



2015

National Institutes of Health (NIH)

Grants for Boston



**BOSTON
REDEVELOPMENT
AUTHORITY**

Produced by the BRA Research Division



Boston

Top Recipient of NIH Funding for the 20th Year

ABOUT NIH

The National Institutes of Health (NIH), part of the U.S. Department of Health and Human Services, is the largest source of funding for medical research in the world. Its mission is “to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.” NIH is comprised of 27 Institutes and Centers, each with a specific research agenda. More than 80% of the \$30 billion NIH budget goes to funding researchers outside the NIH— at more than 2,500 universities and research organizations.

2014 marked the 20th consecutive year that Boston received the most NIH funding of any U.S. city. Forty-six Boston institutions received 3,521 NIH awards for more than \$1.7 billion in funding. This total

represents 5.7% of all NIH spending and 71.4% of all NIH funding in Massachusetts. Eight Boston organizations received over \$100 million in NIH funding, reinforcing Boston as a powerhouse in medical research.

TOP BOSTON RECIPIENTS OF NIH FUNDING 2014

| ORGANIZATION | AWARDS | FUNDING |
|---------------------------------------|--------------|------------------------|
| Massachusetts General Hospital | 778 | \$350 million |
| Brigham and Women's Hospital | 564 | \$323 million |
| Harvard Medical School | 386 | \$194 million |
| Children's Hospital Corporation | 305 | \$127 million |
| Harvard School of Public Health | 184 | \$126 million |
| Dana-Farber Cancer Institute | 210 | \$123 million |
| Boston University Medical Campus | 233 | \$113 million |
| Beth Israel Deaconess Medical Center | 241 | \$111 million |
| TOTAL of Top Boston Recipients | 2,901 | \$1,466 million |

Source: National Institutes of Health “NIH Awards by Location and Organization FY2014,” BRA Research Division Analysis

Since 1992, Boston has received over \$30.4 billion in NIH funding. Boston's NIH funding reached a record high in 2009 due to economic stimulus dollars created by the American Recovery and

Reinvestment Act (ARRA). After 2009, funding levels decreased as ARRA ended, but Boston's annual NIH funding has remained over \$1.7 billion since 2011.

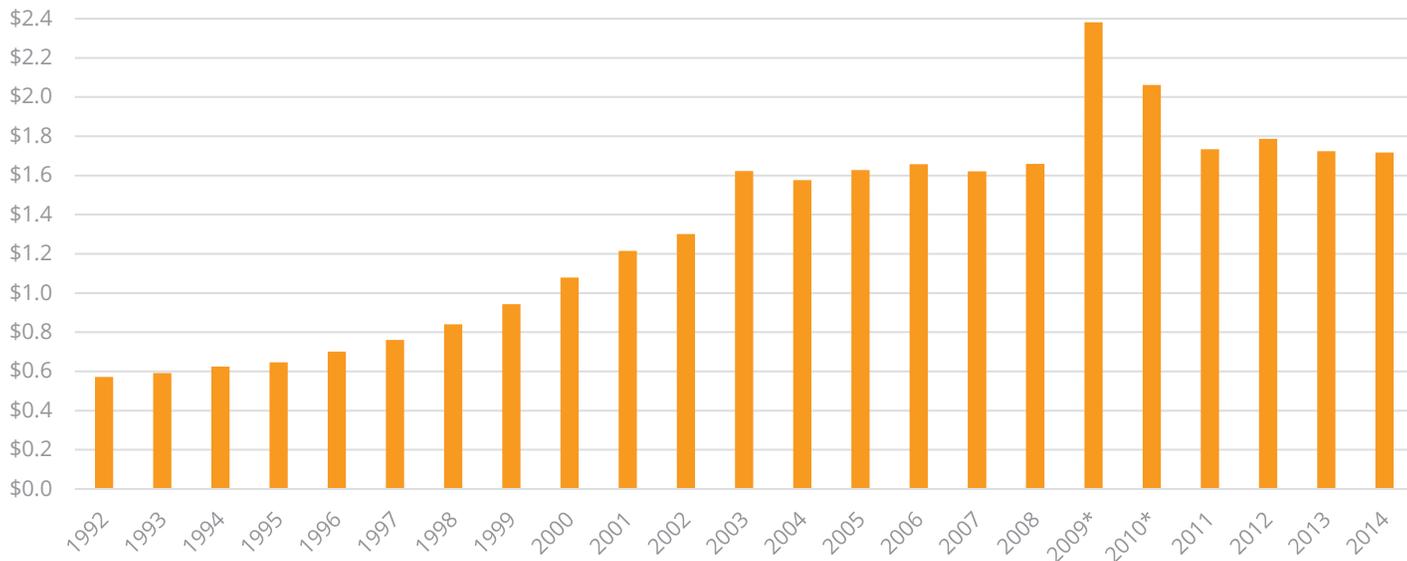
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BOSTON NIH AWARDS

