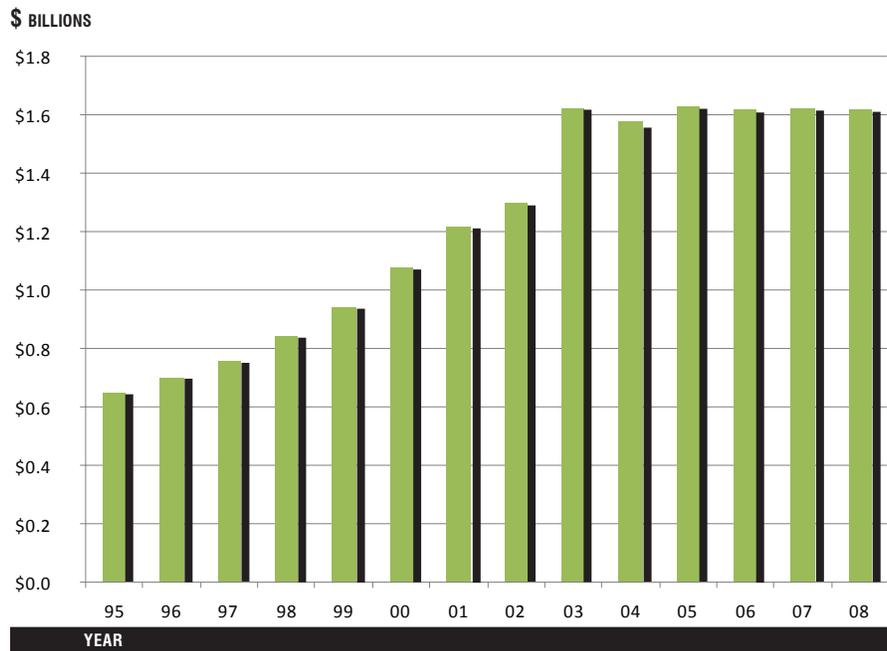


# Boston Leads the Nation in NIH Awards Top Recipient for 14 Consecutive Years

THE NATIONAL INSTITUTES OF HEALTH (NIH), a part of the U.S. Department of Health and Human Services, is the agency directly responsible for funding biomedical and health-related research across areas including: medical and academic centers, research universities, and pharmaceutical and biotech companies. In Federal Fiscal Year (FY) 2008<sup>1</sup>, the annual budget for NIH was \$28 billion. More than 80% of the NIH's annual funding is distributed through 50,000 competitive grants. These grants are awarded for medical research to more than 325,000 researchers at over 3,000 universities, medical schools, and other research institutions and life sciences companies throughout the United States, as well as around the world. These monies are critical in easing the surge in drug development and clinical trial costs.

<sup>1</sup>Federal Fiscal Year 2008, is the last year for which full information is available. All NIH grant monies are accounted for on a Federal Fiscal Year schedule which runs from October 1 of the previous calendar year through September 30 of the noted Fiscal Year. Throughout this report, when referring to grant funding in a year, we are referring to the Federal Fiscal Year.

Boston's NIH Funding 1995 – 2008



In 2008, the full range of public, private, and non-profit agencies, firms, and institutions located within the city of Boston received more than \$1.615 billion in NIH awards. Boston led all cities in NIH funding for the 14th consecutive year. Boston's share of total national NIH funding has increased to 7.8% in 2008, moving up from nearly 7.0% in 2002.

Boston's 2008 total was nearly identical to the amounts the city received in 2007 and only a fraction below the high of \$1.626 billion of Fiscal 2005. In total, the top five cities receiving NIH awards in FY 2008 equaled \$5.322 billion. Of the top five cities, only Baltimore, home of Johns Hopkins University, received more funding than they did during FY 2007.

Nationally, NIH awards more than doubled during the 1990s. NIH funding continued to increase during the current decade, moving from \$16.5 billion in 2001 to \$22.9 billion in 2007. The 2008 awards total of \$20.8 billion reflected a small downturn, however as we will discuss later, funding made available through the American Recovery and Reinvestment Act (ARRA) will help drive up the total NIH funding again for 2009 and 2010.

