



**CincyBio 2009**

# **State of the Bioscience Industry**

John F. Lewis Jr.

11-4-09

*An Ohio Thomas Edison Center*

# Why Listen to me?

- We want to give you...better equip you...to...
- Licensed attorney in Ohio 1987
- 18 yrs international and TBED experience
- Lived in 3 countries, traveled to >50
  - VC in Caribbean, Medical/Pharma/Opto Asia
- Started offices, JV's in Korea & China, closed one in PRC
- Since 2001 been with BioOhio
  - Helped raised more than \$1 billion



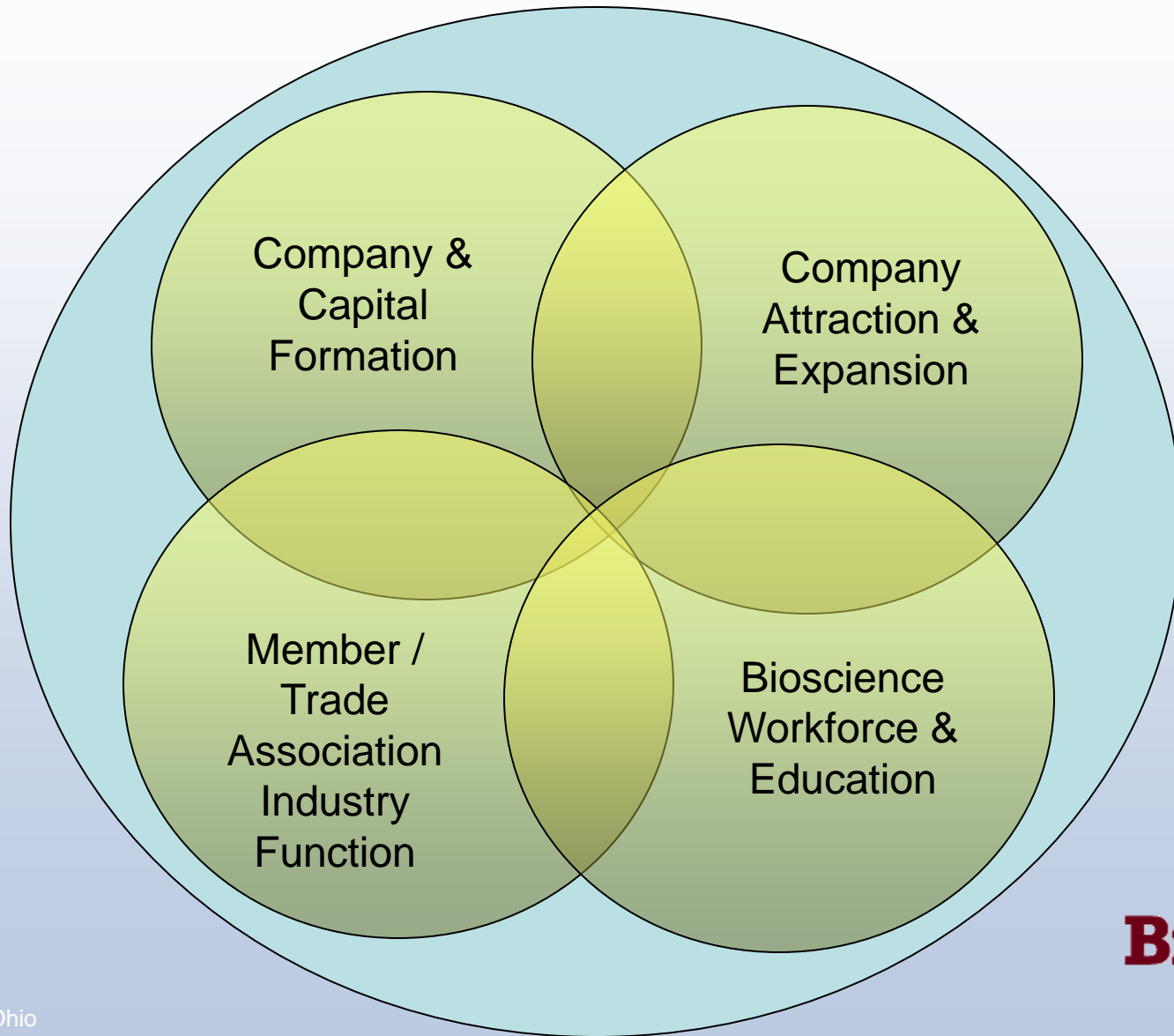
# Our History

- 1987 Edison BioTechnology Center (EBTC)
- 2001 Moved HQS to Columbus
- 2002 Omeris
- 2007 BioOhio



# BioOhio's Balanced Strategy

industry growth, resource optimization, community building



# BioOhio Statewide Board

- **John A Bantle, II**, PhD, Vice President - Research, Wright State University
- **Timothy G. Biro**, CEO - MORK Process; Partner, Ohio Innovation Fund & Reservoir Ventures
- **Rathindra Bose**, PhD, Vice President for Research & Creative Activity - Ohio University
- **Mark A. Collar**, Chairman - Third Frontier Advisory Board
- **Sandra J. Degen**, PhD, Vice President for Research - University of Cincinnati
- **Anthony J. Dennis**, PhD, President & CEO - BioOhio
- **Brian Duncan**, Medical Director, Emerging Businesses - Cleveland Clinic
- **Kevin Driscoll**, PhD, Exec Director, Global Health Care Connect & Develop-Procter & Gamble
- **John Fisher**, Executive Vice President - Ohio Farm Bureau Federation
- **Mike Hooven**, President & CEO - Enable Medical Technologies
- **Peter G. Kleinhenz**, General Partner - CID Equity Partners
- **Barbara Kunz**, President - Health & Life Science Global Division Battelle
- **John M. Rice**, PhD, Managing Partner - Triathlon Medical Ventures
- **David R. Scholl**, PhD, President & CEO - Diagnostic Hybrids
- **Arnold W. Strauss**, MD, Director - Cincinnati Children's Research Foundation
- **Caroline Whitacre**, PhD, Senior Vice President for Research - The Ohio State University



# Be Proud...Be Strategic

“ Ohio is one of the best places in the world to optimize the growth of your bioscience company because we can imbed you in an asset base, 1645 companies and growing; We are a partner that allows you to maximize any or all phases of your business strategy”



# What is Bioscience?

Agricultural  
Feedstock & Chemicals

- Agricultural processing
- Basic organic chemicals
- Ethyl alcohol mfg.
- Organic fiber mfg.
- Fertilizers
- Pesticides and other agricultural chemicals

Drugs &  
Pharmaceuticals

- Medicinal & botanicals
- Pharmaceutical preparations
- Diagnostic substances
- Biological products

Medical Devices  
& Equipment

- Laboratory apparatus & furniture
- Surgical, medical, dental, ophthalmic & analytical instruments & equipment
- Irradiation apparatus & electromedical equipment

Hospitals

- Specialty hospitals
- University medical research hospitals
- Clinical research institutions
- EMR
- Healthcare IT

Research, Testing, &  
Medical Laboratories

- Biological research
- Commercial medical research
- Testing laboratories
- Medical laboratories & diagnostic imaging centers

