
Kaleido Biosciences	101	Series C
Constellation Pharmaceuticals	100	Series Undisclosed
Generation Bio	100	Series B
Rubius Therapeutics	100	Series B
Stoke Therapeutics	90	Series B
Beam Therapeutics	87	Series A
Fulcrum Therapeutics	80	Series B
KSQ Therapeutics	80	Series C
Morphic Therapeutic	80	Series B
SQZ Biotech	72	Series C
Compass Therapeutics	70	Series A
Akero Therapeutics	70	Series B

Source: EvaluatePharma®, July 2019 Note: Excluding PIPE numbers.

Top Venture Capital Financings in Massachusetts, 2019 (Q1&2)



Investment in the Industry

The first half of 2019 has seen smaller financing rounds, with Beam Therapeutics raising the largest financing amount at **\$135 million**.

Company	Financing (\$ million)	Investment Round
Beam Therapeutics	135	Series B
OncologiE	80	Series B
Arrakis Therapeutics	75	Series B
Karuna Therapeutics	68	Series B
Inozyme Pharma	67	Series A
Ribon Therapeutics	65	Series B
Imara	63	Series B
Dewpoint Therapeutics	60	Series A
Lyndra	55	Series B
Dyne Therapeutics	50	Series A
Life Biosciences	50	Series B

Source: EvaluatePharma®, July 2019 Note: Excluding PIPE numbers.

Location of Venture Capital Backed Companies

Investment in the Industry

Cambridge-based biopharma companies received **63%** of all biotech venture investment in the state.

Location of venture-backed companies (\$ million)



Source: EvaluatePharma®, July 2019

Massachusetts IPOs

2018



Investment in the Industry

There were **18 IPOs** from Massachusetts biotech companies in 2018.
31% of all US-based biotech IPOs in 2018 were from Massachusetts companies.



\$604 MM



\$108 MM



\$84 MM



\$277 MM



\$100 MM



\$80 MM



\$165 MM



\$100 MM



\$84 MM



\$143 MM



\$99 MM



\$69 MM



\$121 MM



\$97 MM



\$69 MM



\$114 MM



\$86 MM



\$60 MM

Massachusetts IPOs 2019 (Q1&2)

Investment in the Industry

There have been **9 IPOs** from Massachusetts biotech companies in the first half of 2019.
35% of all US-based biotech IPOs in the first half of 2019 were from Massachusetts companies.



\$142 MM



\$90 MM



\$75 MM



\$105 MM



\$78 MM



\$71 MM



\$102 MM



\$75 MM



\$70 MM

Note: Figures refer to "offer amounts" (investment secured) at time of IPO. Source: Nasdaq.com

Geography of Companies with IPOs, 2018



Location of Companies with IPOs

In 2018, **78%** of all Massachusetts biotech companies that went public were located in Cambridge.