Since 2001, at a time when competition for funding has been increasing, Boston has managed to raise its level of NIH funding as well as its share of total awards. This record exemplifies the quality and performance of Boston's world-renowned hospitals, universities, and research institutions, as well as illustrates the small but burgeoning number of private companies. As health care, education and research play an increasingly important role in today's knowledge-based economy, Boston's medical research sector provides a crucial and growing part of the regional economy.

### Boston Leads the Top Five Cities

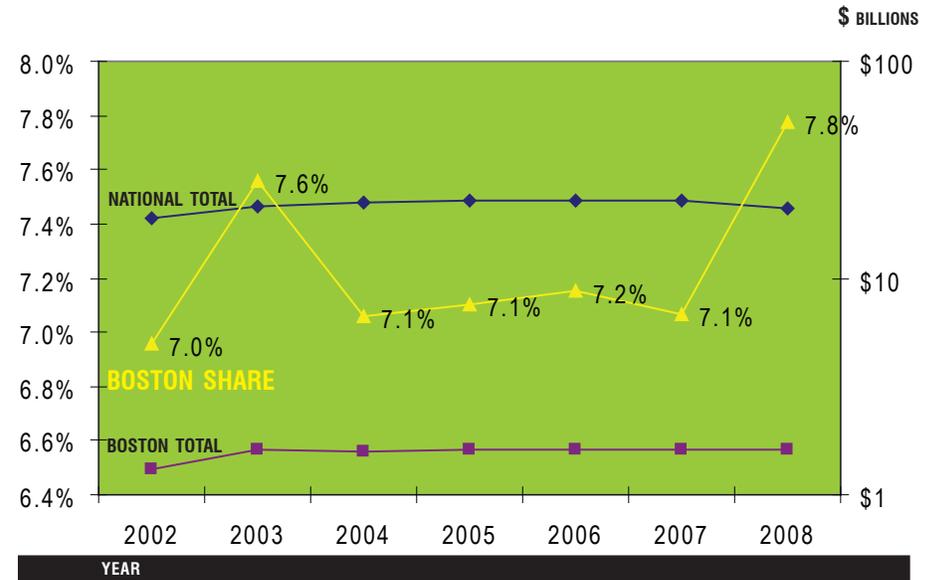
In attracting over \$1.6 billion in NIH funding in 2008, Boston finished first amongst all cities followed by New York City, Baltimore, Philadelphia, and Seattle.

Boston has been able to maintain its leadership in NIH funds for the 14 straight years despite the fact that other cities have become more competitive in attracting funding. For example, Baltimore has been able to increase its funding from \$618 million to \$972 million, a 57% increase from 2001 to 2008. During the same time Boston's percentage increase in NIH funding was 33%.

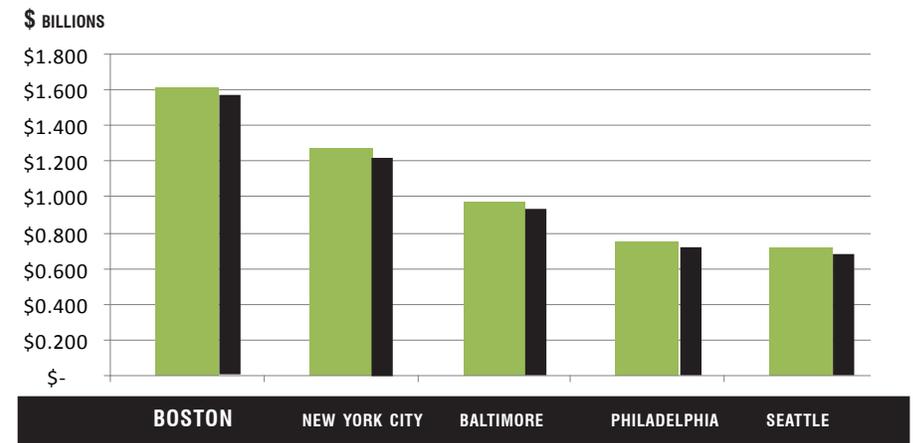
### Boston NIH Funding by Type of Institution

Independent hospitals accounted for almost \$1 billion of Boston's NIH dollars in 2008, 62% of the city's total. Institutions of higher education received more than \$531 million, 33% of the total. Boston's research institutes received more than \$78 million (almost 5%), and other private companies, non-profit organizations, health maintenance organizations and health centers received more than \$12 million (1%).