Product-Oriented

Service -Oriented

# Nobody should be afraid of biotech!

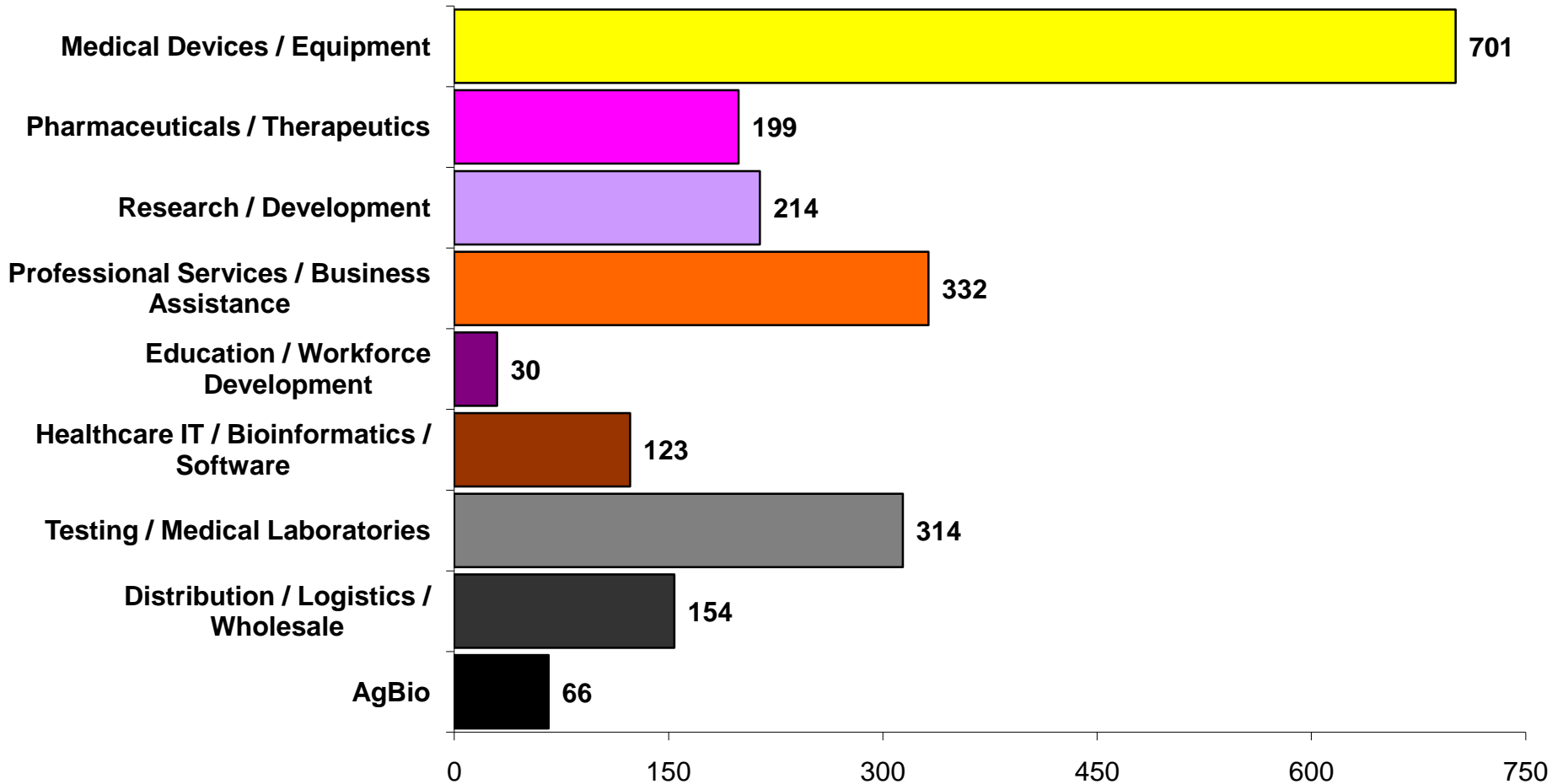


# Ohio, more than you know...

- 7th largest state with 11.5 million people
  - 4<sup>th</sup> in the nation for biotech Industry strength
  - Within 1 day drive of 61% of USA, 50% Canada
  - Highly educated workforce
- > 150 colleges and universities



# 1,645 Bioscience Establishments by Category

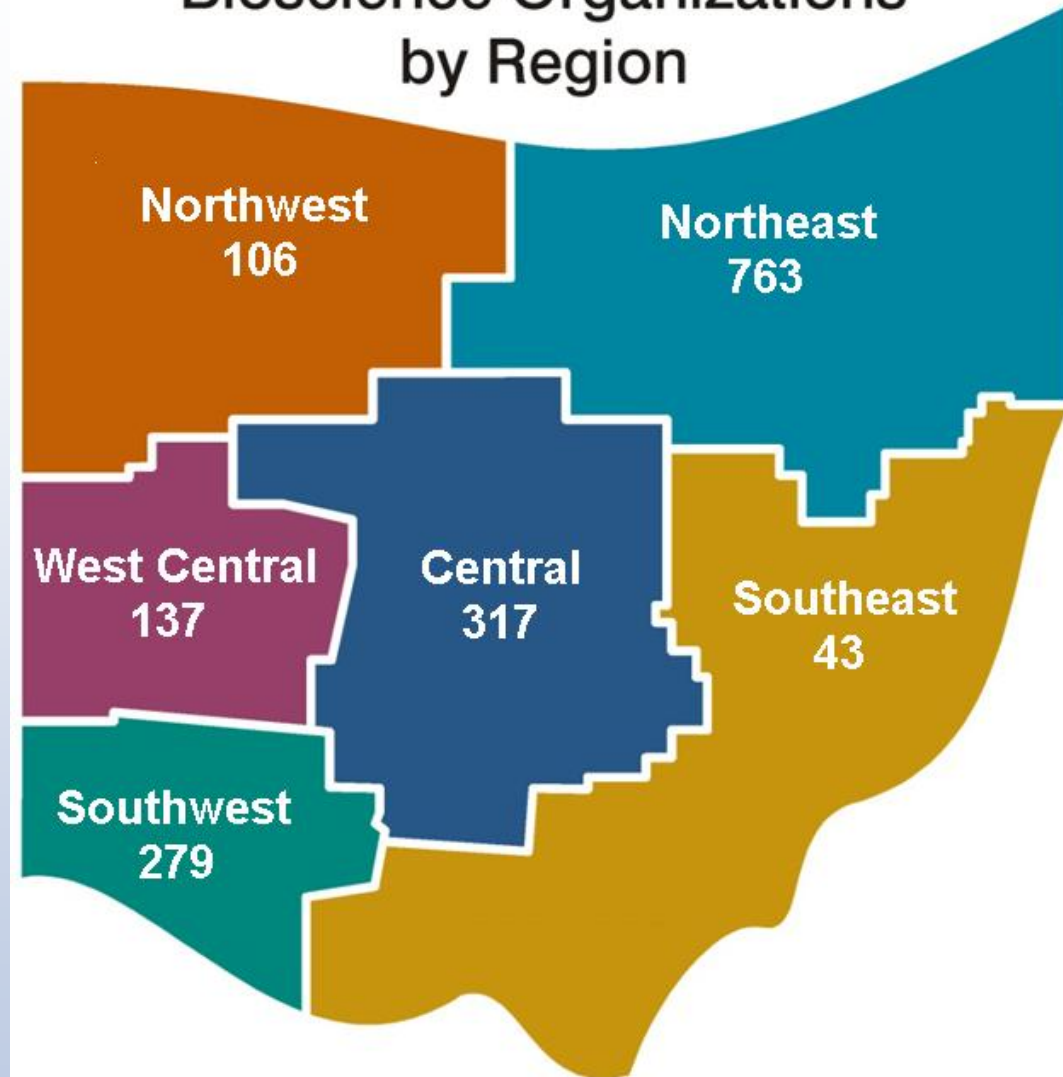


*Total Ohio bioscience establishments are 1,645 (October 26, 2009) PRELIMINARY*

*Source: BioOhio Directory*

*\*company may be categorized within one more areas, and may have multiple facilities.*

