Massachusetts’ Competitive Position in Life Sciences: Where Do We Stand?

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Massachusetts Life Sciences Summit
12 September 2003

This presentation is composed of excerpts from reports and presentations created by the Boston Consulting Group, Professor Alan Clayton-Matthews, the Howell Group of Boston, the Massachusetts Biotechnology Council, MassMedic, the Massachusetts Medical Device Industry Council, the Massachusetts Technology Collaborative, the Milken Institute, the Monitor Company Group, Professor Michael E. Porter and the New England Healthcare Institute. See Sources.
Situation Facing Massachusetts

- Massachusetts is one of the world’s leading centers in Life Sciences, but the State is facing a crowded and increasingly competitive field.

- The Life Sciences cluster encompasses a wide range of products and services, including medical devices, pharmaceutical products, research and testing, and health care delivery.

- Massachusetts has a rich set of institutions in the field, but each tends to be narrowly focused on one aspect of the cluster.

- There has been no overarching strategy for the cluster and no structure to develop one.
## A Crowded Field

### U.S. States

- 41 states have launched Life Sciences initiatives
- 16 states have appropriated funds for new biotech activities
- 12 states have a dedicated Biotech specialist in government
- 10 states have explicit biotechnology strategies

### Countries

- Denmark/Sweden, *Mediconvalley*
- Germany, *BioRegio-Initiative*
- Netherlands, *BioDelta*
- Saudi Arabia, *Jeddah BioCity*
- Singapore, *Biopolis of Asia*
- United Kingdom, *Genome Valley*

... and many other countries

Source: BIO, State Government Initiatives in Biotechnology, September 2001; life sciences institutions’ web sites
Life Sciences Cluster

- Health Services Provider
  - Health and Beauty Products
  - Surgical Instruments and Suppliers
  - Medical Equipment
  - Dental Instruments and Suppliers
  - Ophthalmic Goods
  - Diagnostic Substances
  - Containers
  - Analytical Instruments
  - Biological Products
  - Biopharmaceutical Products
  - Research Organizations
  - Educational Institutions
    - Harvard University, MIT, Tufts University, Boston University, UMass
  - Cluster Organizations
    - MassMedic, MassBio, others
  - Specialized Business Services
    - Banking, Accounting, Legal
  - Specialized Risk Capital
    - VC Firms, Angel Networks
  - Specialized Research Service Providers
    - Laboratory, Clinical Testing
Clusters and Competitiveness

- **Clusters Increase Productivity / Efficiency**
  - Efficient **access** to specialized inputs, services, employees, information, institutions, and “public goods” (e.g. training programs)
  - Ease of **coordination** and transactions across firms
  - Rapid **diffusion** of best practices
  - Ongoing, visible **performance comparisons** and strong incentives to improve vs. local rivals

- **Clusters Stimulate and Enable Innovations**
  - Enhanced ability to **perceive innovation opportunities**
  - Presence of multiple suppliers and institutions to assist in **knowledge creation**
  - Ease of **experimentation** given locally available resources

- **Clusters Facilitate Commercialization**
  - Opportunities for **new companies** and **new lines of established business** are more apparent
  - **Commercializing** new products and starting new companies is easier because of available skills, suppliers, etc.

Clusters reflect the fundamental influence of **externalities / linkages** across firms and associated institutions in competition
## Institutions for Collaboration
### Selected Massachusetts Organizations

### Life Sciences Industry Associations
- Massachusetts Biotechnology Council
- Massachusetts Medical Device Industry Council
- Massachusetts Hospital Association

### General Industry Associations
- Associated Industries of Massachusetts
- Greater Boston Chamber of Commerce
- High Tech Council of Massachusetts

### Economic Development Initiatives
- Massachusetts Technology Collaborative
- Mass Biomedical Initiatives
- Mass Development
- Massachusetts Alliance for Economic Development

### University Initiatives
- Harvard Biomedical Community
- MIT Enterprise Forum
- Biotech Club at Harvard Medical School
- Technology Transfer offices

### Informal networks
- Company alumni
- VC community
- University alumni

### Joint Research Initiatives
- New England Healthcare Institute
- Whitehead Institute For Biomedical Research
- Center for Integration of Medicine and Innovative Technology (CIMIT)
Shifting Responsibilities for Economic Development