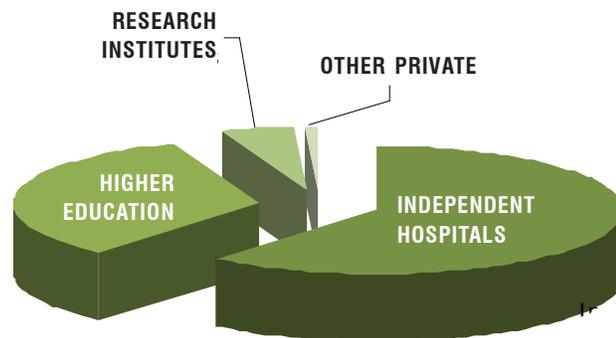
### Boston and National NIH Awards Fiscal Years 2002 – 2008



### Fiscal Year 2008 Awards – Top Five Cities



### Boston Fiscal Year 2008 NIH Awards by Type of Boston Recipient



## Hospitals

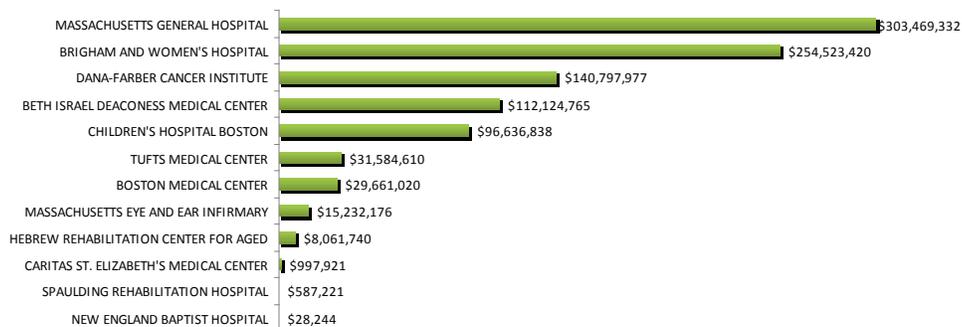
Every year since 2000 Massachusetts General Hospital (MGH) has topped the list in NIH recipients in Boston. In 2008, MGH received more than \$303 million in grants, \$202,000 more than in 2007. Brigham and Women's Hospital was second (more than \$254 million), followed by Dana Farber Cancer Institute (more than \$140 million), Beth Israel-Deaconess Medical Center (over \$112 million), and Children's Hospital (more than \$96 million).



## The Longwood Medical Area

The Brigham and Women's Hospital, Dana-Farber Cancer Institute, Beth Israel Deaconess Medical Center, Children's Hospital and Harvard University's Schools of Medicine and Public Health are all located in the city's Longwood Medical Area (LMA). This world-famous medical campus is also home to a number of other health care, research, and educational institutions. Collectively, the institutions in the Longwood Medical Area received more than \$949 million in NIH grants in FY2008. If the Longwood Medical Area were a city unto itself, it would rank 4th among the major full-city recipients of NIH funding, smaller than only all of Boston, New York City and Baltimore.

## Fiscal Year 2008 NIH Awards to Boston Hospitals



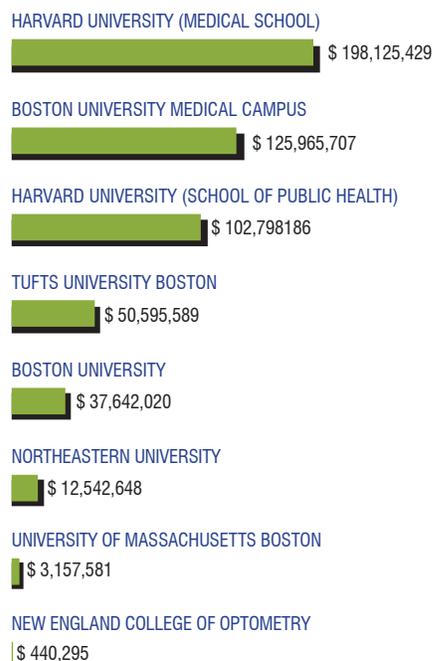
## Longwood Medical Area Institutions with NIH Awards