## Bioscience Organizations by Region





**CardioInsight**

**Meridian**  
Life Science, Inc.

**PHILIPS**

**SPARTON**  
CORPORATION



**charles river**  
accelerating drug development. exactly.



**NORWOOD**  
MEDICAL

**ETHICON ENDO-SURGERY**  
a Johnson & Johnson company

**P&G**

**Hill Top**  
RESEARCH

**PROGNOSTIX**

**FMI**

**IMALUX**

**ChanXpress**



**Interventional Imaging, Inc.**

**INTEGRA**

**PROGNOSTIX**



**SPINEMATRIX**  
Advanced Spine Diagnostics

Real people. Real results.®

**Alkermes**  
Patient inspired™

**INVACARE**

**GE Healthcare**

**CardinalHealth**

**COVIDIEN**

**Kendle**

**RMR**  
Rapid Medical Research, Inc.

**Abbott**  
A Promise for Life

**Athersys**  
i n c.

**MIDMARK**

**MemberHealth**

**Life Line Screening**

**V3L**  
VASCULAR BIOGENICS LTD.

**STERIS**

**THE Scotts Miracle-Gro COMPANY**  
...dedicated to a beautiful world

**COPERNICUS**  
THERAPEUTICS, INC.

**AtriCure**

**ENABLE**  
MEDICAL CORPORATION

**MEDPACE**

**MDL**  
Molecular Diagnostics Laboratories

**ScottCare**

**OrthoHelix**  
SURGICAL DESIGNS, INC.  
Surgeons speak. We deliver.™

**FRANTZ MEDICAL**

**EURAND**

**NeoMed**  
TECHNOLOGIES INC.

**DIAGNOSTIC HYBRIDS**  
Integrating Science and Humanity

**Barr Laboratories**  
A subsidiary of Barr Pharmaceuticals, Inc.

**Boehringer Ingelheim**

**neoprobe**

**Givaudan**

**i3 STATPROBE**

**Nordson**

**Patheon**  
Performance the World Over

**TREK**  
DIAGNOSTIC SYSTEMS  
MAGELLAN BIOSCIENCES

**Girindus**

**Norman Noble, Inc.**  
Serving Customers Worldwide

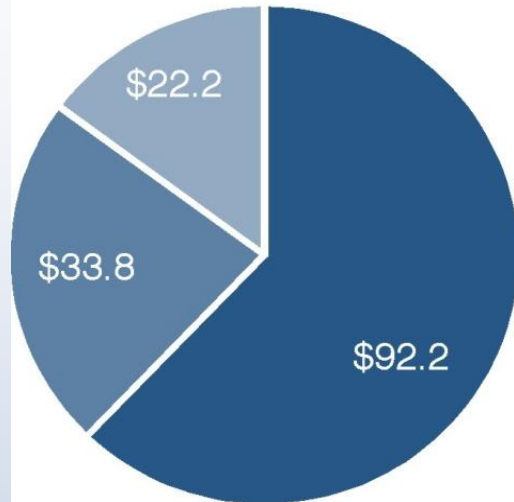
**CTI**  
Clinical Trial and Consulting Services