**Old Model**
- Government drives economic development through policy decisions and incentives

**New Model**
- Economic development is a **collaborative process** involving government at multiple levels, companies, teaching and research institutions, and institutions for collaboration
The Massachusetts Life Sciences Cluster  
Performance

Productivity

- Average wages in the Massachusetts Life Sciences Cluster are amongst the highest in the country, and growing strongly
- The Cluster has the largest share of national life sciences employment of any metropolitan region but growth is only slightly above the national average for life sciences

Innovation

- The Massachusetts Life Sciences Cluster has generated many recently approved biotech products, and has about 7.5% of the world’s pharmaceutical product pipeline
- The Cluster is the leading metropolitan region in terms of life sciences patents, but growth in patents is only slightly above average

Establishments

- The Massachusetts Life Sciences Cluster has relatively few large local firms. Establishment growth is only slightly above average
Wages in Leading Life Science Clusters

Note: S. F. Bay Area — Average wage of San Francisco, San Jose, Oakland
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Employment in Leading Life Science Clusters

2001 National Life Sciences Employment (in 10,000 workers)

Note: S. F. Bay Area — San Francisco, San Jose, Oakland, New Jersey – Newark, Middlesex
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Innovation Output in Leading Life Science Clusters

Note: S. F. Bay Area — San Francisco, San Jose, Oakland, New Jersey – Newark, Middlesex
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Innovation Performance in Leading Life Sciences Clusters
Share of Global Clinical Development Pipeline by U.S. State

<table>
<thead>
<tr>
<th>State</th>
<th>Number of Products in Pipeline</th>
<th>Share of Products in Pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>470</td>
<td>17.5%</td>
</tr>
<tr>
<td>MA</td>
<td>218</td>
<td>8.1%</td>
</tr>
<tr>
<td>NJ</td>
<td>201</td>
<td>7.5%</td>
</tr>
<tr>
<td>NY</td>
<td>196</td>
<td>7.3%</td>
</tr>
<tr>
<td>PA</td>
<td>145</td>
<td>5.4%</td>
</tr>
</tbody>
</table>

Note: Pipeline includes large- and small-molecule drugs, diagnostic tests, and biodevices.
State attribution based on headquarters location of product’s primary owner.
Source: Biospace Clinical Competitive Intelligence Systems (CCIS) database, September 2002
Massachusetts' Competitive Position in Life Sciences

- Relative Performance

- Competitive Assessment

- Strategic Issues
Assessing Life Sciences Competitiveness

Sources of Data

- Findings from recent studies of the cluster:
  - *Massachusetts Life Sciences Data*, Massachusetts Technology Collaborative, 2003

- Survey of 250 Massachusetts’ companies, 50+ from the Life Sciences
  - Conducted by Monitor Company

- 125+ in-depth interviews with cluster leaders
  - Conducted by Monitor Group and the Boston Consulting Group

- Analysis of regional and cluster data from the Institute for Strategy and Competitiveness at Harvard
Massachusetts Life Science Cluster
Summary Assessment

Context for Firm Strategy and Rivalry

Factors (Input) Conditions

Strengths
- Strong base of local companies that compete on innovation using cutting edge science
- Local companies compete and cooperate intensively

Weaknesses
- Limited manufacturing in the State, especially in pharmaceuticals
- Few headquarters of large, international companies

Demand Conditions

Strengths
- Sophisticated local medical practitioners

Weaknesses
- Reimbursement environment does not foster the adoption of product and process innovations in health care delivery
- High medical malpractice costs in Massachusetts may deter new treatments
- Barriers to performing clinical trials with local institutions

Related and Supporting Industries

Strengths
- Presence of specialized service providers such as law firms and consultants
- Frequent interaction with local suppliers
- Presence of instrument companies and other equipment suppliers

Weaknesses
- High cost of doing business
- High cost of living, especially housing
- Weaknesses in physical infrastructure, notably Logan airport
- Developing shortages of mid-level professionals
- Technology transfer lagging other important regions

Strengths
- Strong K-12 educational system
- Strong science base of leading researchers and leading academic research centers
- Frequent technology and knowledge transfer from research to industry
- High availability of risk capital and federal research funding

Weaknesses
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Massachusetts Life Science Cluster
Summary Assessment - Continued

Role of Government

**Strengths**
- Increasing recognition of the potential of Life Sciences for the Commonwealth

**Weaknesses**
- Lack of consistent, predictable process for site regulation, especially at the local level
- Lack of overall responsiveness and a coordinated approach to support the cluster by state government
- **R&D tax credits** are not well structured to benefit research companies

Institutions for Collaboration

**Strengths**
- Strong array of industry councils, tech transfer offices, enterprise networks, and other institutions for collaboration
- Very **high frequency of interaction** among cluster members relative to other locations (producers, suppliers, customers, universities, etc.)

