

## PENNSYLVANIA

Pennsylvania accounts for approximately 5 percent or more of national employment and State specializations or concentrations in three bioscience subsectors—research, testing, and medical laboratories (location quotient of 1.69); drugs and pharmaceuticals (1.63); and medical devices and equipment (1.12). Pennsylvania ranked among the top 5 states across all additional key bioscience metrics. Academic bioscience research expenditures were nearly \$1.5 billion in 2006, heavily concentrated in medical sciences (\$971 million). Venture capital investments in the biosciences rose steadily over the past 6 years, totaling nearly \$2.8 billion, invested mostly in pharmaceuticals, human biotechnology, and medical therapeutics. The 8,522 bioscience patents over the same period were mainly in drugs and pharmaceuticals, surgical and medical equipment, and biochemistry.

### Major Industry Developments and Recent Successes

- **Morphotek** was acquired in April 2007 by Eisai Corporation for \$325 million and will remain in Exton. Founded in 2000 with early funding from the Ben Franklin Technology Partnership, Morphotek develops therapeutic monoclonal antibodies targeting cancer, rheumatoid arthritis, and infectious diseases.
- **BioEnergy International** announced in 2006 that it would construct a \$250 million biorefinery in Clearfield County, it's second in the United States, with support through the State's PennSecurity Fuels initiative.
- **Royal Philips Electronics** acquired Murrysville-based Respironics in 2007 and will make its offices the new headquarters for the Philips Home Healthcare Solutions group.

### Recent State Initiatives

Pennsylvania continued to execute on its 2002 **Pennsylvania Bioscience Strategy**, providing continued annual allocations to bioscience research and commercialization initiatives through the **Commonwealth Universal Research Enhancement (CURE)** program, the three regional **Life Sciences Greenhouses** and the associated **Health Venture Investment Account** (now fully committed to four private venture-capital partnerships), and the **Ben Franklin Technology Partners** program.

Since the last BIO report, Pennsylvania has also rolled out 29 **Keystone Innovation Zones** statewide. The KIZ program offers incentives for institutions of higher education to partner in regional economic-development strategies, offers incentives for institutions to improve technology-commercialization programs, supports Eminent-Scholar recruitments, and provides tax benefits to start-up companies in the zones.

The State has also seen considerable activity in workforce issues. A \$2.43 million grant allowed the Pittsburgh Life Sciences Greenhouse to target both employed and unemployed trainees, reaching 5,000 persons in 30 participating companies.

A statewide **Health Careers Week** reached 6,000 students in 2007, and school district-based **Bioscience Industry Partnerships** are being piloted in certain regions. New biomanufacturing diplomas are being offered at Northampton Community College in the Lehigh Valley, with the intention to replicate at other community colleges.

### Pending Proposals

Governor Edward G. Rendell's proposed **Jonas Salk Legacy Fund**, which would leverage tobacco-settlement funds to finance \$1 billion in life-science facilities investment at Pennsylvania's universities, was pending as of the 2008–2009 executive budget proposal. Governor Rendell has also proposed an

\$850 million **Energy Independence Fund**, with components similar to those of the Life Sciences Greenhouse program. This Fund would provide support for research, development, and commercialization of biofuels, among other alternative energy programs.

For additional information on Pennsylvania's bioscience policies and programs, please see <http://www.newpa.com> and <http://www.pennsylvaniabio.org>.