1992 - 2014, in billions of dollars



Source: National Institutes of Health, "NIH Awards by Location and Organization," BRA Research Division Analysis

Top Funded U.S. Cities

The only other U.S. city with close to Boston's level of NIH funding was New York City, a city of thirteen times Boston's population. Boston received \$2,664 in NIH funding per capita in FY2014, the highest per capita funding among the top 10 cities. Following Boston and New York are Philadelphia, Seattle, and San Diego for cities with the most NIH funding. These five cities receive almost 20% of the total NIH funding.

TOP FIVE U.S. CITIES IN NIH FUNDING

FY 2014, in billions of dollars



Source: National Institutes of Health, "NIH Awards by Location and Organization," BRA Research Division Analysis

Top Funded Organizations

Three Boston organizations were among the top 30 funding recipients in the United States: Massachusetts General Hospital, Brigham and Women's Hospital, and Harvard Medical School.

They received a total of 1,728 awards and over \$860 million in funding. Their combined funding represents 36% of all funding in Massachusetts and 50.5% of Boston's entire NIH funding.

| RANK | ORGANIZATION | CITY | AWARDS | FUNDING |
|-----------|---|-------------------|------------|----------------------|
| 1 | Johns Hopkins University | Baltimore, MD | 1,252 | \$619 million |
| 2 | University Of California, San Francisco | San Francisco, CA | 1,210 | \$547 million |
| 3 | University Of Pennsylvania | Philadelphia, PA | 1,109 | \$489 million |
| 4 | University Of Washington | Seattle, WA | 938 | \$438 million |
| 5 | University Of Pittsburgh At Pittsburgh | Pittsburgh, PA | 937 | \$426 million |
| 6 | University Of Michigan | Ann Arbor, MI | 997 | \$418 million |
| 7 | University Of California San Diego | San Diego, CA | 852 | \$399 million |
| 8 | Univ. Of North Carolina Chapel Hill | Chapel Hill, NC | 909 | \$396 million |
| 9 | Washington University | Saint Louis, MO | 815 | \$391 million |
| 10 | Stanford University | Stanford, CA | 861 | \$386 million |
| 11 | University Of California Los Angeles | Los Angeles, CA | 833 | \$373 million |
| 12 | Duke University | Durham, NC | 746 | \$372 million |
| 13 | Yale University | New Haven, CT | 882 | \$361 million |
| 14 | Massachusetts General Hospital | Boston, MA | 778 | \$350 million |
| 15 | Brigham And Women's Hospital | Boston, MA | 564 | \$323 million |
| 16 | Vanderbilt University | Nashville, TN | 788 | \$309 million |
| 17 | Columbia University Health Sciences | New York, NY | 771 | \$308 million |
| 18 | Emory University | Atlanta, GA | 669 | \$287 million |
| 19 | University Of Wisconsin-Madison | Madison, WI | 606 | \$261 million |
| 20 | University Of Minnesota | Minneapolis, MN | 556 | \$252 million |
| 21 | New York University School Of Medicine | New York, NY | 449 | \$251 million |
| 22 | Icahn School Of Medicine At Mount Sinai | New York, NY | 485 | \$251 million |
| 23 | University Of Alabama At Birmingham | Birmingham, AL | 482 | \$225 million |
| 24 | Fred Hutchinson Cancer Research Center | Seattle, WA | 248 | \$222 million |
| 25 | Oregon Health & Science University | Portland, OR | 460 | \$211 million |
| 26 | Mayo Clinic Rochester | Rochester, MN | 407 | \$204 million |
| 27 | Baylor College Of Medicine | Houston, TX | 435 | \$194 million |
| 28 | Harvard Medical School | Boston, MA | 386 | \$194 million |
| 29 | University Of Colorado Denver | Aurora, CO | 522 | \$191 million |
| 30 | Scripps Research Institute | San Diego, CA | 320 | \$191 million |

