The Medical Device Industry in Massachusetts:

A Presentation to MassMEDIC’s 15th Annual Meeting

May 3, 2011
Contents

Overview of the Massachusetts Medical Device Industry

Massachusetts Medical Device Industry employment and investment

Medical Device exports from Massachusetts

The future
Massachusetts has the culture, people, technology, and support in place that position it as a key player in the dynamic medical device industry

*Massachusetts is positioned with*

- **Research**
  - Between 2003 and 2007, MA R&D / GDP far outpaces the rest of the country

- **Technology transfer**
  - MA leads the country in spin-outs from universities and other non-profits

- **Political support**
  - Strong support from Congressional delegation
  - Patrick administration created Massachusetts Life Science Center to help administer $1B to the industry

- **Capital**
  - Had the highest Venture Capital investment per capita in the country in 2009

- **Talent**
  - As of 2007, almost half (47%) of residents have college degrees (1\textsuperscript{st} in the US)

*To develop medical devices that result in:*

- Less invasive surgery
- Lifelike prosthetics and joint replacements
- Earlier detection of disease
- Point of care diagnostics
- Mobile disease/condition monitoring
- Convergent technologies
- Personalized medical treatment

*Source: 2009 Index of the Massachusetts Innovation Economy, John Adams Innovation Institute*
400 Massachusetts companies focus on medical devices, with surgical and medical instrument manufacturers leading the pack.

Massachusetts Medical Devices Industry

- Surgical and medical instrument manufacturing
- Electromedical and electrotherapeutic apparatus manufacturing
- Surgical appliance and supplies manufacturing
- Irradiation apparatus manufacturing
- Analytical laboratory instruments (formerly laboratory apparatus and furniture manufacturing)
- In-vitro diagnostic substance manufacturing
- Ophthalmic goods manufacturing

46%  26%  18%  4%  3%  1.5%  1.5%

Source: Deloitte Research analysis, Hoovers, Dunn and Bradstreet, MassMedic and The Donahue Institute

Number of MA medical device companies by primary business
Companies that may be relevant
* Diagnostics companies are categorized as pharma and provider
Massachusetts is the second largest employer of people in the medical device industry, behind California.

In 2008, the industry employed 392,282 people nationally. Massachusetts employed 24,268 within 7 medical device manufacturing categories.

1. California
2. Massachusetts
3. Minnesota
4. New York
5. Florida

Source: 2008 US Census Bureau, County Business Patterns
The Massachusetts medical device industry has a strong impact on job creation in related industries

<table>
<thead>
<tr>
<th>State</th>
<th>MDI Employment (per thousand)</th>
<th>MDI-Related Employment (per thousand)</th>
<th>Multiplier Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>2.3</td>
<td>8.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Minnesota</td>
<td>5.2</td>
<td>16.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>3.7</td>
<td>12.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>1.8</td>
<td>6.4</td>
<td>3.6</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2.4</td>
<td>7.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Florida</td>
<td>1.2</td>
<td>3.4</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The medical device industry has created approximately 82,500 jobs in related Massachusetts industries

Note: Taken from “The Lewin Group: State Economic Impact of the Medical Technology Industry, prepared for AdvaMed June 7, 2010”, calculation of the MDI vary

Massachusetts medical device firms received $286 million, or 12% of national medical device venture funds in 2010.

MA investment may be rebounding faster than the national rate.