<b>LONGWOOD MEDICAL AREA TOTAL</b>	<b>\$ 949,005,989</b>
BRIGHAM AND WOMEN'S HOSPITAL	\$ 254,523,420
HARVARD UNIVERSITY (MEDICAL SCHOOL)	\$ 198,125,429
DANA-FARBER CANCER INSTITUTE	\$ 140,797,977
BETH ISRAEL DEACONESS MEDICAL CENTER	\$ 112,124,765
HARVARD UNIVERSITY (SCHOOL OF PUBLIC HEALTH)	\$ 102,798,186
CHILDREN'S HOSPITAL BOSTON	\$ 96,636,838
IMMUNE DISEASE INSTITUTE INC.	\$ 22,385,864
JOSLIN DIABETES CENTER	\$ 20,897,533
JUDGE BAKER CHILDREN'S CENTER	\$ 715,977

## Colleges and Universities

Boston's colleges and universities attracted almost one-third of the city's 2008 NIH funding. Harvard University Medical School led all of these institutions, attracting more than \$198 million in NIH funding, 15% greater than for the previous year. Boston University Medical School was second (more than \$125 million) followed by Harvard University School of Public Health (over \$102 million), Tufts University (almost \$51 million), and Boston University (close to \$38 million).

## Fiscal Year 2008 NIH Awards to Boston Colleges and Universities



## Other Organizations 2008

<b>ALL OTHER ORGANIZATIONS, TOTAL</b>	<b>\$12,334,826</b>
PRIVATE FIRMS, TOTAL	\$ 3,610,250
IMMUNETICS, INC.	\$ 1,356,661
ALTEC, INC.	\$ 455,129
TALKING LIGHTS, LLC	\$ 375,068
MEDICAL DISCOVERY PARTNERS, LLC	\$ 373,948
EUTROPICS PHARMACEUTICALS, INC.	\$ 326,983
CATALYST INSTITUTE, INC.	\$ 323,693
ARIETIS	\$ 299,643
FENWAY BIOSCIENCE, INC.	\$ 99,125
<hr/>	
<b>NON-PROFIT ORGANIZATIONS, TOTAL</b>	<b>\$ 177,520</b>
JUSTICE RESOURCE INSTITUTE	\$ 163,504
AMERICAN SOC OF LAW, MEDICINE & ETHICS	\$ 14,016
<hr/>	
<b>NON-PROFIT HEALTH ORGANIZATIONS, TOTAL</b>	<b>\$ 8,547,056</b>
HARVARD PILGRIM HEALTH CARE, INC.	\$ 6,484,234
FENWAY COMMUNITY HEALTH CENTER	\$ 1,246,845
JUDGE BAKER CHILDREN'S CENTER	\$ 715,977
HLTH SVCS PARTNERSHIP OF DORCHESTER	\$ 100,000

## Boston's Smaller Institutions and Organizations

The amount of NIH funding received by Boston's smaller private companies, non-profit institutions, and Health Maintenance Organizations (HMOs) and health centers grew to almost \$13 million in 2008.

This, despite being much lower than the amounts received by the city's major hospital, educational and research institutions in the city, is increasingly becoming a larger component of the city's total.



## Research Institutions

In 2008, more than \$78 million was awarded to Boston's research institutes in. These include the Immune Disease Institute, formerly known as the Center for Blood Research (over \$23 million), Joslin Diabetes Center (more than \$20 million), Schepens Eye Research Institute (more than \$13 million), Frontier Science & Technology Foundation (almost \$15 million), and Forsythe Institute (over \$8 million).

While NIH funding is predominately directed toward research activities, funds also go to support fellowships and related medical, educational, and research training programs that are an important component of Boston's knowledge-based institutions.

These smaller organizations have an important impact. Aside from creating jobs, paying taxes, and providing services to people in the Greater Boston region, their work supports and complements that of the larger institutions, while generating new ideas and applications. Some of the small private bio-tech and medical research companies in Boston, ranked from largest to smallest in NIH awards, include: Immunetics, Altec, Talking Lights, Medical Discovery Partners, Eutropics Pharmaceuticals, Catalyst Institute, Arietis, and Fenway Bioscience.



## Topics of Research Funding

Topics that attracted NIH funding in Boston in 2008 ranged from anatomy and biology to social and veterinary clinical sciences. They include technology-intensive areas such as mechanical and industrial engineering, pharmaceutical-based areas such as pharmacology and experimental therapeutics, and bio-tech areas such as biological chemistry and genetics. The following table lists the NIH Award categories for approximately 30% of the grants awarded and reflects the diversity and range of Boston's life sciences and medical research community.