**AMYLIN**

**Arteriocyte, Inc.**  
Cellular Therapies for Ischemic Diseases™

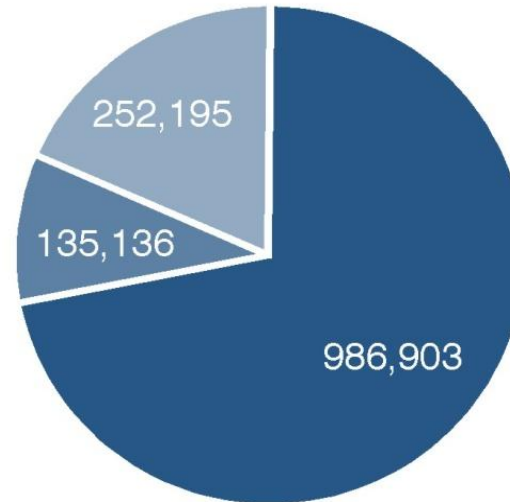
# \$146 Billion

2007 Statewide  
Economic Impact



In billions

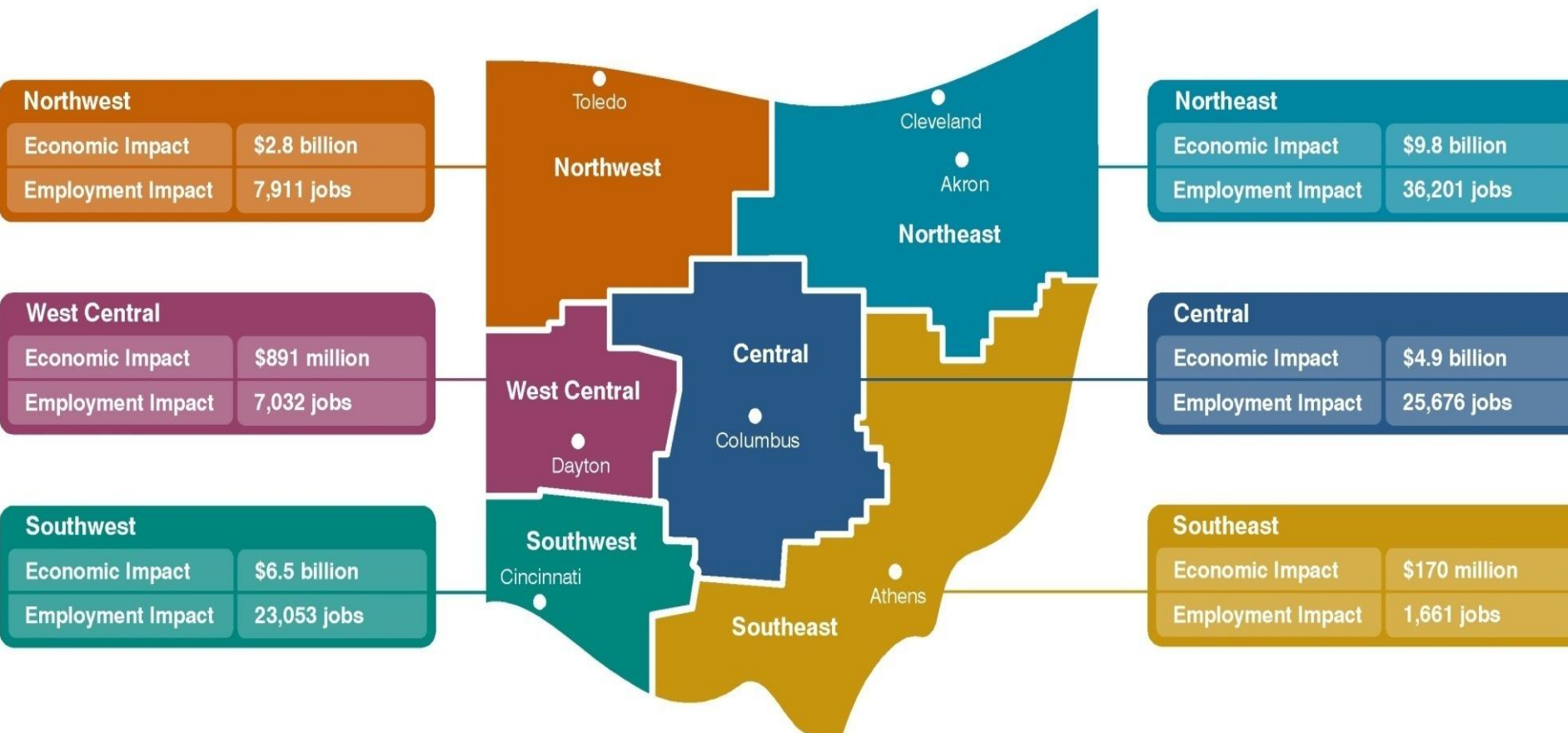
2007 Statewide  
Employment Impact



- Hospitals & Healthcare
- Commercial Bioscience Industry
- Medical Colleges



## Commercial Bioscience Sector: Total Economic Impact & Employment

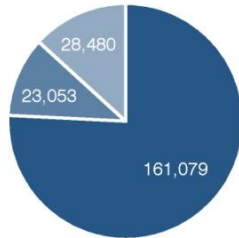


Based on 2007 data



# Southwest Ohio Regional Impact

2007 Total Employment Impact



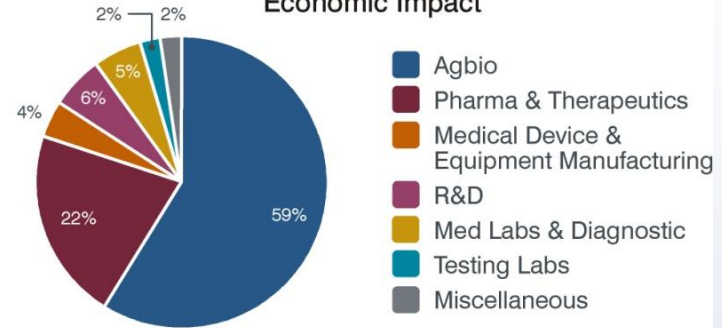
2007 Total Economic Impact



In billions

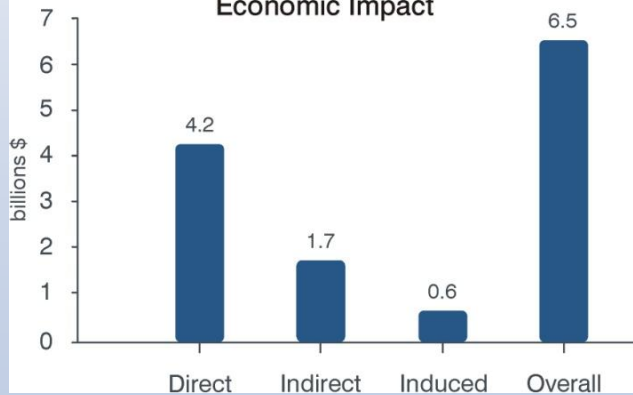
- Hospitals & Healthcare
- Commercial Bioscience Industry
- Medical Colleges

Commercial Bioscience Direct Economic Impact

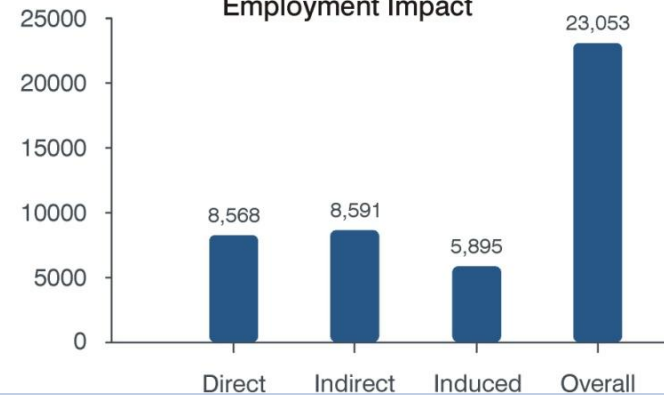


- Agbio
- Pharma & Therapeutics
- Medical Device & Equipment Manufacturing
- R&D
- Med Labs & Diagnostic
- Testing Labs
- Miscellaneous

Commercial Bioscience Economic Impact



Commercial Bioscience Employment Impact



# Total Bioscience Funding

	2008	2007	2006	2005	2004
				Funding in Millions \$	
VC/Angels	\$189	\$296	\$114	\$98	\$91
IPO	\$0	\$188	\$12	\$49	\$0
SBIR/STTR*	\$19	\$19	\$27	\$29	\$22
State Biomedical Partnerships (Third Frontier)	\$98	\$135	\$155	\$75	\$51
Matching Corporate Funds for Biomedical Partnerships	\$102	\$92	\$273	\$112	\$111
NSF Bioscience Grants	\$13	\$12	\$10	\$15	\$36
NIH Institutional Grants	\$637	\$708	\$692	\$725	\$695
Other Healthcare Equity Financing	\$0	\$13	\$0	\$112	\$12
Acquisitions	\$473	\$1,089	\$75	\$279	\$0
<b>Total Bioscience Funding</b>	<b>\$1,531</b>	<b>\$2,552</b>	<b>\$1,358</b>	<b>\$1,494</b>	<b>\$1,018</b>

- |   |                                  |                                   |
|---|----------------------------------|-----------------------------------|
| 1. Adena Ventures                       | 25. Foundation Medical Partners  | 50. Rivervest Capital             |
| 2. Akron ArchAngels Network             | 26. Frantz Medical Ventures      | 51. Soin International            |
| 3. Alpha Capital Partners               | 27. Glengary Ventures            | 52. RMS Investments               |
| 4. Arboretum Ventures                   | 28. GLIDE Fund                   | 53. Rocket Ventures               |
| 5. Athenian Ventures                    | 29. iNetwork BioOpportunity      | 54. Southern Ohio Creates Capital |
| 6. Battelle Ventures                    | 30. Innovation Fund of LCCC      | 55. Summit Health Ventures        |
| 7. Blue Chip Venture Company            | 31. Isabella Capital             | 56. Sycamore Partners             |
| 8. Blue Point Capital                   | 32. JumpStart                    | 57. Talisman Capital              |
| 9. Bridge Investment Fund               | 33. Kadima Partners              | 58. TechColumbus TechGenesis      |
| 10. Case Technology Ventures            | 34. Miami Valley Ventures        | 59. TechColumbus RCF              |
| 11. Charter Life Sciences               | 35. Morgenthaler Ventures        | 60. Teton Capital                 |
| 12. Chrysalis Ventures                  | 36. Mutual Capital               | 61. Triathlon Medical Ventures    |
| 13. CID Equity Partners                 | 37. NCIC Capital                 |                                   |
| 14. Cincinnati Children's Tomorrow Fund | 38. NCT Ventures                 |                                   |
| 15. CincyTech Ventures                  | 39. North Coast Angels           |                                   |
| 16. Cleveland Clinic Innovations        | 40. Oakwood Medical              |                                   |
| 17. Core Network                        | 41. Ohio Tech Angels I, II & III |                                   |
| 18. Draper Triangle Ventures            | 42. Portal Capital               |                                   |
| 19. Early Stage Partners                | 43. Primus Capital               |                                   |
| 20. Edgewater Capital                   | 44. Queen City Angels            |                                   |
| 21. Entrepreneurs "E" Fund              | 45. Radius Ventures              |                                   |
| 22. Everett Partners                    | 46. Redwood Holdings             |                                   |
| 23. Fletcher Spaght                     | 47. Reservoir Ventures           |                                   |
| 24. Fort Washington Capital             | 48. River Cities Capital Funds   |                                   |
|   | 49. Riverside Capital            |                                   |

➤ **Now 63 Ohio Health Care Venture Funds...More than 100 have invested into Ohio bioscience companies**