Source: National Institutes of Health, "NIH Funding by Location and Organization" FY 2014, BRA Research Analysis

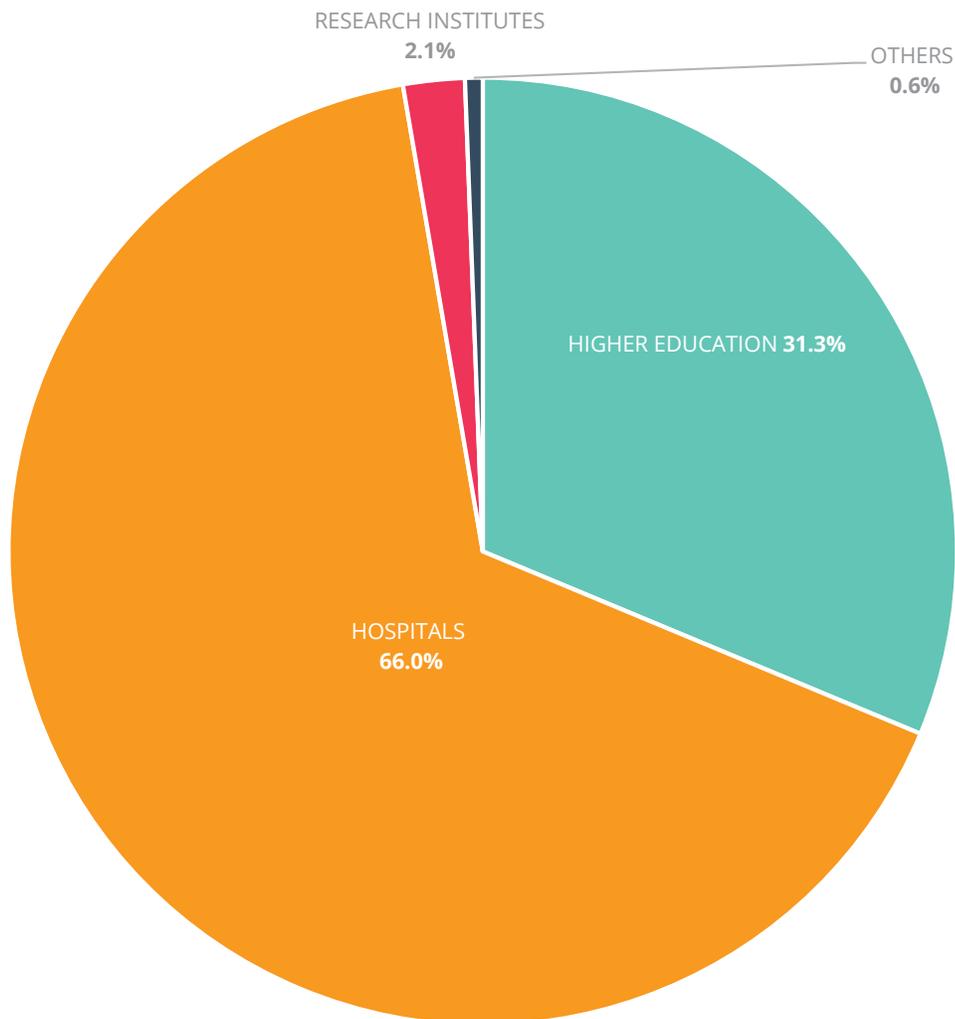


Funding by Organization Type

The bulk of NIH funding goes toward hospitals and universities. However, NIH also provides vital funding to research institutes and other companies. The major research institutes in terms of NIH funding were the Joslin Diabetes Center and the Schepens Eye Research Institute, an affiliate of Massachusetts Eye and Ear

Infirmery. Harvard Pilgrim Health Care Institute also received NIH funding for research in collaboration with Harvard Medical School. Other organizations receiving NIH funding included manufacturing, fitness technology, health insurance, and software companies.