Source: PWC MoneyTree
US medical devices shipments have been growing steadily

Source: 1997 and 2007 Economic Census Data
MA medical devices are more than 10% of total state exports and $1 out of every $10 of US medical device exports

Massachusetts medical device exports compared to statewide industrial exports & US medical device exports—2008-10 ($B)

<table>
<thead>
<tr>
<th>Year</th>
<th>All Exports MA</th>
<th>Medical Devices MA</th>
<th>Medical Devices US</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$28</td>
<td>$35</td>
<td>$28</td>
</tr>
<tr>
<td>2009</td>
<td>$32</td>
<td>$35</td>
<td>$24</td>
</tr>
<tr>
<td>2010</td>
<td>$26</td>
<td>$35</td>
<td>$26</td>
</tr>
</tbody>
</table>

**MA med devices as a %**

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total MA exports</td>
<td>12%</td>
<td>14%</td>
<td>13%</td>
</tr>
<tr>
<td>US medical device exports</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>
...and have been growing faster than aggregate state exports

Previous analysis by the Donahue Institute indicates the trend began in 2001

Source: WiserTrade; The Medical Device Industry in Massachusetts, A Presentation to MassMEDIC’s XXth Annual Meeting – prepared by the Donahue Institute 2007
Despite year-to-year variation, Asian and European markets are the biggest consumers of Massachusetts's medical devices.

Massachusetts international exports breakdown by region ($M)

<table>
<thead>
<tr>
<th>Region</th>
<th>Massachusetts exports ($M)</th>
<th>% of 2010 international exports</th>
<th>% change since 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>$1,721</td>
<td>49%</td>
<td>6%</td>
</tr>
<tr>
<td>Asia</td>
<td>$1,282</td>
<td>37%</td>
<td>-9%</td>
</tr>
<tr>
<td>N America</td>
<td>$321</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Australia &amp; Region</td>
<td>$75</td>
<td>2%</td>
<td>-8%</td>
</tr>
<tr>
<td>S America</td>
<td>$68</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Africa</td>
<td>$43</td>
<td>1%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Source: WiserTrade
While heavily concentrated in Eastern Massachusetts, firms are present in almost all regions of the state.

Source: Firm list compiled by Deloitte

Employee count
- Less than 30
- 30-300
- Greater than 300

Source: Hoovers, Dun and Bradstreet, Deloitte Analysis
Massachusetts’s research, funding, and talent environment help contribute to new medical device companies …
Cambridge based iWALK is developing mechanical foot prosthetics to help amputees achieve a stable gait.

From MIT’s Media Lab

To Cambridge based iWALK

- Founded in 2006 by Dr. Hugh Herr of MIT
- Garnered $15 M in third round funding led by Boston based General Catalyst and Sigma
- Delivered its product “the PowerFoot BiOM”, which iWALK calls “the world’s first bionic lower leg system” to Walter Reed Army Medical Center

Waltham based On-Q-ity is turning research from MGH into potential oncology diagnostics

From MGH

- Mehmet Toner’s lab at MGH developed a microfluidic chip that can capture circulating tumor cells, a potential tissue source for characterizing solid tumors
- The initial research showed that the “CTC-Chip” could isolate cells from early stage patients indicating its usefulness in detection and monitoring

To Waltham based On-Q-ity

- On-Q-ity further developed technology to capture CTCs by size and affinity for specific cellular markers enabling selection for specific types of CTCs
- Together with LabCorp, On-Q-ity is developing CTC-chips that will enable clinical trialists to stratify and monitor oncology patients by genomic inspection of their CTCs
- This research offering will provide proof-of-concept for potential clinical diagnostics

The future is bright, but not without challenges

**Medical devices are a contributor to MA’s economy**

- Massachusetts's political, educational, and business environment are contributing to a robust Medical Device Industry

- Massachusetts’s Medical Device Industry employs almost 25,000 people and is responsible for creating more than 80,000 jobs in related industries

- Venture investment in MA medical devices is robust and may be picking up faster than the national trend

- Over the past decade, MA Medical Device exports have been growing at more than twice the rate of MA exports as a whole

**Opportunities for the industry to grow**

- Address the increasing complexity of the regulatory process

- Understand how Health Care Reform will impact the industry
  - Which investments will meet the shifting health care landscape?
  - How will payment reform impact the industry’s business model?

- Determine how to meet the funding challenges for new start-ups as investors demand faster returns

- Embrace globalization and consider the best methods for opening up and competing in overseas markets

The future is bright, but not without challenges
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