OBJECTIVES

1. Pharmaceutical Industry Environment

2. Harnessing the Industry’s Potential

3. Pharmaceutical Industry Investment Benefits
Pharmaceutical Industry Environment
The Innovative Pharmaceutical Industry

- Innovative, or ‘brand name’, pharmaceutical industry refers to companies actively engaged in the pursuit of new medical discoveries
  - significant R&D costs
  - strong reliance on patent law, enforcement
  - heavy reliance on scientific investments and partnership
  - individual companies focus on specific therapeutic areas
  - compete for leadership in new areas of medical care or for better outcomes in a therapeutic area
Global Market

WORLD PHARMACEUTICAL MARKET (1998) - US$251 BILLION

- U.S.A.: 39.6%
- Europe: 23.3%
- Japan: 15.4%
- Brazil, Argentina: 4.05%
- Others: 15.75%
- Canada: 1.9%

* Excludes OTC and Vaccines

Source: The Pharmaceutical Market World Review 1999, IMS Health

* Ontario represents roughly 40% of the Canadian market, or ¾% globally
Canadian R&D Investment 2001

- Pharmaceuticals/biotech sector ranked 2nd in R&D Intensity (R&D as a % of Revenue)
- 25 of the top 100 R&D companies were from pharmaceuticals/biotech sector
- GSK ranked No. 3 in the (innovative) pharmaceutical (R&D) sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>R&amp;D Exp. (2001)</th>
<th>Research Intensity (R&amp;D as a % of Revenue)</th>
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</thead>
<tbody>
<tr>
<td>1. Telecommunications</td>
<td>$6.4B</td>
<td>17.3%</td>
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<tr>
<td>2. Pharma/biotech</td>
<td>$1.27</td>
<td>14.1%</td>
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<tr>
<td>3. Software/computers</td>
<td>$955M</td>
<td>9.7%</td>
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<tr>
<td>4. Aerospace</td>
<td>$686M</td>
<td>~6%</td>
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<tr>
<td>5. Energy</td>
<td>$410.5M</td>
<td>~5%</td>
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</tbody>
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Source: Canada’s Innovation Leaders. Research Infosource Inc.; July 2002
Pharmaceutical R&D* Investment
Ontario (1988-2001)

Source: PMPRB Annual Reports
• Does not include capital equipment and depreciation expenditures
R = Revised
Research and Development at GSK

- Over $100 million invested annually in Cdn. R&D
- Employ 400 highly skilled R&D staff - one of the largest R&D organizations in the country
- Conduct over 200 clinical studies annually in Canada, involving some 40,000 patients
- Approximately 35% of our national clinical research program is conducted in Ontario
- Extensive university/biotech discovery collaborations
The Estimated Cost of Bringing a New Drug to Market (1976-2001)

New Drug Development Process

- Preclinical Development
- Clinical Development
- Regulatory Approval
- Effective Patent Term

Patent Year 0 | 3 - 4 | 8 | 10* | 20

* Average year for market entry, individual products can vary
International NCE Approval Times

Source: Rx&D, PhRMA, SAPI.
Ratio of Canadian Prices to Median International Prices (1987-2001)

Source: PMPRB Annual Report, 2001
Note: Beginning in the year 1999, the ratio includes prices of patented drugs for human use only.
Harnessing the Industry’s Potential
Industry Investment

“Innovation is the now recognized as the major, if not the sole, sustainable source of economic growth and the major determinant of the wealth of a nation.”

Conference Board of Canada, Performance and Potential, 1998
To sustain and enhance innovation by becoming one of the top five jurisdictions in North America

Magnitude of opportunity: US$60 billion per year

Over $13 billion total investment over next decade (by 2005 a potential level of $1 billion per year investment in Ontario)

Represents 7,000 direct jobs plus 18,000 indirect jobs = 25,000 new jobs (by 2006)
Recommendations of Paper

- Partnership between Industry and Government:
  - Level regulatory playing field
  - Leverage Ontario strengths to increase Industry investment
Pharmaceutical Industry Investment Benefits
Current GSK Investments

• GSK has established the $10M *Pathfinders Fund for Leaders in Canadian Health Sciences Research*
  
  • Objective: establish Research Chairs in every medical school across Canada, e.g.,
    • U. Toronto (HSC endowed chair in functional genomics)
    • McMaster U./Firestone Clinic (chair in pediatric respiratory)
    • U. Ottawa (5 year professorship in diseases of aging)

• GSK’s commitment to working with UTM
  
  • helped develop the Master of Biotechnology Program with a donation of $700K to student laboratory facilities and ongoing curriculum planning
  • GSK has employed 4 M.Biotech students during their internship periods
Investment Opportunities for Tomorrow

- Biosciences & Biotechnology Cluster at University of Toronto:
  - Current Opportunities:
    - MARS Discovery District
    - Toronto Academic Health Sciences Complex and CCBR
  - Future Opportunity:
    - Biotechnology Convergence Centre (BIOTECC) at UTM:
      - leverage the expertise and resources of the biopharmaceutical business environment in proximity to UTM
      - aligned with economic development targets for the City of Mississauga
      - expands the scope and reach of the University of Toronto beyond the city core
      - expands the academic program scope at UTM to train Canadian-based scientists and innovators of tomorrow