

Canada's pharmaceutical sector supports knowledge-based jobs, invests more than a billion in R&D annually and generates therapeutics with immeasurable health benefits. As impressive as that is, some say with the right policies this sector could contribute even more.

Health innovation

Q&A with
Russell Williams
President of Rx&D,
Canada's Research-Based
Pharmaceutical Companies



How is this impacting Canada's economy?

The research-based pharmaceutical industry currently employs more than 15,000 highly skilled Canadians and supports another 10,000 jobs in health research. Our ability to keep those jobs in Canada depends on our global competitiveness.

Canada and the European Union (EU) are conducting negotiations aimed at expanding trade that could produce an estimated \$12 billion in benefits for Canada over the next seven years. As part of these negotiations, the EU is calling on Canada to improve its intellectual property protection to meet international standards.

IP protections are a platform for better treatment options and a vibrant knowledge-based economy. But we have to get it right. A Canada Europe Trade Agreement and strong intellectual property protections represent a great opportunity for Canada.

How does Canada's intellectual property protection compare to that in other countries?

A report released this January by the Canadian Intellectual Property Council (CIPC), a

group of experts that works with the Canadian Chamber of Commerce, examined the role intellectual property plays in developing and sustaining a strong pharmaceutical and life sciences sector. The report considered 32 countries, including the EU, the United States and Japan. These countries represent our most important trade partners and competitors for research dollars. The report's conclusions are sobering: Canada has less robust IP protections than our major trading partners. Higher IP standards would increase R&D spending, stimulate job creation in Canada, and help bring to Canada the most cutting-edge medicines.

What are Canada's primary strengths in this global competition?

Canada represents slightly less than three per cent of global sales in our industry, but attracts just over one per cent of global investment. Unfortunately, Canada does not compare well on a global level with either IP protection or programs that make innovative medicines available. Due to this, we are seeing clinical studies and other research programs going to other jurisdictions.

Canada has vibrant communities, universities and world-class researchers. We also have a very sound health-care system that could be used

about

Rx&D is an association of leading research-based pharmaceutical companies dedicated to improving the health of all Canadians through the discovery and development of new medicines and vaccines. Guided by its Code of Ethical Practices, Rx&D's membership is committed to working in partnership with governments, health-care professionals and stakeholders in a highly ethical manner.



as a tremendous platform for research. About 75 per cent of our domestic investment, more than a billion dollars, is invested in clinical trials. That is very exciting, because it benefits our teaching hospitals, patients and health-care providers. These strengths will provide us with a great advantage if we modernize our IP rights. But we have to move quickly.

What are the implications for Canada's health-care system?

The benefits of innovation to health care are clear. Today's medicines not only provide better patient outcomes; they reduce the need for hospitalizations and costly operations. They also improve patient quality of life by increasing treatment options, improving tolerability, reducing side-effects or simplifying treatment regimens. If you look just at the last 25 years, we've seen huge breakthroughs in breast cancer, cardiovascular disease, diabetes and HIV/AIDS, to name just a few examples. The increased knowledge of genetics, cell processes and information technology has seen exponential growth in new biologic therapies and treatment possibilities. This research not only holds promise to further revolutionize health care. The global pharmaceutical industry itself is testing 800 medicines and vaccines to better treat or prevent cancer.

STAYING AHEAD
BY STAYING AT THE FOREFRONT
OF INNOVATION.



From radical medical breakthroughs to incremental improvements to existing treatments, GlaxoSmithKline believes that every step forward is a step in the right direction. As one of Canada's leading research-based pharmaceutical companies, we believe in continuous innovation, because we know that everyone benefits from medical advancements, big or small. At GSK, we stay ahead by staying committed to progress. Discover more at GSK.ca



DISEASE PREVENTION

Despite efficacy, more could be done to put vaccines to work

When Bill and Melinda Gates began investing their enormous wealth in social change, they started with extensive research to determine the most effective way to help all people live healthy, productive lives. That research identified vaccines as "one of the most effective health interventions ever developed."