## State Ranking in NIH Awards

In 2008, the NIH awarded \$20.778 billion in awards to U.S. states and territories. Massachusetts trailed only California in total NIH funding and awards among all U.S. states and territories. California ranks high on this list due, in part, to its large population and concentration of several major urban areas.

When accounting for population size, Massachusetts is by far and away the number one state in NIH awards. Massachusetts received approximately \$347 per capita in NIH funding, more than double the mark of the next highest state.



## Top NIH Award Topic Categories to Boston for 2008

BIOCHEMISTRY	124
INTERNAL MEDICINE/MEDICINE	110
PUBLIC HEALTH & PREVENTATIVE MEDICINE	98
ANATOMY/CELL BIOLOGY	75
BIOLOGY	75
MICROBIOLOGY/IMMUNOLOGY/ AND VIROLOGY	75
GENETICS	52
PATHOLOGY	50
DENTISTRY	47
PSYCHOLOGY	36
NEUROLOGY	34
NUTRITION	33
ENGINEERING (ALL TYPES)	31
PSYCHIATRY	31
PHARMACOLOGY	28
VETERINARY SCIENCES	24
BIostatISTICS & OTHER MATH SCIENCES	22
OTHER HEALTH PROFESSIONS	19
PHYSIOLOGY	19
ADMINISTRATION	17
CHEMISTRY	17
NEUROSCIENCES	13
PHYSICS	7
MISCELLANEOUS, SPECIFIED	63
<b>TOTAL SPECIFIED</b>	<b>1,100</b>
<b>NOT SPECIFIED</b>	<b>2,577</b>
<b>GRAND TOTAL</b>	<b>3,677</b>

## 2008 NIH Awards: The Top Ten States

### DOLLARS AND GRANTS AWARDED

STATE	DOLLARS AWARDED	GRANTS AWARDED
California	\$3,151,057,273	7,228
Massachusetts	\$2,252,139,029	4,932
New York	\$1,876,328,218	4,643
Pennsylvania	\$1,354,061,770	3,466
Texas	\$1,074,229,689	2,738
Maryland	\$ 972,375,730	2,140
North Carolina	\$ 931,855,917	2,130
Washington	\$ 761,401,047	1,539
Illinois	\$ 719,247,226	1,963
Ohio	\$ 636,620,056	1,727

### DOLLARS PER CAPITA

STATE	DOLLARS PER CAPITA
Massachusetts	\$ 346.59
Maryland	\$ 172.60
Connecticut	\$ 133.38
Rhode Island	\$ 132.01
Washington	\$ 116.26
Pennsylvania	\$ 108.78
Vermont	\$ 104.09
North Carolina	\$ 101.04
New York	\$ 96.27
California	\$ 85.73

## Cambridge Would Add Another \$315 Million

Institutions in the City of Cambridge are also major recipients of NIH funding and awards. Cambridge is home to the Massachusetts Institute of Technology (MIT), one of the premier science and technology colleges in the world, and also hosts most of Harvard University's undergraduate and graduate departments. These two universities combined received close to \$260 billion in NIH awards during 2008. Cambridge also has 22 private biotech firms which received a total of \$21.5 million in awards. In addition, seven research institutes receiving NIH funding including the renowned Whitehead Institute. These institutions garnered \$33.6 million in 2008. Together, Cambridge and Boston combined received a total of \$1.93 billion in NIH awards in 2008. Few other places in the U.S. other than San Diego and the San Francisco-Oakland-San Jose region have such a concentration of NIH funded companies and institutions.

## Boston and Cambridge Concentration of NIH Awards in Massachusetts

	GRANTS	DOLLARS AWARDED
<b>Boston</b>	<b>3,677</b>	<b>\$ 1,615,799,072</b>
<b>Cambridge</b>	<b>569</b>	<b>\$ 314,736,031</b>
<b>Combined</b>	<b>4,246</b>	<b>\$ 1,930,535,103</b>
<b>Massachusetts</b>	<b>5,145</b>	<b>\$ 2,252,139,029</b>
<b>Percentage</b>	<b>82.5%</b>	<b>85.7%</b>

## Boston's Lead Over New York Grows Larger

Since 1995, when Boston's NIH funding first topped that of New York, Boston's lead has continued to grow. In 1995 Boston received \$17.7 million more than second-place New York City. In 2008, Boston received \$343 million more in NIH funding than New York City. There are several reasons for Boston's growing lead. First, Boston's major NIH award recipients tend to be larger institutions than those in New York. New York has a total of 86 recipients receiving an average of \$14.8 million while Boston has 39 total recipients averaging \$41.4 million. Secondly, in total, Boston's major medical centers and medical schools have both tripled their NIH award size since 1992. While similar institutes in New York also experienced a growth in NIH awards, their total award amount only doubled since 1992.