## Bioscience Industry Base, 2006

Industry Subsector	Pennsylvania		United States	
	2006	2001-06 Change	2006	2001-06 Change
<b>Agricultural Feedstock &amp; Chemicals</b>				
Establishments	60	-22.0%	2,183	3.8%
Employment	1,814	-37.6%	105,846	-6.1%
Location Quotient	0.40		n.a.	
Direct-Effect Employment Multiplier	7.30		11.22	
Total Employment Impact	13,245		1,214,709	
Average Annual Wage	\$69,580		\$67,870	
<b>Drugs &amp; Pharmaceuticals</b>				
Establishments	111	-10.5%	2,654	1.9%
Employment	22,298	-13.5%	317,149	4.0%
Location Quotient	1.63		n.a.	
Direct-Effect Employment Multiplier	7.61		9.92	
Total Employment Impact	169,761		2,880,242	
Average Annual Wage	\$98,070		\$86,892	
<b>Medical Devices &amp; Equipment</b>				
Establishments	598	-8.0%	15,215	0.3%
Employment	20,446	-3.6%	422,993	-0.9%
Location Quotient	1.12		n.a.	
Direct-Effect Employment Multiplier	3.48		4.85	
Total Employment Impact	71,251		1,980,128	
Average Annual Wage	\$54,341		\$59,441	
<b>Research, Testing, &amp; Medical Laboratories</b>				
Establishments	967	12.4%	22,857	32.7%
Employment	32,855	42.2%	449,991	17.8%
Location Quotient	1.69		n.a.	
Direct-Effect Employment Multiplier	2.59		3.25	
Total Employment Impact	85,182		1,440,500	
Average Annual Wage	\$75,575		\$71,284	
<b>Total Private Sector</b>				
Establishments	319,410	-0.7%	8,575,730	10.2%
Employment	4,890,305	0.8%	113,463,842	3.1%
Average Annual Wage	\$41,013		\$42,272	

Note: n.a. = metric is not applicable.

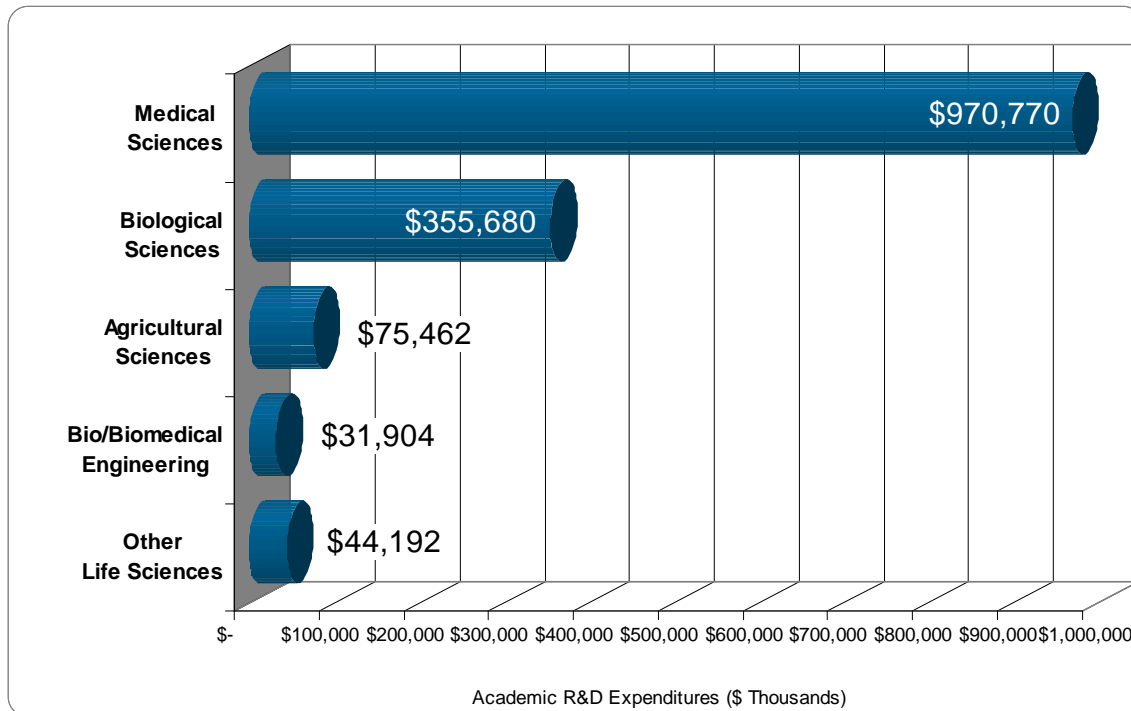
## Additional Bioscience Performance Metrics