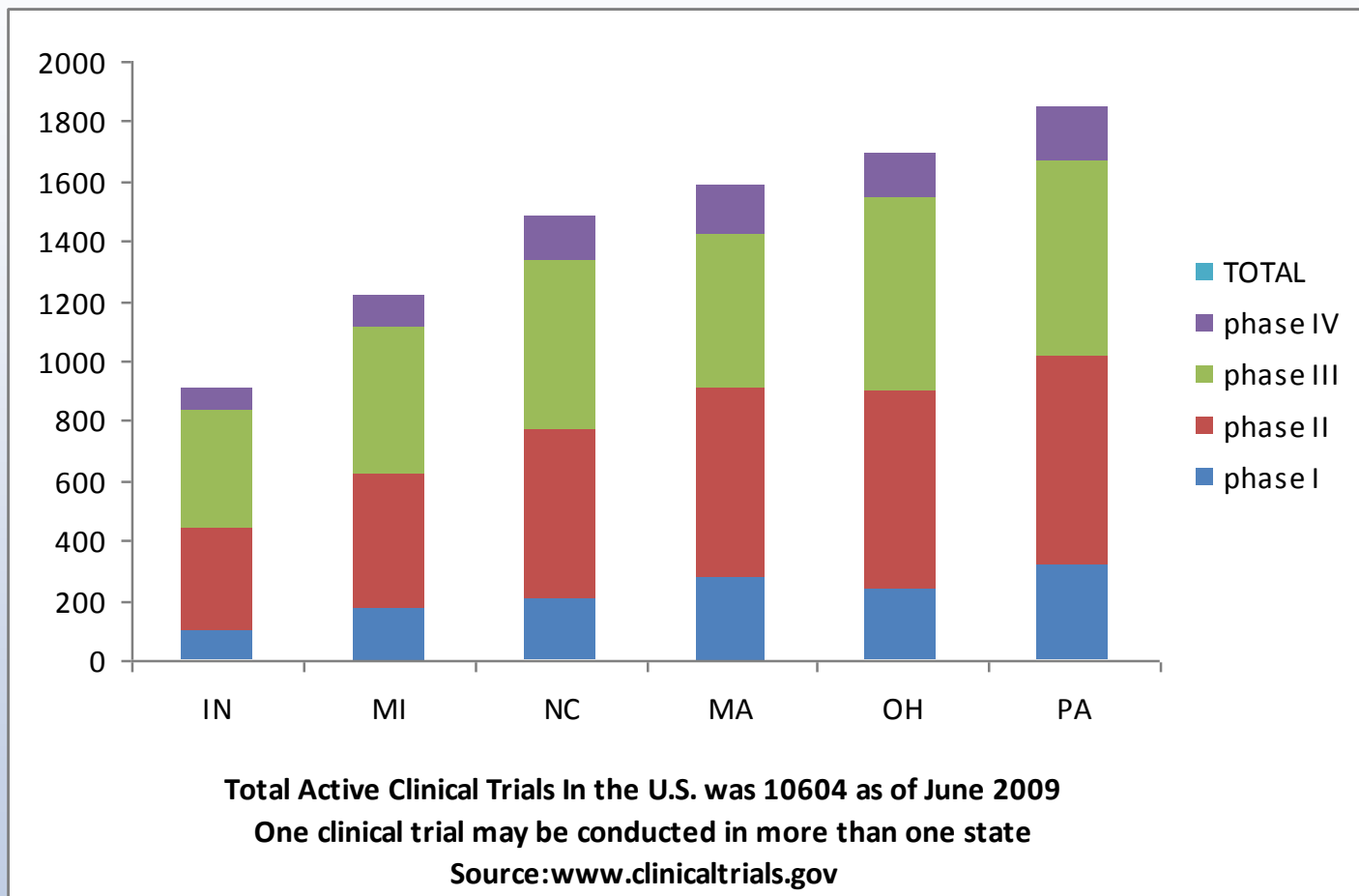


# New Bio Companies

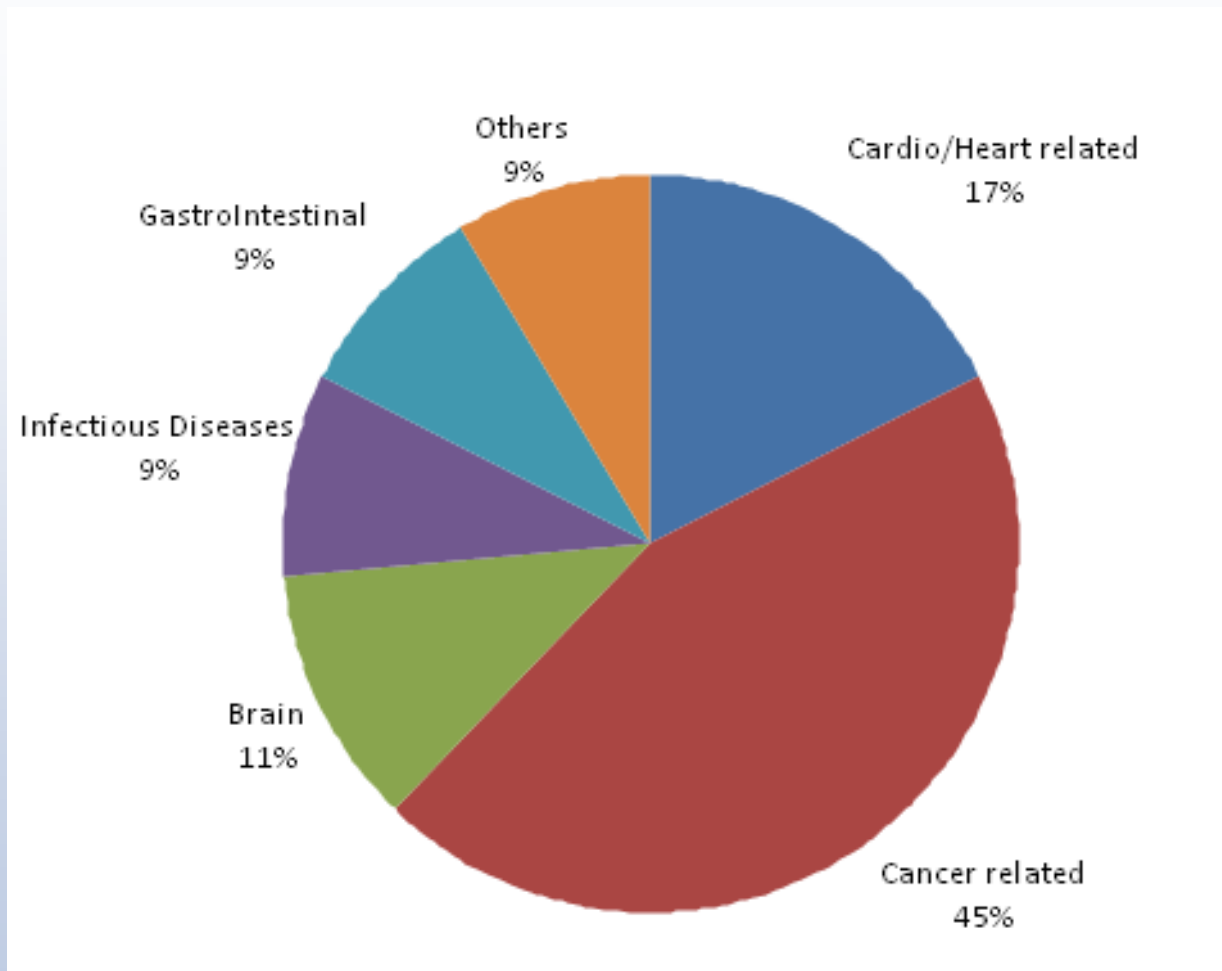
	2008	2007	2006	2005	2004	2004-2008
<b>Central</b>	<b>21</b>	<b>12</b>	<b>23</b>	<b>18</b>	<b>20</b>	<b>94</b>
<b>NEO</b>	<b>33</b>	<b>39</b>	<b>35</b>	<b>39</b>	<b>37</b>	<b>183</b>
<b>SW</b>	<b>9</b>	<b>13</b>	<b>8</b>	<b>9</b>	<b>13</b>	<b>52</b>
<b>SE</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>5</b>
<b>NW</b>	<b>6</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>15</b>
<b>WC</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>5</b>
<b>Statewide Totals</b>	<b>70</b>	<b>71</b>	<b>69</b>	<b>70</b>	<b>74</b>	<b>354</b>