**Weaknesses**
- Lack of institutions facilitating networking **across** segments
Role of Universities and Research Institutions
Leading Life Sciences Clusters

Share of Life Sciences Patenting from Hospitals and Research Institutions, 1996 – 2001

Note: S. F. Bay Area — San Francisco, San Jose, Oakland, New Jersey – Newark, Middlesex
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Regional Knowledge Spill-Overs
Total Life Sciences Patent Citations by Region, 1990s

Note: Data corresponds to non-individual patents issued between 1994-1998 and citing patents issued between 1990 and 1998; Self-citations are excluded; only life sciences patents citing life sciences patents are considered.
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Availability of NIH Funding for Life Sciences

Source: National Institute of Health, Office of Extramural Research from Massachusetts Technology Collaborative - Massachusetts Life Sciences Data
Local Competition

- Massachusetts Life Sciences Cluster has a relatively intense level of local competition with high numbers of competitors based in the area
  
  - “Life science businesses in the area compete primarily for skilled labor, and competition here can get intense.”
    
    – Senior Executive, Hospital Organization

Competition and Cooperation

- Despite intense competition, companies work together on common concerns
  
  - “We come together to lobby for regulatory reform and legislation that can benefit the industry. It’s one of the perks of a high industry concentration.”
    
    – Senior Executive, Medical Device Company

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle

Source: Professor Michael E. Porter, Monitor Company survey and interviews
Local Customers

- Local customers in the Massachusetts Life Sciences cluster are relatively sophisticated, demanding, and offer frequent feedback to firms.

  - “Customer needs are sophisticated because of the high concentration of medical treatment and academic centers. Patients’ expectations are very high, both in terms of access and quality.”
    - Senior Executive, Hospital Organization

  - “Our customers are primarily hospitals . . . It’s a real benefit to be located so close by. In addition, we can get immediate feedback from doctors about how a product is working.”
    - Senior Executive, Medical Device Company

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle
Source: Professor Michael E. Porter, Monitor Company survey and interviews
The cost of doing business in Massachusetts is high relative to other regions and may represent a barrier for further expansion in the region.

- "Labor costs and price for space are much higher here."
  - Senior Executive, Medical Device Company

- "Space and the cost of space are significant barriers to future expansion in the region."
  - Senior Executive, Biotechnology Company

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle
Source: Professor Michael E. Porter, Monitor Company survey and interviews
Physical infrastructure

- The quality of the transportation and communications infrastructure are seen as lacking relative to other life science clusters

  - “The transportation infrastructure is a significant barrier to future expansion for companies in the area.”
    - Senior Executive, Industry Organization

  - “Something needs to be done about the Logan Airport. It’s becoming a bigger problem for our employees, most of whom travel a great deal.”
    - Senior Executive, Medical Device Company

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle
Source: Professor Michael E. Porter, Monitor Company survey and interviews
Massachusetts Life Sciences Cluster
Competitive Position by Sub-Cluster, 2001

Health Services Provider

Biological Products

Biopharmaceutical Products

Research Organizations

Educational Institutions
Harvard University, MIT, Tufts University, Boston University, UMass

Cluster Organizations
MassMedic, MassBio, others

Specialized Business Services
Banking, Accounting, Legal

Specialized Risk Capital
VC Firms, Angel Networks

Specialized Research Service Providers
Laboratory, Clinical Testing

Health and Beauty Products
Surgical Instruments and Suppliers
Medical Equipment
Dental Instruments and Suppliers
Ophthalmic Goods
Diagnostic Substances
Containers

Analytical Instruments

Note: Competitive position based on relative employment
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Survey and Interviews Highlights

Government Regulation

- Massachusetts ranks below other regional clusters in perceived governmental support for Life Sciences
  - “Local government regulations and compliance procedures can often be a problem; in contrast, there aren't as many issues at the state level.”
    - Senior Executive, Pharma Company