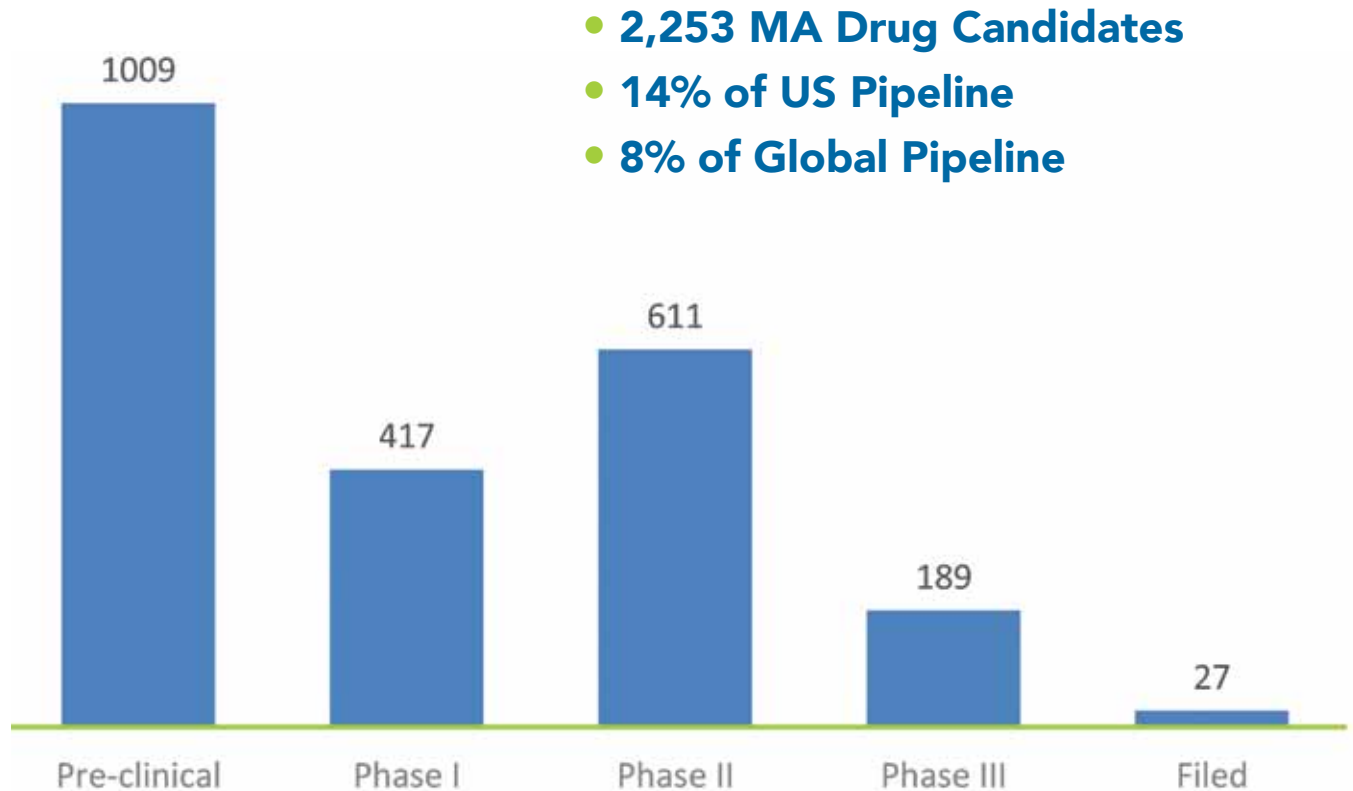
Source: EvaluatePharma®, July 2019



Drug Development Pipeline

Massachusetts Drug Development Pipeline & Trials by Phase

The Massachusetts drug development pipeline includes **27 candidates** pending FDA approval.



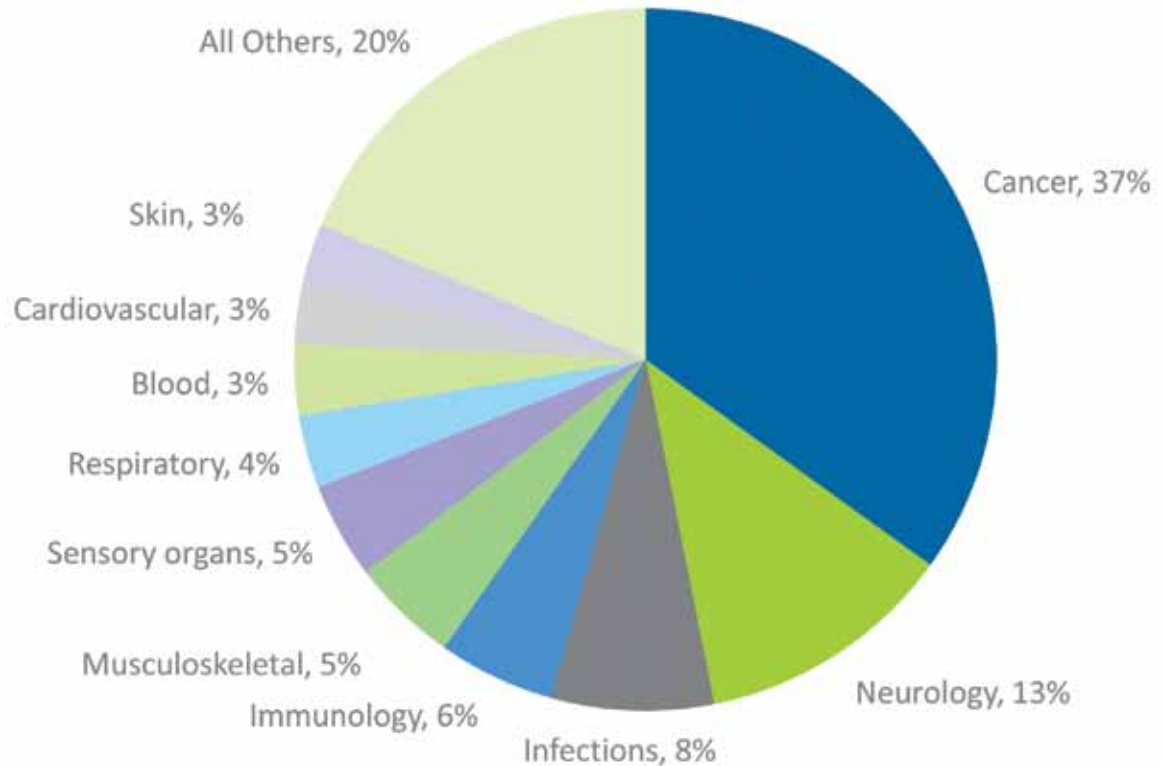
- **2,253 MA Drug Candidates**
- **14% of US Pipeline**
- **8% of Global Pipeline**