# 16% of all clinical trials in the US are conducted in Ohio



# Distribution of Active Clinical Trials by Disease



As of June 2009

© 2009 BioOhio

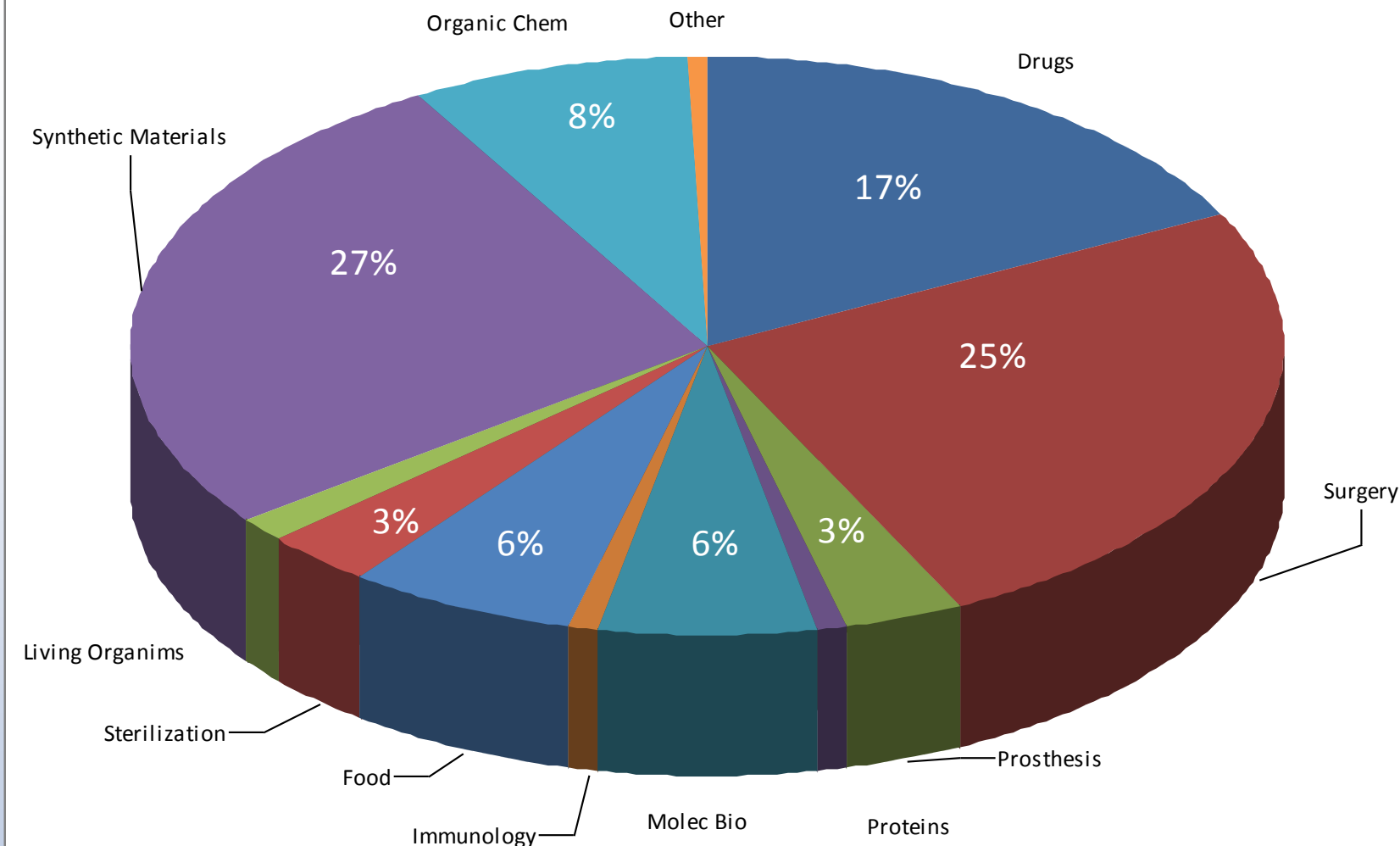


# Fantastic Hospitals

- 2008 US News and World Report found 14 top hospitals in Ohio
  - Cleveland Clinic 4<sup>th</sup> best hospital in the nation and **Top Heart Center in the country** for 14 straight years
  - Cincinnati Children's 3<sup>rd</sup> Best pediatric hospital in 2008
  - 4 pediatric hospitals ranked in the Top 15
  - 6 of the top 50 Endocrinology Centers, most in the nation
  - 6 top 50 Orthopedic centers
  - 3 top 50 adult cancer centers,
- Child Magazine ranked Nationwide Children's Hospital (Columbus) as the **#1 facility for pediatric emergency care** in 2007
- Thomson Reuters National Top 100, which measures hospital reliability, ranked 10 Ohio hospitals, second most in the nation in 2008
  - **Most ranked facilities in the nation over the last five years**



## 2001-2008: Ohio's Bioscience Patents by Type



Ohio is ranked 8<sup>th</sup> nationally in total patents issued and has more than every country in the world except for Japan, Germany, and the UK



# 3 cities in the top 40 Biotech locations in USA #4 in biotechnology industry strength 2008



State	City	Rank
OH	Cleveland-Akron	20
	Columbus	22
	Cincinnati	28

All three cities rank higher than the 100 city average in Research grant awards in Bio-Sciences