Priorities for State Government

- Speed up the approval process to decrease time to market
- Improve the incentives and processes for innovation and investment in R&D initiatives
  - “Introduce legislation that permits life sciences to innovate in a clear and predictable framework (e.g., permitting and ability to do research).”
    - Senior Executive, Biotech Company
## Government Support for Life Sciences

### Leading States

<table>
<thead>
<tr>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>California</th>
<th>North Carolina</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tax Policy</strong></td>
<td><strong>Institutional Support</strong></td>
<td><strong>Financial Support</strong></td>
<td><strong>Institutional Support</strong></td>
</tr>
<tr>
<td>• 10% R&amp;D tax credit; can be carried forward for up to 3 years</td>
<td>• Massachusetts Biomedical Initiatives (MBI)</td>
<td>• Cumulative MBI investment of $8 million</td>
<td>• 10% R&amp;D tax credit</td>
</tr>
<tr>
<td>• 3% credit on depreciable assets</td>
<td></td>
<td>• Some state-pension-fund investment</td>
<td>• 7% tax credit for machine and equipment leases</td>
</tr>
<tr>
<td>• Single sales factor</td>
<td>• Biotechnology Council of New Jersey</td>
<td></td>
<td>• 5% R&amp;D tax credit</td>
</tr>
<tr>
<td></td>
<td>• New Jersey Technology Council’s Life Sciences Network</td>
<td></td>
<td>• 100% net-operating-loss carry forward for 8 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Jointly-funded research programs of state universities and industry</td>
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<tr>
<td></td>
<td></td>
<td>• $500 million CalPERS Biotechnology Program</td>
<td>• State-funded North Carolina Center for Biotechnology (NCBC)</td>
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<td>• Early Stage Enterprises, $40m</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• NJ Technology Council Venture Fund, $30m</td>
<td>• $10 million North Carolina Bioscience Investment Fund</td>
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<tr>
<td></td>
<td></td>
<td>• Seed Capital Program</td>
<td>• $42 million-$150 million in tobacco money for bio-manufacturing</td>
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</table>

**Source:**
Institutions for Collaboration
Helpfulness for Entrepreneurs

How Much Do the Following Local Institutions Help Entrepreneurs in Your Region Form Valuable Business Contacts or Obtain Valuable Business Advice?

- University-based Networking Organizations
- University Technology Transfer Offices
- Regional Industry or Cluster Councils
- National Trade Associations
- Economic Development Organizations

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle
Source: Professor Michael E. Porter, Monitor Company survey
Massachusetts' Competitive Position in Life Sciences

- Relative Performance
- Competitive Assessment

- Strategic Issues
Competitive Agenda
Massachusetts State Government

• Address weaknesses in the **physical infrastructure**, especially in transportation

• Increase the **supply of housing** to lower the cost of living in the State

• Work with local governments to identify, develop, and permit promising **sites for life sciences companies** (e.g., single site locator)

• Improve the structure of **R&D incentives** for life sciences companies

• Create a **clear point of contact** for existing companies in the Life Sciences cluster as well as potential out-of-state investors

• Participate actively in the Life Sciences **cluster development** process

• Increase the overall **responsiveness** of state government to business needs
Competitive Agenda
Massachusetts Life Sciences Cluster

• Improve **technology transfer**

• Make Massachusetts' **health care delivery** the most advanced and innovative in the nation
  - Create an environment and rules that facilitate the introduction of new treatments
  - Adopt new service delivery technologies (e.g., IT)

• Secure the State’s **medium skilled workforce** position

• Expand **clinical trials** in the State

• Capture more downstream **manufacturing**
Life Sciences Patents
Top Patenting Universities and Affiliated Hospitals

Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School
Life Sciences Research
Patents per Publication, 1996-2001

Compound Annual Growth Rate (CAGR) of LS Patents per 100 LS Publications, 1996-2001

Technology Transfer Effectiveness

Licenses and Options Executed per Patent, 1996–2000

Average CAGR of Top 50: -2.9%

Compound Annual Growth Rate (CAGR) of Licenses and Options Executed per Patent 1996–2000

Note: Dana-Farber values for 1996 are averages of 1995 and 1997
analysis by Professor Michael E. Porter and Monitor Company Group
Technology and Knowledge Transfer

