1 | **Overview**

- Ontario is Canada’s Life Sciences jurisdiction
- Life Sciences – Overview
- Life Sciences Stats
- A long history of discovery and innovation
- Life sciences clusters concentrated in Southern Ontario
- Pharm and Biologics Manufacturing Capacity

2 | **Business Advantages**

- Close proximity to the United States
- Highly-educated workforce
- Diverse population
- Competitive business costs
- Research and development (R&D) cost advantage
- Research & Development
- Government support programs

3 | **Success Stories**

- Global life sciences companies are located in Ontario
- Biolab
- JLABS
- Taro
Overview
Ontario is one of North America’s largest life sciences hubs - after Northeastern US (e.g. Boston) and California.

The world’s top ten pharmaceutical companies by revenue conduct clinical trials in Ontario.

Ontario has more than 300 pharmaceutical firms – 46% of Canada’s total.

High quality pharmaceutical manufacturing is done in Ontario.
The Ontario life sciences industry includes:

- **Pharmaceuticals** (brand name and generic)
- Biotechnology
- Medical Technologies
- **Contract Services** (including contract research and contract manufacturing)
- Digital Health

More than 50% of Canada’s life sciences economic activity is done in Ontario.

Ontario provides 47% of sites for clinical trials conducted in Canada.

Ontario accounts for 48% of Canada’s biopharma investment in R&D.

Ontario’s strengths include cancer and stem cell research, diagnostic imaging, gene therapy and neuroscience.
Ontario Life Sciences – overview cont’d

- 60,000 employees in the life sciences sector
- 1,900 life sciences companies – 27,500 of these individuals are engaged in pharmaceutical manufacturing firms
- ~8,750 employees in commercial R&D-based establishments (in addition to the above 27,500)
- $39 billion in annual revenues
- $8.6 billion in annual exports (69% of Canada’s life sciences exports)
- Ontario has 44 universities and colleges with over 39,500 skilled graduates in the STEM (science, technology, engineering, math) each year.
- 18 out of the 40 research hospitals in Canada are located in Ontario.*

* RESEARCH Infosource Ltd. 2014.
A Long History of Discovery and Innovation

1922: Discovery of Insulin
Frederick Banting & Charles Best, University of Toronto

1949: Pioneers 1st Pacemaker
John Hopps, University of Toronto

1963: 1st Stem Cell Discovery
(Haematopoietic)
James Till and Ernest McCulloch, University of Toronto

1983: 1st Successful Lung Transplant
Joel Cooper, University of Toronto

1984: Cloned 1st T–Cell Receptor
Tak Mak, University of Toronto/Princess Margaret Hospital

2001: Discovery of Pain Gene
Michael Salter, Hospital for Sick Children

1983: 1st Stem Cell Discovery
(Haematopoietic)
James Till and Ernest McCulloch, University of Toronto

1995: 1st Alzheimer’s Gene Identified
Peter St. George-Hyslop, University of Toronto

1997: 1st Cancer Stem Cell Discovery
John Dick, University of Toronto

2009: Viral–free iPS Cell
Andras Nagy, Mount Sinai Hospital

2013: 1st treatment of localized prostate cancer
Dr. Joseph Chin, London Health Sciences Centre

Dr. Andras Nagy examines freshly induced human pluripotent stem cells from skin. (Photo by Rick Eglinton/Toronto Star, 03/02/2009).

1995: 1st Alzheimer’s Gene Identified
Peter St. George-Hyslop, University of Toronto

1997: 1st Cancer Stem Cell Discovery
John Dick, University of Toronto

2001: Discovery of Pain Gene
Michael Salter, Hospital for Sick Children

1983: 1st Successful Lung Transplant
Joel Cooper, University of Toronto

Other Notable Discoveries
- Dopamine D1, D2, D4, D5 Receptors (1990s)
- Gene for Cystic Fibrosis (1989)
- SH2 Domain (1986)
- 1st Hi-resolution Electron Microscope (1938)
Global Life Sciences Companies are Located in Ontario

Many well known global companies have Canadian head offices in Ontario.