NIH FUNDING BY TYPE OF INSTITUTION
FY 2014



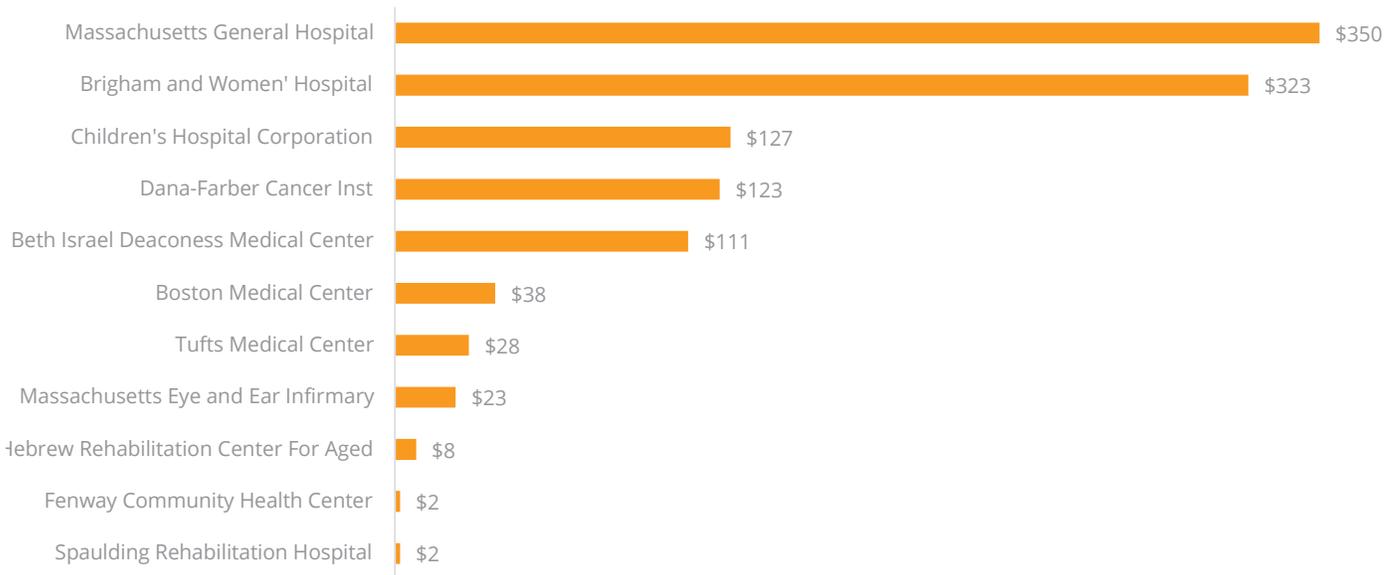
Source: National Institutes of Health, "NIH Funding by Location and Organization" FY 2014, BRA Research Analysis

Hospitals

Boston is a national center for health care and medical research. There are twenty-one in-patient hospitals located within the city with a combined total of 6,161 beds in 2012. Twelve Boston hospitals were granted 2,310 NIH awards

totaling over \$1.13 billion of NIH funding, representing 66% of the city's total and 47% of the state's total. The total funding amount received by Boston's hospitals alone is higher than the entire total funding received by any other city except New York.

TOP BOSTON HOSPITALS IN NIH FUNDING 2014, in millions of dollars



Source: National Institute of Health, "NIH Funding by Location and Organization" FY2014, BRA Research Analysis

Massachusetts General Hospital and Brigham and Women's Hospital, both teaching hospitals for Harvard Medical School, were the top two NIH-funded hospitals in the United States. Massachusetts General Hospital leads the group for the 14th consecutive year with 31% of all grants to hospitals in Boston. Massachusetts General Hospital conducts the largest hospital-based research program in the United States with over 12,000 researchers and staff and over 1 million square feet of research space, primarily in downtown Boston and Charlestown.³ Additional research institutions in this area include,

Massachusetts Eye and Ear Infirmary, Schepens Eye Research Institute, Spaulding Rehabilitation Hospital, and MGH Institute for Health Professions.