Only Massachusetts-headquartered company pipelines are included. Source: EvaluatePharma®, August 2019

Massachusetts Pipeline by Therapeutic Area

Drug Development Pipeline

Oncology continues to be the most frequently researched therapeutic area in Massachusetts.



Only Massachusetts-headquartered company pipelines are included. Source: EvaluatePharma®, August 2018 Percent of total drug candidates

Massachusetts Pipeline by Medical Indication (Top 25)

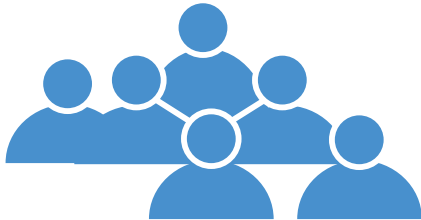
Massachusetts researchers are currently researching and developing products for patients with over **400 different medical indications.**

Medical Indication	Number of Investigational Drugs	% of all Investigational Drugs
General cancer indications	245	12.23%
Solid tumor indications	198	9.89%
Undisclosed	114	5.69%
Other neurological indications	95	4.74%
Other immune indications	58	2.90%
General blood malignancies	53	2.65%
General inflammatory disorders	49	2.45%
Duchenne muscular dystrophy	48	2.40%
Cystic fibrosis (CF)	46	2.30%
Other metabolic indications	42	2.10%
Breast cancer	39	1.95%
Alzheimer's disease	39	1.95%
Leukemia, acute myeloid (AML)	35	1.75%
Non-Hodgkin lymphoma (NHL)	35	1.75%
Amyotrophic lateral sclerosis (ALS)	34	1.70%
Melanoma	32	1.60%
Non-small cell lung cancer (NSCLC)	32	1.60%
Parkinson's disease	32	1.60%
Ovarian cancer	28	1.40%
Diabetes, type II (maturity onset)	28	1.40%
General bacterial indications	27	1.35%
General eye disorders	27	1.35%
Diabetes, type I (juvenile onset)	26	1.30%
Gram negative infections	26	1.30%
Nonalcoholic steatohepatitis (NASH)	25	1.25%

Changing the Lives of Patients

Drug Development Pipeline

**Massachusetts-headquartered companies
have developed therapies that treat
patient populations of up to**



**265 million patients
IN THE UNITED STATES**



**2 billion patients
AROUND THE WORLD**

Appendix

What's in a Number?

Why use the QCEW?