The world’s top ten global pharmaceutical companies conduct clinical trials in Ontario.
Pharma and Biologics Manufacturing Capacity

A strong manufacturing cluster centred on Toronto - global companies with significant Ontario manufacturing presence include:

- Apotex (6,000 employees)
- Teva (1,400 employees)
- GSK (1,150 employees)
- Sanofi Pasteur (1,300 employees – 1,800 in Canada)
- Abbott (875 employees)
- Baxter (1,000 employees)

Biologics Manufacturing: Domestic companies with leading positions in vaccine R&D / production and contract biologics manufacturing and development:

- **Sanofi Pasteur**: Founded in Toronto as Connaught Labs in 1917, produces 1 billion doses of vaccines for the prevention and treatment of infectious diseases, common illnesses and cancers.
- **Therapure Biopharma**: contract manufacturer and biological therapeutics developer, ranked in the top 5% of fastest-growing Canadian companies (Profit, 2014). Has received CMO leadership awards in each of the last 4 years.
- **Microbix**: core technologies relevant to optimizing vaccine and antigen production, with more than 25 years of providing trusted solutions.
Business Advantages
Close Proximity to the United States

142 million consumers within a day’s drive

Daily two-way goods trade between Ontario-USA for 2014 valued at Cdn$844 million

Sources: Industry Canada, Statistics Canada and US Census Bureau, 2015
Overall, 67% of Ontario’s population has completed post-secondary education:

- University: 33%
- College: 27%
- Apprenticeship: 7%

53% of the members of Canada’s highly skilled labor force, including individuals with Masters and/or PhDs, reside in Ontario.
Ontario’s Diverse Population

50% of the Greater Toronto Area population were born outside of Canada – diversity is our strength!

Select Languages Spoken by Ontarians

- Russian: 93,080
- Polish: 128,440
- Arabic: 133,390
- Filipino: 140,805
- German: 140,315
- Portuguese: 147,723
- Spanish: 178,335
- Italian: 251,330
- Major Chinese languages: 499,380
- Major languages spoken in India: 685,193
- French: 1,426,540

In Ontario, you'll benefit from highly competitive business costs that can boost your company's growth and profitability.

<table>
<thead>
<tr>
<th>Location</th>
<th>Costs index</th>
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<tbody>
<tr>
<td>Ontario</td>
<td>85.6</td>
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<tr>
<td>The Netherlands</td>
<td>87.7</td>
</tr>
<tr>
<td>Italy</td>
<td>89.3</td>
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<tr>
<td>France</td>
<td>90.5</td>
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<tr>
<td>United Kingdom</td>
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</tr>
<tr>
<td>Germany</td>
<td>92.3</td>
</tr>
<tr>
<td>Japan</td>
<td>92.7</td>
</tr>
<tr>
<td>United States</td>
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</table>

Ontario’s R&D Cost Advantage

R&D Cost Advantage (Per Cent)

- Ontario: 27.8%
- Netherlands: 26.0%
- France: 22.4%
- Australia: 22.1%
- Italy: 21.0%
- Germany: 16.0%
- Japan: 12.8%
- United Kingdom: 11.9%
- US: 0%

After-Tax Cost of $100 R&D Expenditure
Small and Medium Sized Manufacturers

<table>
<thead>
<tr>
<th>Country</th>
<th>R&amp;D Expenditure (general)</th>
<th>R&amp;D Expenditure (at eligible Ontario research institutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross expenditure</td>
<td>$100.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>Actual after-tax expenditure</td>
<td>$56.60</td>
<td>$44.29</td>
</tr>
</tbody>
</table>

Note: based on information as of June 1, 2016.
Sources: Ontario Ministry of Finance; Canada Revenue Agency, 2016

Ontario has a 27.8% cost advantage relative to the US

Research and Development

- Ontario’s life sciences sector spends $665 million on research and development which accounts for 51% of Canada’s total R&D expenditure in the sector.

- Top research hospitals are located in Ontario which includes: Hospital for Sick Children, Mount Sinai, Hamilton Health Sciences, Ottawa Hospital, London Health Sciences Centre, Sunnybrook Health Sciences Centre, to name a few.

- Ontario clinical trial data is recognized by U.S. and EU authorities and trial costs are lower than in the U.S.

- Toronto has more clinical trial sites than London, U.K. and San Diego, U.S., with over 1,400 active clinical trials in 2015 alone.