Brigham and Women's Hospital has the largest medical research program in the Longwood Medical Area, a world famous medical campus that includes Brigham and Women's Hospital, Children's Hospital, Dana-Farber Cancer Institute, Beth Israel Deaconess Medical Center, and Joslin Diabetes Center. Harvard Medical School and Harvard School of Public Health are also located in the Longwood area, making it an epicenter

of health care and medical training and research. Institutions in the Longwood area received almost 2,500 NIH grants in 2014, bringing in approximately \$1.3 billion. The Longwood Medical Area has over 43,000 scientists, researchers and staff, including over 19,000 students.⁴ The synergy afforded by this concentration of doctors and scientists leads to successful biomedical research. In fact, if Longwood were its own city, it would be second only to New York City in the amount of NIH funding received.



Education

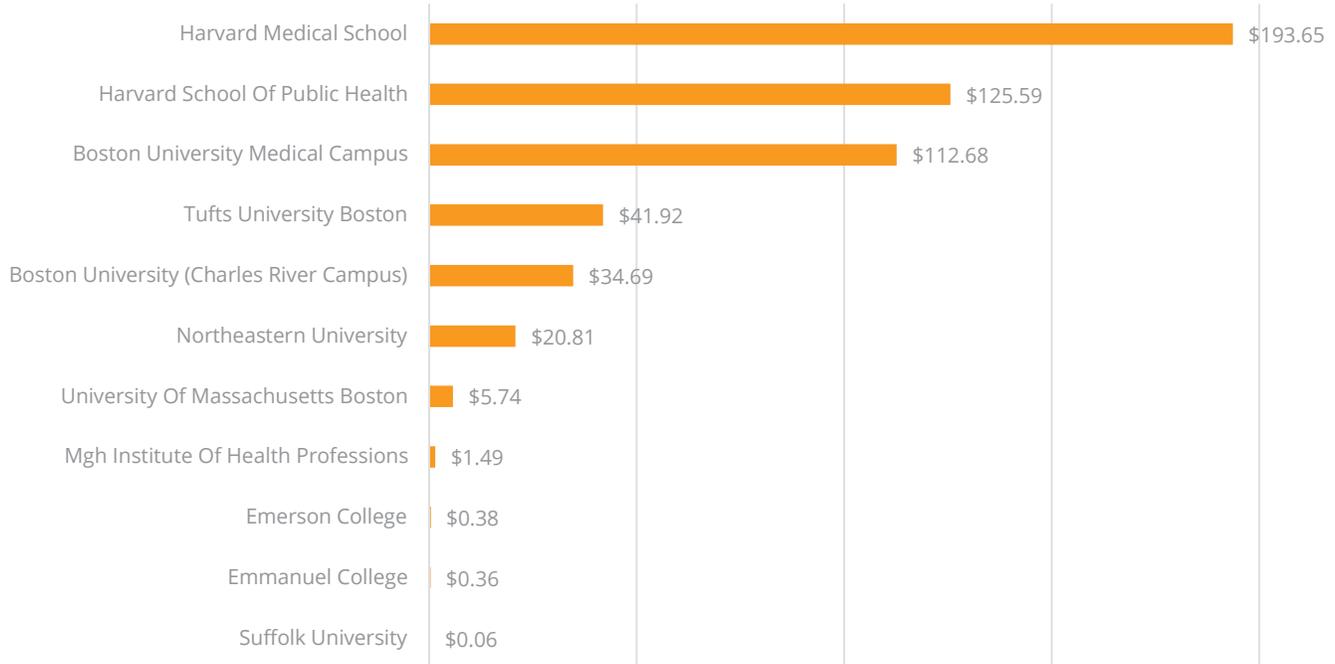
Boston is also a world-renowned center of higher education. Eleven of Boston’s higher education institutions received 1,102 NIH awards and over \$537 million in funding, a total that represented 31% of the city’s total and 22% of the state’s total.