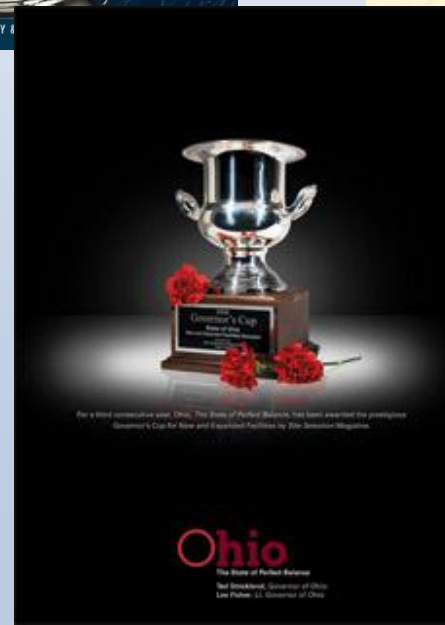
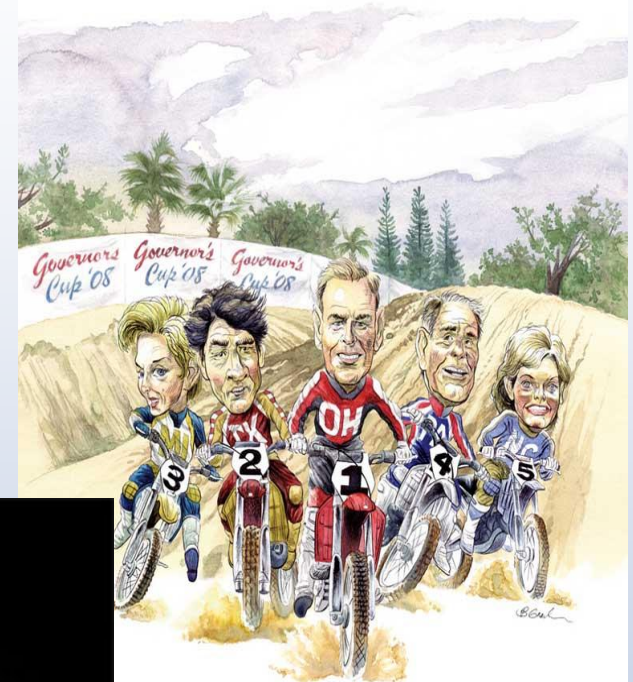
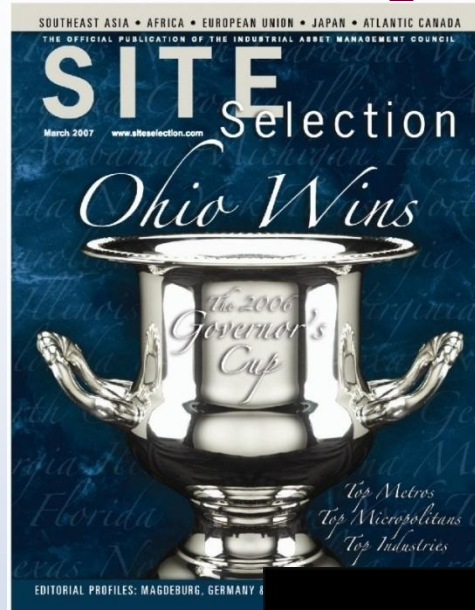
**\$637 Million in NIH Awards in 2008!**

## Expansions & New Facilities: Notable Examples (2007-08)

Year	Company	City	Jobs Created	Investment
2008	<b>Advanced Testing Laboratory</b>	Blue Ash	200	\$2,000,000
2008	<b>Affymetrix</b>	Warrensville Heights	61	\$3,400,000
2008	<b>Medpace</b>	Cincinnati	792	\$23,000,000
2008	<b>Modular Genetics</b>	Columbus	40	\$175,500,000
2008	<b>Norwood Medical</b>	Dayton	50	\$5,200,000
2008	<b>PharmaForce</b>	New Albany	200	\$35,000,000
2008	<b>Ricerca Biosciences</b>	Concord Twp	22	\$3,800,000
2008	<b>Integra Life Sciences (Theken Spine)</b>	Akron	10	\$3,000,000
2008	<b>ViewRay</b>	Oakwood	93	\$13,500,000
2008	<b>WIL Research Laboratories</b>	Ashland	100	\$1,200,000
2007	<b>Amylin Pharmaceuticals</b>	West Chester Twp	500	\$400,000,000
2007	<b>Ben Venue</b>	Bedford	175	\$139,000,000
2007	<b>Buckeye Biofuels</b>	Toledo	40	\$220,000,000
2007	<b>Cardinal Health</b>	Columbus	675	\$50,000,000
2007	<b>Charles River Laboratories</b>	Spencerville	80	\$16,000,000
2007	<b>Kendle International</b>	Cincinnati	75	\$4,000,000
2007	<b>Philips Medical</b>	Highland Heights	70	\$15,000,000
2007	<b>Ricerca Biosciences</b>	Concord Twp	125	\$15,000,000
2007	<b>SpineMatrix</b>	Akron	76	\$1,200,000
2007	<b>Workflow.com</b>	Westlake	180	\$2,300,000



# Winning the Cup three consecutive years suggests Ohio should be on every CEO's list of location options for due diligence when considering a capital investment.



# Ohio Ranks 4<sup>th</sup> in the Nation in Biotech Strength in 2008 and 2009 report

## Business Facilities 2009 State Rankings

Our annual look at the top-ranked localities reveals those that are thriving as well as surviving.



Overall Biotechnology Strength	
1.	CALIFORNIA
2.	MASSACHUSETTS
3.	PENNSYLVANIA
4.	OHIO
5.	MARYLAND
6.	TEXAS
7.	NEW JERSEY
8.	ILLINOIS
9.	KANSAS
10.	NORTH CAROLINA





Bringing Innovation to Patient Care Worldwide

## State Impacts of the Medical Technology Industry

*Prepared by:  
The Lewin Group, Inc.*

# Ohio – National Top 10 AdvaMed



### Exhibit 2 Ten States with Largest MTI Employment

State	Employment	State	Employment
California	72,485	Pennsylvania	17,482
Massachusetts	21,847	New York	16,607
Florida	19,949	Indiana	15,548
Minnesota	18,571	Texas	14,253
New Jersey	17,953	Ohio	12,820

# Ohio Third Frontier

- Third Frontier \$1.6 billion



<http://www.thirdfrontier.com/>

Third Frontier Funded Bioscience Projects	Participants	State Award Amount (in millions)	Corporate/ Matching Amounts (in millions)	Year
Granule Technology for Agricultural Applications	The Andersons Inc, Ohio BioProducts Innovation Center, National Lime & Stone Company, PSB Company, Syngenta, and the US Department of Agricultural Research	\$5.00	\$2.50	2008
Functional Prosthetic Limb for Amputee Soldiers	Cleveland Clinic's Lerner Research Institute, Ohio Willow Wood, and Cleveland State University	\$2.10	\$2.13	2008
Musculoskeletal Applications in Wound Healing and Nerve Repair	Cleveland Clinic's Clinical Tissue Engineering Center, Akron General Medical Center, Case Western Reserve University, University of Akron, and University of Cincinnati	\$4.98	\$5.02	2008
Cystic Fibrosis, Retinal Disease, and Breast Cancer Treatments	Case Western Reserve University, University Hospitals of Cleveland, Copernicus Therapeutics, Akrotome Imaging, and Polgenix, Inc.	\$3.98	\$3.98	2008
Nitric Oxide Sensor for Asthma Patients	Cleveland Clinic, NASA Glenn Research Center, The Ohio State University, Case Western Reserve University, and Makel Engineering, Inc.	\$3.78	\$4.93	2008
Chemicals Targeting Multiple Sclerosis/Neuroregenerative Therapies	Cleveland Clinic, Case Western Reserve University, and the University of Toledo	\$3.00	\$5.91	2008
Yeast-based Cloning System for Antiviral Resistance Treatment and Vaccine Development	Diagnostic Hybrids Inc, Case Western Reserve University's School of Medicine, and Apath LLC	\$5.00	\$7.04	2008
Real-time Pathogen Detection Instrument	Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Pathogen Systems Inc, and Kent State University	\$3.00	\$3.00	2008
Custom Foot Orthotics for Diabetic Peripheral Neuropathy	Acor Orthopaedic Inc	\$0.35	\$0.35	2008
Speech Recognition	Think-A-Move Ltd	\$0.35	\$0.35	2008
Magnetically Guided Feeding Tube	Syncro Medical Innovations	\$0.35	\$0.35	2008
Spinal Disease Research	University of Toledo, Cleveland Clinic's Center for Spine Health and Clinical Center for Tissue Engineering	\$4.46	\$4.46	2008
Network of Biomedical Imaging	The Ohio State University Research Foundation, Case Western Reserve University, and Wright State University	\$24.87	\$28.33	2008
Layered Sensing for Synergistic View of Environment	University of Dayton, The Ohio State University, Wright State University, and Miami University	\$24.35	\$24.37	2008