*See the tables at the end of the report for a detailed comparison between Boston and New York.*

## American Recovery and Reinvestment Act

The recent American Recovery and Reinvestment Act (ARRA) sets aside an additional \$8.2 billion in NIH funding. While NIH Institutes and Centers (ICs) have broad flexibility to invest in many different types of projects, these additional funds are geared towards helping create and retain jobs, increase student-teacher training opportunities, accelerate moving new drugs to the marketplace, and making significant scientific progress over the next two years.

As of August 2009, through the additional NIH funding in ARRA, the NIH has awarded 487 grantees at various institutions in Massachusetts. These awards total over \$118 million. Of the federal funds and grantees in Massachusetts, \$91 million and 369 recipients are part of Boston's larger bio-technology and life sciences community.

<b>Boston</b>	<b>1992</b>	<b>2008</b>	<b>Change</b>
Boston	\$ 571,747,151	\$ 1,615,799,072	282.6%
Recipients	39	39	
There in 1992 Not in 2008	21		
There in 2008 and Not in 1992		21	
There Both Years	18	18	
<b>Average Award Per Recipient</b>	<b>\$ 14,660,183</b>	<b>\$ 41,430,745</b>	<b>282.6%</b>
Boston Population 2008		609,023	
Awards Per Capita 2008		\$ 2,653	
U.S. Inflation Rate, 1992 – 2008	86.385	122.422	141.7%
Growth in U.S. NIH Awards, 1992 – 2008	\$7,079,887,000	\$20,778,393,376	293.5%

#### **Boston Top Ten in 2008 and change from 1992 (current year dollars)**

	<b>1992</b>	<b>2008</b>
1 MASSACHUSETTS GENERAL HOSPITAL	\$ 85,873,616	\$ 303,469,332
2 BRIGHAM AND WOMEN'S HOSPITAL	\$ 84,431,466	\$ 254,523,420
3 HARVARD UNIVERSITY (MEDICAL SCHOOL)*	\$ 114,892,133	\$ 198,125,429
4 DANA-FARBER CANCER INSTITUTE	\$ 50,724,635	\$ 140,797,977
5 BOSTON UNIVERSITY MEDICAL CAMPUS**	\$ 53,656,467	\$ 125,965,707
6 BETH ISRAEL DEACONESS MEDICAL CENTER***	\$ 32,746,729	\$ 112,124,765
7 HARVARD UNIVERSITY (SCH OF PUBLIC HLTH)*	\$ 114,892,133	\$ 102,798,186
8 CHILDREN'S HOSPITAL (BOSTON)	\$ 34,588,194	\$ 96,636,838
9 TUFTS UNIVERSITY BOSTON	\$ 26,623,128	\$ 50,595,589
10 BOSTON UNIVERSITY**	\$ 53,656,467	\$ 37,642,020

<b>TOTAL OF TOP 10</b>	<b>\$483,536,368</b>	<b>\$1,422,679,263</b>
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\* In 1992 Harvard Medical School awards were combined with the Harvard School of Public Health, so the correct comparison is between \$114.8 million in 1992 and \$302.9 million in 2008.

\*\* In 1992 both the BU Medical Campus (School) and the rest of Boston University was combined, so the correct comparison is between \$56.6 million in 1992 and \$163.5 million in 2008.