Boston’s successful scientific research benefits from the city’s well-educated labor force. About half of people who work in Boston have a Bachelor’s degree

or higher.⁵ As of academic year 2013-2014, the city’s 35 universities, colleges, and community colleges had a combined enrollment of 145,471 full- and part-time students.⁶ Boston, with nearly 10% of the state’s population, has about one third of the statewide college student enrollment. Boston companies and institutions are able to attract and utilize students and graduates of our world class educational institutions.

BOSTON’S NIH GRANT RECIPIENTS IN HIGHER EDUCATION

2014, in millions of dollars



Source: National Institute of Health, “NIH Funding by Location and Organization” FY2014, BRA Research Analysis

Biotechnology Companies

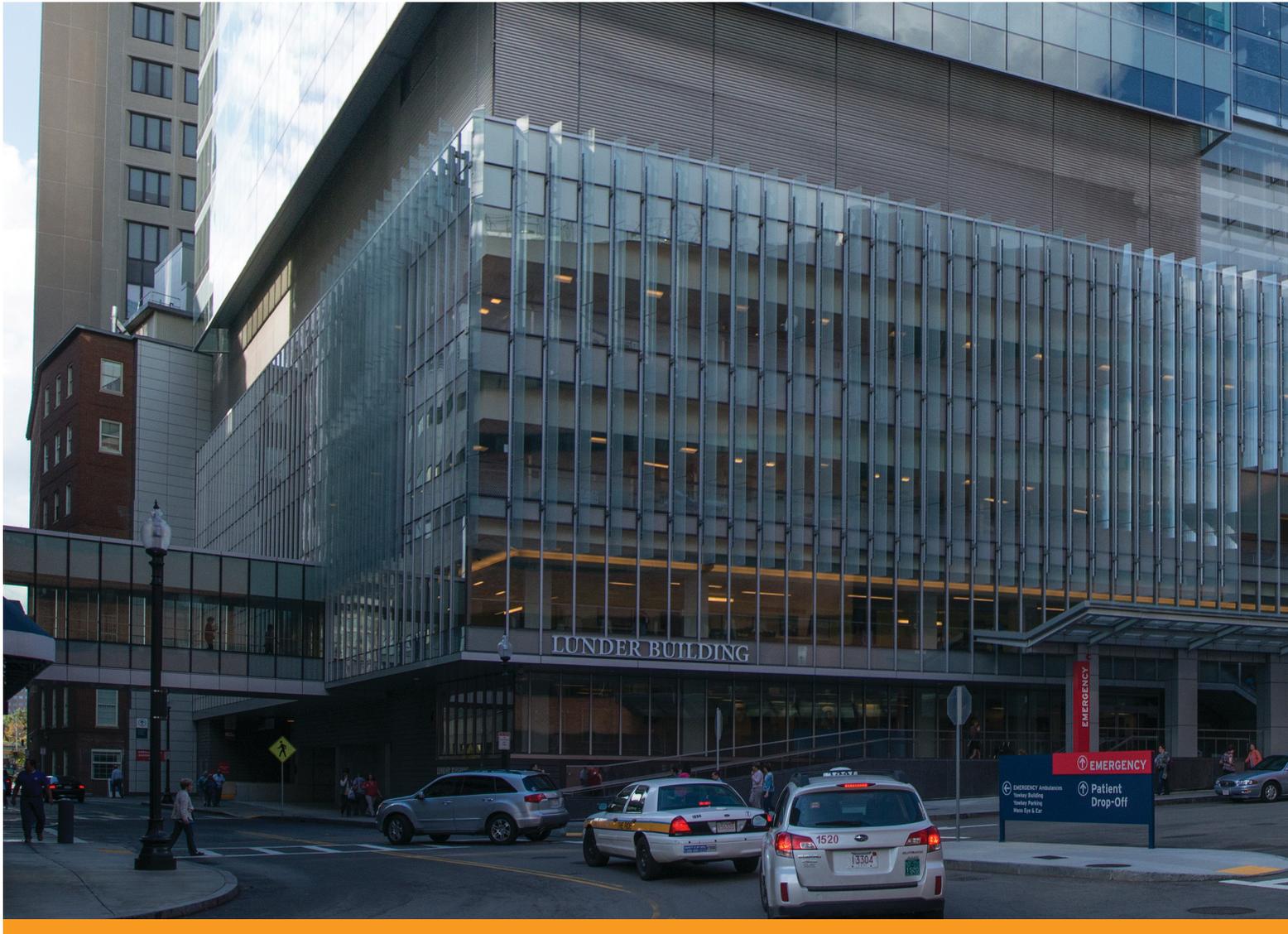
There is an emerging cluster of biotechnology companies on the South Boston Waterfront that have received research funding from the NIH. These include Immunetics, Inc. which develops diagnostic tests for diseases and pathogens, Invicro, LLC which creates imaging techniques for drug discovery and development, and Skulpt, Inc which develops technology to quantify muscle