### Summary of State Performance in Selected Bioscience-related Metrics

	Pennsylvania	United States	Rank
Academic R&D Expenditures, FY 2006			
Total (\$ thousands)	\$2,428,346	\$47,760,402	5
Bioscience R&D (\$ thousands)	\$1,478,008	\$29,307,628	4
Bioscience Share of Total R&D	60.9%	61.4%	
Bioscience R&D Per Capita	\$119.17	\$98.10	
Change in Bioscience R&D FY 2002–2006	30.2%	36.9%	
NIH Funding, FY 2007			
Total (\$ thousands)	\$1,399,308	\$21,066,389	4
Per Capita Funding	\$112.55	\$69.84	
Change in Funding, FY 2002–2007	12.4%	11.2%	
Higher Education Degrees in Bioscience Fields, AY 2006	7,506	143,433	5
Employment in Bioscience-related Occupations, 2006	34,780	588,520	2
Bioscience Venture Capital Investments, 2002-2007 (\$ millions)	\$2,771.6	\$51,260.9	4
Bioscience and Related Patents, 2002-2007	8,522	121,817	3

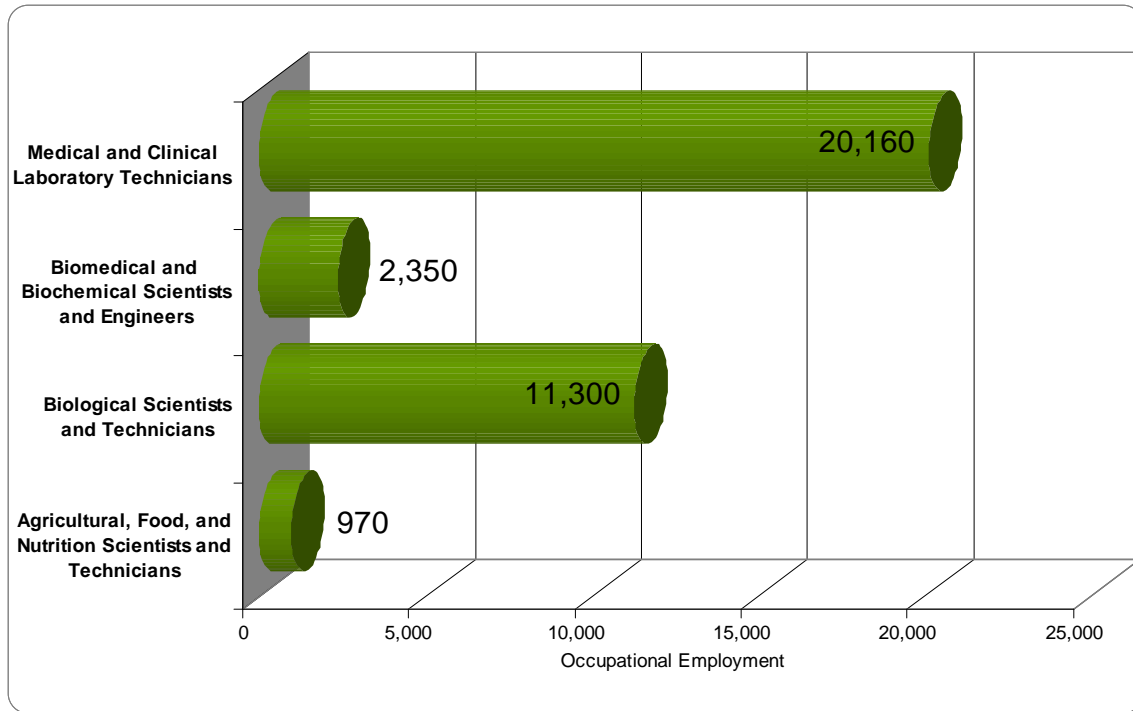
## Bioscience R&D Base

### Bioscience Academic R&D Expenditures in Pennsylvania, FY 2006

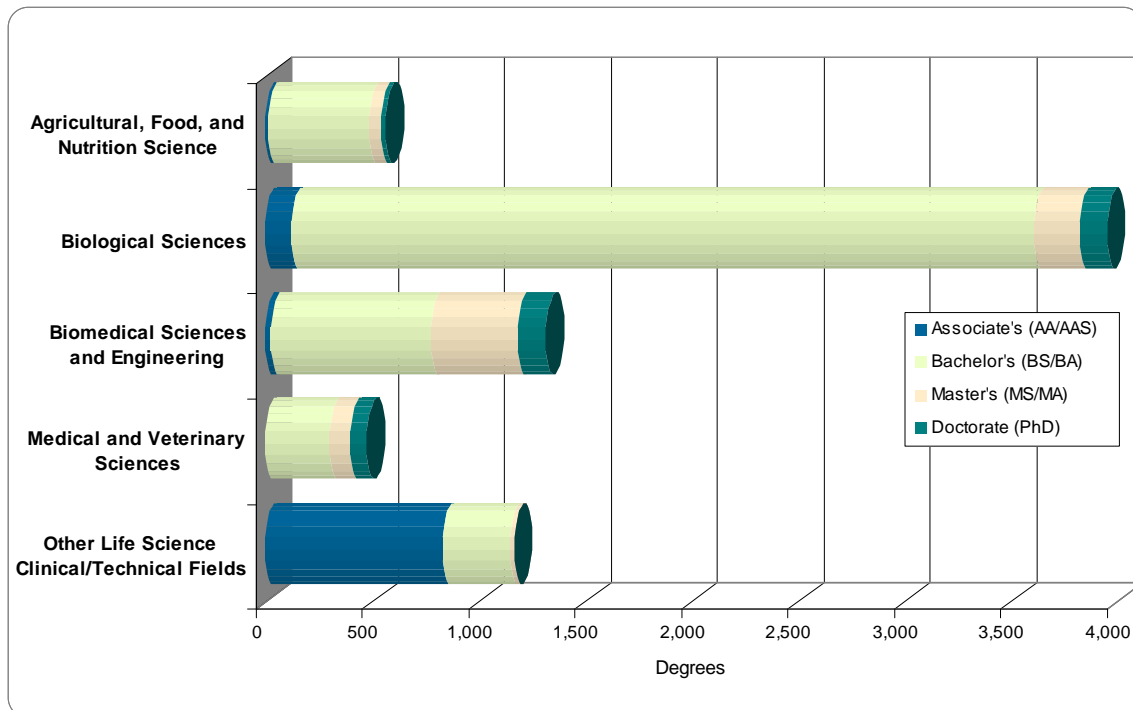


## Bioscience Talent Base

### Bioscience-related Occupational Employment in Pennsylvania, 2006

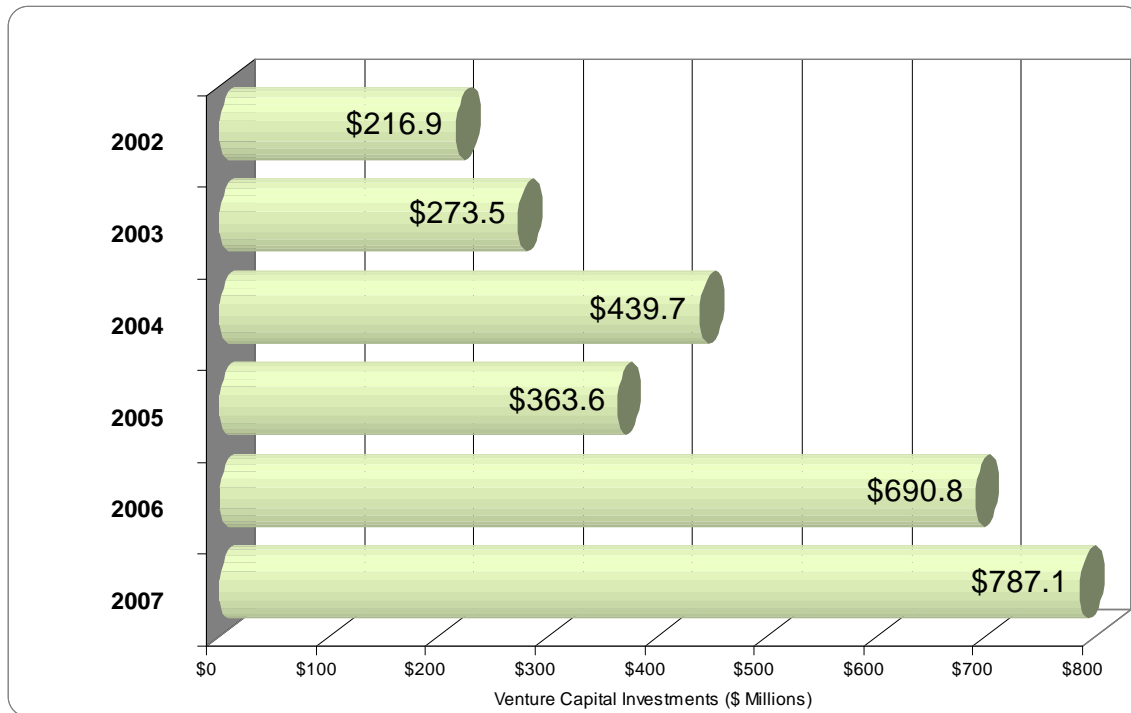


### Bioscience-related Degrees in Pennsylvania, AY 2006

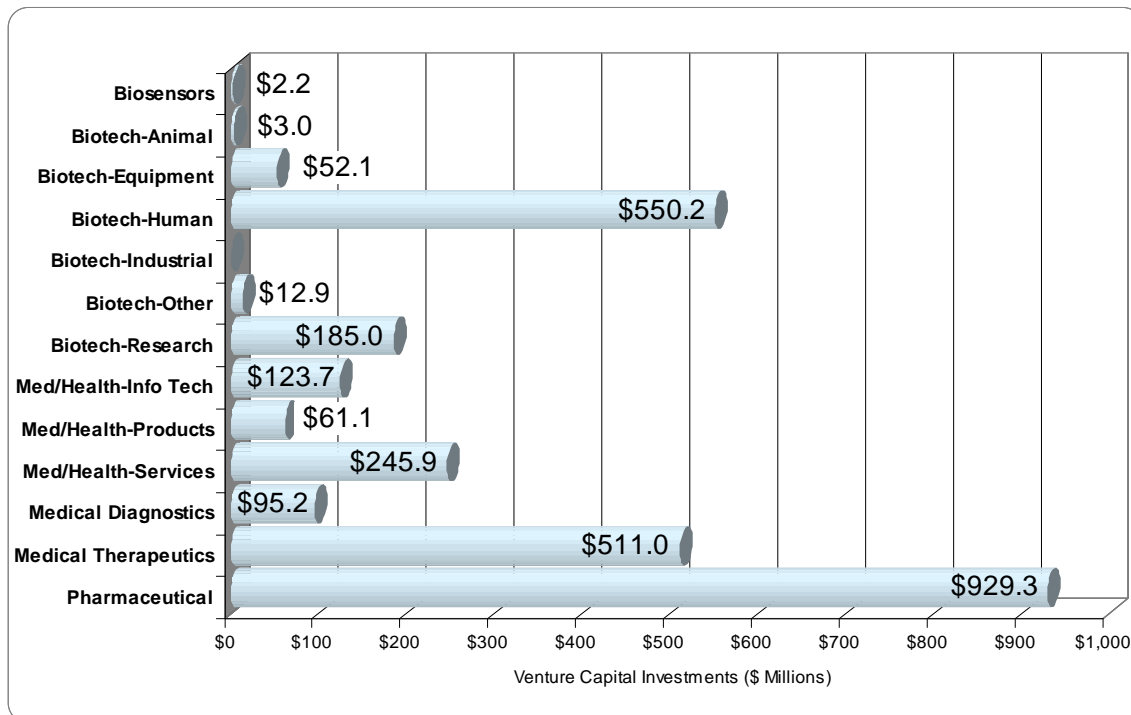


## Bioscience Venture Capital

### Bioscience-related Venture Capital Investments in Pennsylvania, 2002–2007

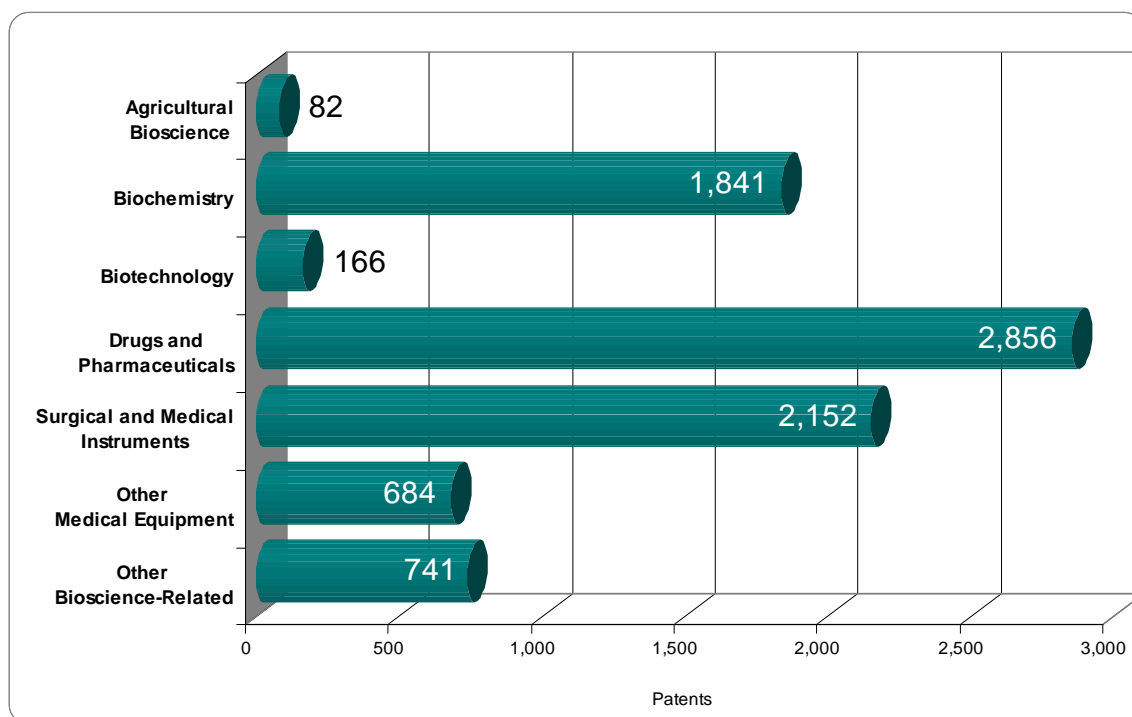


### Bioscience-related Venture Capital Investments in Pennsylvania by Segment, 2002–2007



## Bioscience Patents

### Bioscience-related Patents by Classification Group in Pennsylvania, 2002–2007



## State Bioscience Contacts

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### Source Notes:

**Employment, Establishment, and Wage Data:** U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) industry data provided by the Minnesota IMPLAN Group, 2001 and 2006.

**Employment Multipliers:** U.S. Bureau of Economic Analysis RIMS II Employment Multipliers, 2005 (most currently available).

**Academic R&D Expenditures:** National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges, 2002 and 2006.

**NIH Funding:** National Institutes of Health – Office of Extramural Research, Award Trends – Dollars Awarded by State, 2002 and 2007.

**Higher Education Degrees:** National Center for Educational Statistics, Integrated Postsecondary Education Data System (IPEDS), 2006.

**Occupational Employment:** U.S. Bureau of Labor Statistics, Occupational Employment Statistics (OES) survey data, 2006.

**Venture Capital:** Thomson Reuters VentureXpert Database, 2002-2007, as of May 1, 2008.

**Patents:** U.S. Patent & Trademark Office data as available from the Thomson Reuters' Delphion Patent Analysis Database, 2002–2007, as of May 1, 2008.

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