\*\*\* In 1992 these were 2 different medical centers, the 1992 figure represents the combined total of \$21.8 million for Beth Israel Hospital and \$10.8 million for Deaconess Hospital

<b>New York City</b>	<b>1992</b>	<b>2008</b>	<b>Change</b>
New York City	\$604,739,981	\$1,272,280,154	210.4%
Total Recipients	75	86	
There in 1992 not in 2008	35		
There in 2008 and not in 1992		46	
There Both Years	40	40	
<b>Average Award Per Recipient</b>	<b>\$ 8,063,200</b>	<b>\$ 14,793,955</b>	<b>183.5%</b>
New York Population 2008		8,363,710	
Awards per capita 2008		\$ 152	
U.S. Inflation rate, 1992-2008	86.385	122.422	141.7%
Growth in U.S. NIH Awards, 1992-2008	\$7,079,887,000	\$20,778,393,376	293.5%

#### **New York City Top 10 in 2008 and change from 1992 (in current year dollars)**

	<b>1992</b>	<b>2008</b>
1 COLUMBIA UNIVERSITY HEALTH SCIENCES*	\$136,471,279	\$ 278,909,111
2 MOUNT SINAI SCHOOL OF MEDICINE OF NYU**	\$ 49,621,567	\$ 175,849,549
3 NEW YORK UNIVERSITY SCHOOL OF MEDICINE***	\$ 73,627,987	\$ 122,503,787
4 YESHIVA UNIVERSITY	\$ 76,568,816	\$ 132,129,676
5 SLOAN-KETTERING INSTITUTE FOR CANCER RES	\$ 45,996,211	\$ 110,661,605
6 WEILL MEDICAL COLLEGE OF CORNELL UNIVERSITY	\$ 53,481,410	\$ 108,959,265
7 ROCKEFELLER UNIVERSITY	\$ 36,413,528	\$ 63,768,202
8 NEW YORK STATE PSYCHIATRIC INSTITUTE	\$ 23,460,101	\$ 50,789,662
9 COLUMBIA UNIV NEW YORK MORNINGSIDE*	\$136,471,279	\$ 41,703,205
10 NEW YORK UNIVERSITY***	\$ 73,627,987	\$ 29,500,693

<b>TOTAL OF TOP 10</b>	<b>\$495,640,899</b>	<b>\$1,114,774,755</b>
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\* In 1992 Columbia University Health Sciences awards were combined with the Columbia University Morningside Campus, so the correct comparison is between \$136.4 million in 1992 and \$320.6 million in 2008.

\*\* Mount Sinai School of Medicine was affiliated with CUNY in 1992

\*\*\* In 1992 New York University School of Medicine and New York University were combined in reporting awards, so the correct comparison is between \$73.6 million in 1992 and \$152.0 million in 2008



## Conclusion

Boston is a renowned center for biomedical research and scientific discovery. Since the early 1990s, the U.S. government's effort to fund medical research through NIH awards has helped grow this vital industry in Boston.

This strategic investment is paying dividends in advancing medical research, including the development of cutting-edge therapies and the discovery of new drugs and related pharmaceuticals to treat disease and chronic conditions. In addition, NIH grants play an important role in the economic development of the City. According to the NIH Record – a bi-weekly newsletter for employees of the National Institutes of Health – each NIH grant supports six new jobs.<sup>2</sup> Applying this to Boston, NIH grants accounted for 22,062 jobs in 2008.

The biomedical and life sciences industry is one of the future foundations of Boston's economy. This sector is expected to grow in the future and deserves to be enhanced and maintained by effective economic development policies.

<sup>2</sup> Source: National Institutes of Health Record, Vol. LXI, No. 1; ACD Hears U.S. Stimulus Package Could Spur NIH Finances; January 9, 2009; [http://nihrecord.od.nih.gov/newsletters/2009/01\\_09\\_2009/story2.htm](http://nihrecord.od.nih.gov/newsletters/2009/01_09_2009/story2.htm)



CITY OF BOSTON  
Thomas M. Menino  
*Mayor*



Boston  
Redevelopment  
Authority

John F. Palmieri  
*Director*

Prepared by:  
Boston Redevelopment Authority  
Research Division  
Gregory Perkins  
Mark Melnik  
Alvaro Lima, *Director of Research*

Source: National Institutes of Health, Boston Redevelopment Authority, Research Division Analysis

If you want to learn more about the Life Sciences industry in Boston and the Mayor's LifeTech program, please contact Martina Toponarski, Biotechnology and Life Sciences Manager for LifeTech Boston, at 617.918.4457 or [Martina.Toponarski.bra@cityofboston.gov](mailto:Martina.Toponarski.bra@cityofboston.gov)