QCEW data is comprised of employment and wages from unemployment insurance (UI) tax reports submitted by employers and is augmented by both BLS worksite reports and the Annual Re-filing Survey (ARS), which surveys one quarter of all private-sector establishments each year. The QCEW data is available on a more timely basis than the CBP and is directly related to the state's ES-202 data, providing an additional, ongoing corroborative source.

What is considered "biopharma" employment?

Using the North American Industry Classification System (NAICS), with which QCEW data is reported, MassBio has determined that several NAICS classifications can be considered part of the biotechnology and pharmaceutical industry. However, only in certain cases can the industry claim 100% of any one NAICS code. MassBio determined that a percentage of some industry classifications could be used in estimating overall industry employment. In some cases, the percentage determination for certain industry codes was based on reports developed by other organizations. The following NAICS codes are utilized:

NAICS 3254: Pharmaceutical MFG, including Biologics (100%)

NAICS 541714 Research and Development in Biotechnology (except Nanobiotechnology) (100%)

NAICS 541715 Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (27% in 2017 and beyond, 22% for 2016 and prior.)

NAICS 541713 Research and Development in Nanotechnology (22%)

NAICS 334516: Analytical Laboratory Instrument MFG (30%)

NAICS 54138: Testing Laboratories (9%)

NAICS 622: Hospitals (4.5%)

NAICS 61131: Universities (1.9%)

NAICS 621511: Medical Testing Laboratories (100%)

As of 2017 data, NAICS 541711, Research and Development in Biotechnology and NAICS 541712, R&D in Physical, Engineering, and Life Sciences (except biotech) have been replaced by 541714 and 541715 respectively. NAICS 541715 was created from parts of the previous NAICS 541711 and NAICS 541712 and now stands alone in the 2017 data.

NAICS 4242, Drug merchant wholesalers, is no longer included in any current or annual employment figures. NAICS 621511, Medical Laboratories, is included. Prior to 2013, we omitted Medical Laboratories, as these laboratories are health care services related, providing services to the medical delivery and patient care system, rather than the Biopharma research development and manufacturing industry. We now acknowledge that Medical Laboratories are closely connected to the Biopharma industry, requiring similar capacity and skills found in the Biopharma industry.

About Us



MassBio's mission

is to advance Massachusetts' leadership in the life sciences to grow the industry, add value to the healthcare system and improve patient lives.

We represent 1,200+ organizations in the life sciences industry, including biopharma, medical device, combination product, digital health companies, along with academic institutions, research hospitals, disease foundations and service providers.

MassBio.org



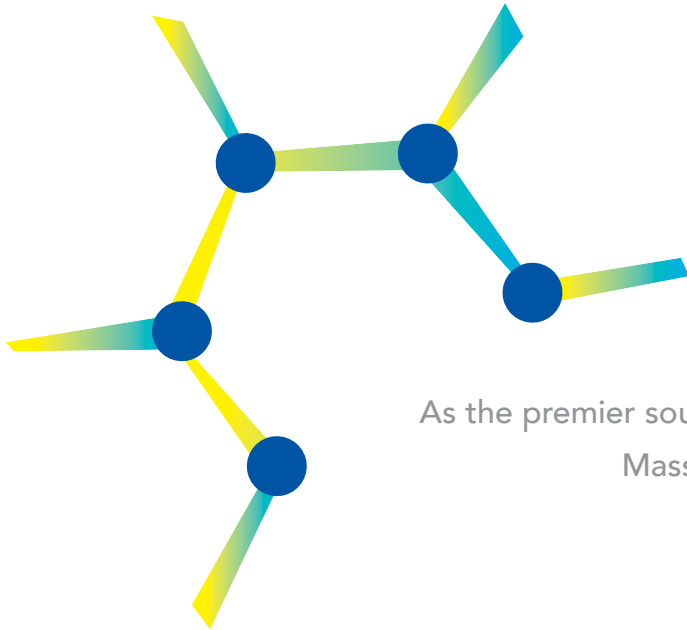
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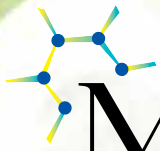
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As the premier source of information on life sciences in Massachusetts, MassBio tracks industry statistics over time and issues an overview Industry Snapshot each year.

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