health. The South Boston Waterfront is home to MassChallenge, the world’s largest startup accelerator, and Vertex’s Pharmaceuticals’ new 1.1 million square foot office and laboratory space.⁷ In contrast to the large hospitals and universities in other parts of the city, the South Boston Waterfront is becoming the place for biotech companies to congregate.

Boston: Leader of a Regional Powerhouse

The city of Boston is a center of biomedical research within the United States. It also benefits from collaborations with biomedical research institutions in other cities within the metropolitan area and the state. Boston shares its metropolitan area with other centers for scientific and medical research. Cambridge boasts premier research centers, particularly at Harvard, MIT, and in Kendall Square. In FY14, Cambridge institutions received 565 NIH awards for \$331 million in funding. One example of collaboration between institutions in

Boston and Cambridge is the Broad Institute, which brings together researchers from Harvard, MIT, and five Harvard-affiliated hospitals located in Boston. Massachusetts as a whole received \$2.4 billion dollars in NIH funding in FY2014, allocated among almost 5,000 awards. Massachusetts led the country in NIH funding per capita at \$359 – almost 5 times the national average. Massachusetts also leads the nation in per capita bioscience venture capital distributions and per capita bioscience related patents.⁸



Conclusion

Boston has earned the most NIH funding of any U.S. city for the 20th year in a row due to its critical mass of researchers and resources. Boston has a well-educated labor force supported by world class hospitals and universities and robust life tech industries.

NIH funding to Boston researchers has facilitated dramatic breakthroughs in science that will improve healthcare and quality of life for years to come. Examples of NIH funded research include the following:

- Researchers at Boston University and MGH are developing a bionic pancreas for patients with Type I diabetes
- Researchers at MGH developed techniques to better preserve organs for transplantation
- Researchers at Dana Farber Cancer Institute developed a new drug combination for treating ovarian cancer.



End Notes

- ¹ National Institutes of Health. "About NIH," last modified February 2, 2015. <http://www.nih.gov/about/mission.htm>
- ² National Institutes of Health. "About NIH," last modified February 2, 2015. <http://www.nih.gov/about/>
- ³ Massachusetts General Hospital, "About Research: Facts at a Glance" <http://www.massgeneral.org/research/about/facts.aspx>
- ⁴ Cambridge Community Development Department
- ⁵ Source: U.S. Census Bureau, 20009-2013 American Community Survey, BRA Research Division Analysis
- ⁶ City of Boston's University Accountability Ordinance report; U.S. Department of Education, National Center for Education Statistics
- ⁷ MassChallenge, "Accelerator Model" <http://masschallenge.org/accelerator/model>; Vertex, "Working Here: Massachusetts" <http://careers.vrtx.com/location/massachusetts/>
- ⁸ Battelle/BIO State Bioscience Jobs, Investments and Innovation 2014 <https://www.bio.org/sites/default/files/Battelle-BIO-2014-Industry.pdf>, p. 46-48
- ⁹ National Institutes of Health, "Bionic Pancreas" <http://www.nih.gov/news/health/jun2014/niddk-15.htm>
- ¹⁰ National Institutes of Health, "Liver Preservation" <http://www.nih.gov/news/health/jun2014/nibib-30.htm>
- ¹¹ National Institutes of Health, "Ovarian Cancer" <http://www.nih.gov/news/health/jun2014/nci-02.htm>





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