Key Issues

• The transfer of technology from research to commercialization is traditionally a key competitive advantage of the Massachusetts Life Sciences cluster

However

• Other regions are catching up
  – Life Sciences research institutions in Massachusetts show only average performance on a number of technology transfer indicators
• Tech transfer performance is seen as lagging in some institutions, with cumbersome decision-making processes and inappropriate understanding of appropriate deal structures

• The context for technology and knowledge transfer is changing
  – Pharmaceutical companies entering the cluster will need to establish new relationships with local research institutions
• Massachusetts’ traditional approach of knowledge transfer via small start-up companies needs to evolve
Massachusetts Life Sciences Cluster
Health Care Delivery & Financing: Challenges Facing Physicians

Massachusetts Physician Practice Environment Index, 1992-2001

Source: Massachusetts Medical Society, MMS Index Report, March 2002
Massachusetts Health Care Delivery Overview

• Competitiveness and innovation in a region are strongly influenced by sophisticated local demand

• Having the most advanced health care delivery offers major benefits to the cluster as well as to patient care

• While Massachusetts is seen as the home of demanding companies, research institutions, and medical practitioners, cost pressures, and reimbursement structures have the potential to slow down innovation
  – Health care delivery runs the risk of becoming driven by short-term cost reduction
Massachusetts Life Sciences Cluster
Mid-Level Workforce Retention and Recruitment

Highlights from the Survey and Interviews

- The cost of living in Massachusetts makes it difficult to recruit employees at all levels
  - “The high cost of living, especially housing, makes it difficult to convince people to move to Boston.”
    - Senior Executive, Hospital Organization
  - “I don’t even try to recruit people from California anymore.”
    - Senior Executive, Biotechnology Company
  - “We pay higher salaries here, but we lose people because of housing costs.”
    - Senior Executive, Medical Device Company

Note: Life Sciences average reflects data from the life sciences clusters of San Diego, Pittsburgh, and the Research Triangle
Source: Professor Michael E. Porter and Monitor Company Group
Mid-Level Workforce
Employment Changes in Massachusetts

Change of Employment, 1999 - 2001

Increase

Decrease

- Biomedical Engineers
- Biochemists/Biophysicists
- Biomedical technicians
- Internists
- Registered nurses
- Post-secondary biology teachers
- Pharmacy technicians
- Post-secondary health specialty teachers
- Medical equipment repairers
- Radiology technicians
- Medical appliance technicians
- Anesthesiologists

Source: NEHI
Mid-Level Workforce Overview

• The Massachusetts Life Sciences Cluster requires a strong base of mid-level professionals
  – **High cost of living** makes the Boston-region increasingly unattractive
  – The growth of corporate research facilities increases the pressure on hospitals and research institutions to **compete** for mid-level professionals
  – Educational institutions need to be equipped to **adjust supply** to meet the need for mid-level professionals

• A **strategy** is needed to expand the supply of needed skills for the cluster
Clinical Trials
Current Situation

● Nationwide, **2.3 million people** participated in industry- and government-funded clinical trials in 2002
  – In Massachusetts, an estimated 40 to 50,000 patients participated in clinical trials (ca. 2% of national trial participants vs. 2.2% of national population and 5.3% of life sciences employment)

● The **recruitment costs** for volunteers are rising
  – Spending on recruiting volunteers is rising nationwide by 18% annually, reaching $500m in 2002 (ca. $215 per volunteer)

● The **efficiency of carrying out clinical trials** is declining
  – Nearly 25% of those enrolled in clinical trials drop out before the trial is completed
  – Enrollment delays are increasingly pushing back the timetable for trials and product introduction

Source: Center Watch; presented at MBC
Clinical Trials
The Challenge for Massachusetts

• The environment for conducting clinical trials in Massachusetts gets mixed reviews
  – Many companies value the close proximity to leading research hospitals
  – However, there is widespread concern about the lack of responsiveness of teaching hospitals in conducting trials, and no mechanisms to facilitate the process of performing trials in the State

  “It is incredibly difficult to work with the hospitals here for clinical trials. I’d like to but it is just so difficult.” Executive, Biotech Company

• Increasing the quantity and efficiency of clinical trials conducted here by Massachusetts (and other) companies would be an important competitive advantage for the region
  – Clinical trials are a meaningful source of revenue for hospitals
  – Involvement in clinical trials can enhance the image and improve the quality of health care delivery in Massachusetts hospitals
  – Conducting clinical trials at nearby institutions is cost effective and improves the level of innovation throughout the cluster