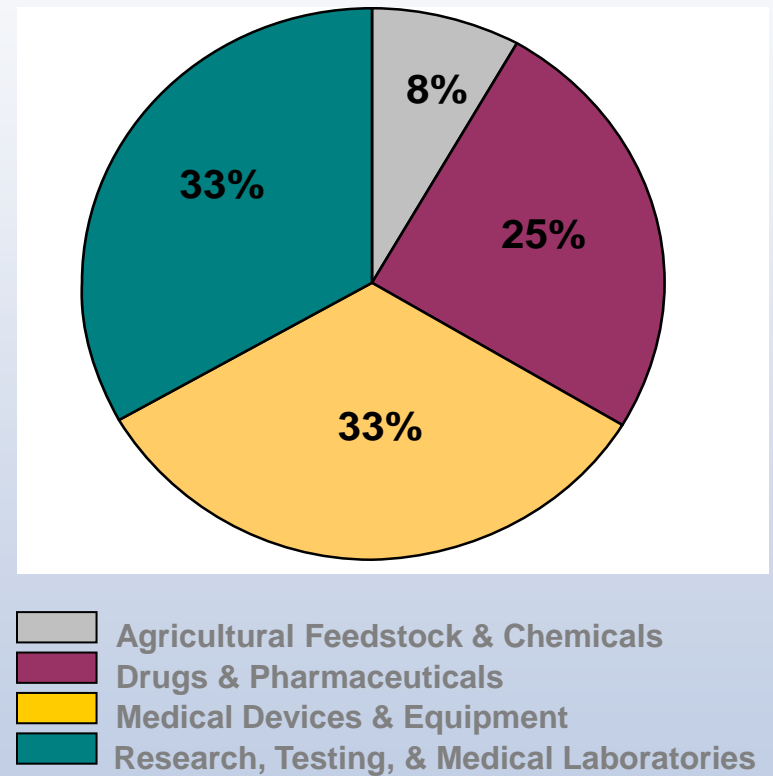
Third Frontier Funded Bioscience Projects	Participants	State Award Amount (in millions)	Corporate/ Matching Amounts (in millions)	Year
Orthopedic Research Cluster of Northeast Ohio	University of Akron and the Northeastern Ohio Universities College of Medicine	\$8.58	\$8.58	2008
Cardiovascular Repair and Tissue Engineering	Cleveland State University and the Cleveland Clinic	\$0.90	\$0.90	2008
Assemble and Test Biomedical Technology	ViewRay Inc, Cleveland Clinic, Cleveland's University Hospitals, and Philips Medical Systems	\$0.25	\$0.25	2008
Ohio Center for Innovative Immunosuppressive Therapeutics	University of Toledo, Case Western Reserve University, Cognitive Pharmaceuticals, and Gene Express	\$3.00	\$3.00	2008
Center for Stem Cell and Regenerative Medicine	Case Western Reserve University, Athersys, Cleveland Clinic, and AcelleRx Therapeutics	\$5.00	\$5.00	2009
Accelerate Pharmaceutical Drug Discovery via the Expansion of Membrane Transport Services	ChanTest and Analiza Inc.	\$4.83	\$5.00	2009
Tools to Improve Orthopedic Surgical Outcomes	Cleveland Clinic, Symbionix USA Corp, and Astro Medical Devices	\$3.50	\$3.50	2009
Developing Ohio's Healthcare IT Industry	ACME Express	\$0.35	\$0.35	2009
Commercialization of Rapid Bedside Stem Cell Therapeutics	Arteriocyte, Cleveland Clinic, The Ohio State University, and the University of Toledo	\$5.00	\$5.00	2009
Expansion of MRI into Radiotherapy Guidance	ViewRay Inc., Case Western Reserve University, The Ohio State University, and Quality Electrodynamics	\$5.00	\$5.00	2009
Magnesium Diboride for Next Generation MRI	Hyper Tech Research, RevWires, Siemens Magnet Technology, and The Ohio State University	\$5.00	\$5.00	2009
Application of Nitinol to Develop Materials and Medical Devices	Cleveland Clinic, Case Western Reserve University, and NASA Glenn Research Center	\$3.00	\$3.00	2009



# Bioscience Jobs

- **Research & Testing**  
20,565 companies
- **Medical Devices**  
15,190 companies
- **Drugs & Pharmaceuticals**  
2,589 companies
- **Ag Feedstock & Chemicals**  
2,111 companies

Distribution of Bioscience Employment by Subsector



Source: Battelle calculations based on Bureau of Labor Statistics, QCEW program data from the Minnesota Implan Group. Data include Puerto Rico.

# Bioscience Wage Trends

- The biosciences offer high-paying, quality jobs across a range of occupations
- Bioscience workers earn \$26,772 more than the average U.S. private sector wage, with all four subsectors above the national average
- Since 2001, real (inflation-adjusted) earnings are up 6.4% for bioscience workers, compared to just a 1.4% increase for private sector

U.S. Average Annual Wages per Employee, 2004	
<b>Drugs &amp; Pharmaceuticals</b>	<b>\$ 79,303</b>
Finance & Insurance	\$ 69,889
<b>Total Biosciences</b>	<b>\$ 65,775</b>
<b>Research, Testing, &amp; Medical Laboratories</b>	<b>\$ 65,414</b>
<b>Agricultural Feedstock &amp; Chemicals</b>	<b>\$ 63,383</b>
Professional, Scientific, & Technical Services	\$ 62,411
Information	\$ 60,530
<b>Medical Devices &amp; Equipment</b>	<b>\$ 56,449</b>
Manufacturing	\$ 47,705
Construction	\$ 40,297
<b>U.S. Total Private Sector</b>	<b>\$ 39,003</b>
Transportation & Warehousing	\$ 38,758
Real Estate & Rental & Leasing	\$ 37,167
Health Care & Social Assistance	\$ 36,606
Retail Trade	\$ 24,337

Source: Battelle calculations based on Bureau of Labor Statistics, QCEW program data from the Minnesota Implan Group.  
Data include Puerto Rico.



# What do our Incubators / Accelerators do?

- **Collaborations with universities, established companies, and start-up companies; national and international collaborations**
- **Business development to help established and startup companies make contacts and pursue success**
- **Management support for startup companies, “portable executives,” “entrepreneurs in residence” until the company operates on its own**
- **Professional Services referrals to attorneys, accountants, regulatory expertise and others who understand the technology, the startup company environment, international business**
- **Access to Capital helping startups find investors, and helping investors find companies to invest in**



# By-The Numbers, then & now

Year	<u>1991</u>	<u>2001</u>	<u>2008/2009</u>
Number of bio entities in Ohio	170	352	1,645 (4.7X) 2009
University R&D expenditures	\$285 million	\$481 million	\$1.1 billion (2.3X)
New Company starts	≈12	12	71 per year (5.8X) 2004-08
Private capital raised for new starts	Unknown	\$14 million	\$189 million (13.5X) \$473 million IPO/Acquisitions 2008
Bioscience Capital sources (in State)	4	8	63 (7.9) 2009
BioOhio (EBTC) membership	52	86	345 (4X) 2009



# Be Proud...Be Strategic

“ Ohio is one of the best places in the world to optimize the growth of your bioscience company because we can imbed you in an asset base, 1,645 companies and growing; We are a partner that allows you to maximize any or all phases of your business strategy”

## Be an Ohio Ambassador



Visit [Ambassador.Ohio.Gov](http://Ambassador.Ohio.Gov) to register





**Let me know how we can help you!**

**John F. Lewis Jr.  
Vice President**

**[jlewis@bioohio.com](mailto:jlewis@bioohio.com)**

**614-675-3686 x7**

*An Ohio Thomas Edison Center*