- Four of the top ten Canadian research universities are located in Ontario: University of Toronto, McMaster University, University of Ottawa and Western University.
Ontario Attracts Investors from Many Countries

Foreign direct investment projects in Ontario by source country, market share in Ontario (%), 2015

- US, 58.72%
- UK, 7.34%
- Switzerland, 4.59%
- Japan, 4.59%
- India, 3.67%
- Netherlands, 2.75%
- France, 1.83%
- Australia, 1.83%
- Israel, 1.83%
- Sweden, 1.83%
- Other, 11.04%

Source: fDi Intelligence, April 2016.
A Few Key Organizations

**Pharma:**
- Dalton Pharmaceuticals – www.dalton.com
- Patheon – www.patheon.com
- CCRM – Centre for Commercialization of Regenerative Medicine – www.ccrm.ca
- CTO – Clinical Trials Ontario – www.ctontario.ca
- OICR – Ontario Institute for Cancer Research – www.oicr.on.ca
- OBI – Ontario Brain Institute – www.braininstitute.ca/homepage

**Legal and Tax:**
- Baker McKenzie LLP – www.bakermckenzie.com
- Collins Barrow – www.collinsbarrow.com
- KPMG – www.kpmg.com
Government Support Programs

Ontario provides Regional Development Funds

Southwestern Ontario Development Fund,

Eastern Ontario Development Fund

- Supports projects that create jobs, encourage innovation, cluster development and attract private sector investment.

- Must be located in, or plan to locate in, a community in Southwestern Ontario or Eastern Ontario.

- Commitment to create at least 10 jobs and minimum $500,000 investment.

- Maximum grant up to $1.5 million

- Maximum loan up to $5 million if investments of more than $10 million that also create more than 50 new jobs.

Northern Business Opportunity Program

- Competitive businesses that currently do not have a presence in Ontario that will expand operations to Northern Ontario and create jobs.

- Support can be in the form of a conditional grant and/or loan and is determined on a case-by-case basis.
Government Support Programs

Jobs and Prosperity Fund

- **The New Economy Stream**: to build R&D capacity, improve private-sector productivity, performance and competitiveness, and support innovative businesses in expanding their market.
  - Focused on Ontario’s key sectors, including life sciences.
  - Looking for projects focused on increasing productivity, innovation and exports (PIE).
  - Projects need $10 million in eligible costs.

- **The Strategic Partnerships Stream**: to help entrepreneurs, companies, research institutions, customers and investors work together to compete globally.
• **Biolab Farmacêutica**, headquartered in Brazil, is the leading pharmaceutical company in chronic heart disease with other focuses on dermatology, gynecology, oncology and other areas.

• The Canadian headquarters will be located in Mississauga, Ontario and known as Biolab Pharma.

• $57 million investment to create their first R&D facility and Canadian headquarters outside Brazil.

• Creating 40 new jobs.
• **Johnson & Johnson Innovation** is part of the Johnson & Johnson family of companies.

• Johnson & Johnson Innovation has created JLABS - life sciences incubators for promising start-up companies. JLABS provides entrepreneurs with shared lab space, offices, and access to scientific, industry and capital funding experts.

• Toronto was chosen as the first location outside of the United States, for a JLABS Incubator.

• JLABS@Toronto opened with 22 companies and can eventually support up to 50 start-up companies.
• **Hoffmann-La Roche** is a multinational healthcare company focused primarily on pharmaceuticals and diagnostics.

• The company is headquartered in Switzerland. The Canadian headquarters is located in Mississauga, Ontario.

• $190 million investment to create a new Roche global pharmaceutical development site (only 1 of 6 in the world). This site plays a leadership role in overseeing global clinical trials.

• Created 200 new jobs in addition to 450 existing jobs.
• **Taro Pharmaceuticals** is a leading manufacturer and supplier of prescription and over-the-counter topical medication like creams, ointments, and gels.

• The company is headquartered in Israel, and owned by Sun Pharma in India. The Canadian headquarters is located in Brampton, Ontario.

• $247 million investment to expand manufacturing and research and development in Brampton, Ontario.

• Created 140 new jobs in addition to 395 existing jobs.
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