• A concerted strategy is needed to address the barriers to conducting trials in Massachusetts, widen the array of hospitals involved in trials, and make the process of conducting trials more efficient
Capturing Life Sciences Manufacturing

- Capturing downstream activities such as manufacturing represents a major opportunity for the Massachusetts Life Sciences cluster
  - The State economy would benefit from new high-paying jobs in downstream manufacturing activities (scaling of production, prototype manufacturing, full-scale production)
  - Companies in the cluster would benefit from proximity to their manufacturing operations to allow easier coordination, shorter reaction times, and reduced complexity of management supervision

  “There is a very delicate passing of the baton. The nth plant can be in Ireland – for the first one, the instinct is to go with Cambridge. We’d pay a 20% premium to stay here” Executive, Biotech Company

- Massachusetts has a strong product pipeline and many companies will have to make manufacturing site decisions over the next several years

### Product Pipeline of the Massachusetts Life Sciences Cluster

**Expected growth of FDA-approved Massachusetts Biotechnology products**

<table>
<thead>
<tr>
<th>Development phase</th>
<th>Current number of products</th>
<th>Probability of success(^{(1)})</th>
<th>Time to market(^{(1)})</th>
<th>Expected output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>63</td>
<td>21%</td>
<td>~6 years</td>
<td>13 compounds by 2008</td>
</tr>
<tr>
<td>Phase II</td>
<td>73</td>
<td>31%</td>
<td>~5 years</td>
<td>23 compounds by 2007</td>
</tr>
<tr>
<td>Phase III</td>
<td>48</td>
<td>59%</td>
<td>~3 years</td>
<td>28 compounds by 2005</td>
</tr>
<tr>
<td>Approval pending</td>
<td>23</td>
<td>91%</td>
<td>~1 year</td>
<td>21 compounds by 2003</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Based on average figures for new chemical entities (NCEs); BCG analysis; Tufts Center for the Study of Drug Development

Capturing Manufacturing in Life Sciences
Massachusetts’ Current Position

• Companies report several competitive disadvantages for Massachusetts as a location for manufacturing

  – High cost of doing business

    “Massachusetts is almost prohibitively expensive”

  – Delays and red tape:

    “Research Triangle has a reliable 6 week process”

  – Unpredictability of the local regulatory environment

    “In MA, you never know what problem you’ll run into with placing a manufacturing plant”

• Most companies with operations in Massachusetts have located some manufacturing outside the State

(1) Clinical development structure in state
(2) Commercial manufacturing only
Note: Sample is 134 human therapeutics companies
Source: Massachusetts Biotechnology Council Survey 2002, BCG analysis
Massachusetts Life Sciences Cluster

Location of Manufacturing

% of Jobs in MA

- 20% for 0 to 5 years
- 35% for 6 to 10 years
- 38% for 11 to 15 years
- 48% for 16 and over

Age of Company

Note: Base Massachusetts headquartered companies
Capturing Manufacturing in Life Sciences

The Need for a Strategy

- The Cluster needs to develop a strategy to increase its share of upcoming manufacturing investments, especially from companies already present in Massachusetts:
  - Development and pre-qualification of suitable sites, including permitting, and infrastructure provision
  - A proactive approach to companies facing manufacturing investment decisions
  - Efficient interaction with potential investors through one point-of-contact
  - An explicit program to assist in workforce development
  - Approaches to minimizing the tax burden consistent with the State’s fiscal realities

- A successful strategy to attract and retain Life Sciences manufacturing in the State will need involve State government, local governments, companies, universities, and other institutions
Other Strategic Issues Identified

- Strategy for recruiting outside investors to the State
- Biogrid / IT infrastructure for life sciences
- Technology mapping and identifying technology gaps
Discussion Questions

- Are these the right issues?

- What are the priorities among them?
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Massachusetts Life Sciences Cluster
Professor Michael E. Porter and Monitor Company Group, L. P.

New Jersey Life Science Super-Cluster
Professor Michael E. Porter and Monitor Company Group, L. P.
http://www.state.nj.us/prosperity/porter.shtml

The Boston Life-Sciences Cluster
Christian HM Ketels, PHD, Institute for Strategy and Competitiveness, Harvard Business School