"After access to safe drinking water, vaccination is widely seen as the 20th century's greatest public health triumph," says Mark Lievonon, a director of BIOTEC Canada, and president of Sanofi Pasteur Limited. "Vaccines save more than three million lives in the world every year. But at the same time, three million lives are lost to vaccine-preventable diseases – three million deaths that didn't have to occur."

Even in developed countries such as Canada, vaccine coverage is less than ideal. "The effectiveness of vaccines has created complacency," says Mr. Lievonon. "If we stopped vaccinating, diseases such as whooping cough, polio and pertussis would re-emerge; we've seen outbreaks of diseases such as measles and whooping cough in communities

where coverage is low."

In light of the burden of rising health-care costs, prevention of disease becomes even more essential, he says. "Vaccination plays a key role in terms of reducing cost within the health-care system. Over the years, more vaccines have been introduced, which requires greater investment in prevention," says Mr. Lievonon. "However, that investment prevents diseases and death, reducing the costs of hospitalization and other costs."

Canada continues to be a leader in vaccine innovation, says Dr. Luis Barreto, former vice president, Immunization and Science Policy, Sanofi Pasteur Limited. Currently in development, for example, is a promising vaccine for C.difficile, a bacterium that has caused infection outbreaks in a number of Canadian hospitals and community care facilities.

While C.difficile has been the source of infection outbreaks in hospitals for more than 30 years, new antibiotic-resistant, hypervirulent strains have emerged recently. "It has cost so many lives, and will continue to do so if an effective vaccine is not developed. We've seen recent

outbreaks in Ontario in January and February, and last year in Manitoba," says Dr. Barreto.

At the end of 2010, GSK had 25 vaccines in clinical development, and anticipates five major vaccine launches in the next five years. Clinical studies are underway for HIV, tuberculosis and malaria.

At Novartis, researchers have successfully applied a new technology, reverse vaccinology, to the development of the first broad-coverage vaccine for meningococcal B. Traditional vaccine technology isolates and inactivates disease agents for injection; reverse technology uses genome sequencing to identify proteins that are then tested for immune responses.

Most of the vaccines that could be developed in the traditional way have been developed, says Dr. James Mansi, medical expert at Novartis. "The remaining diseases will be conquered by new technologies."

There is currently no vaccine for meningococcal B, responsible for more than 80 per cent of meningitis in infants and two-thirds of meningitis in adolescents, but Novartis hopes to introduce the meningococcal B vaccine later this year.



In view of the burden of rising health-care costs, disease prevention is even more essential, say experts. PHOTO: ISTOCKPHOTO.COM

Put to better use, life sciences sector could further boost health care's affordability

Canada's life science industry has a tremendous legacy of innovation: the mass-scale production of polio vaccine; the discovery of insulin and stem cells; Dr. Michael Smith's Nobel Prize-winning DNA sequencing achievements; and 3TC, a cornerstone in AIDS combination therapy and the SARS genome sequencing project.

While research and development in life sciences has helped drive economic growth and academic excellence across Canada, its greatest impact is on the quality of life and life expectancy of Canadians.

"In Canada, we've seen among the most significant increases in life expectancy in the western world," says Paul Lucas, president and CEO of GlaxoSmithKline Canada. "Innovative vaccines prevent disease; when people are ill, innovative medicines improve quality of life and extend life expectancy."

But if life science innovation is to continue to thrive in Canada, he says, our approach to the delivery of health care must change. "We're not taking full advantage of the pharmaceutical technology that is available today, because governments tend to focus on reducing the cost of drugs, doctors and hospitals within those silos rather than on creating better patient

outcomes with the capabilities we have."

Chronic obstructive pulmonary disease (COPD), for example, is one of the major causes of hospitalization in Canada; patients who have a COPD attack must be hospitalized, usually for a number of days. "If we use the medications now available more effectively – by ensuring that the right patients are taking them, and taking them properly – we could significantly reduce the amount of lung attacks. The result would be fewer

hospitalizations, reduced overall costs and increased capacity in the system."

Today, many Canadian researchers are focused on genomics and proteomics, innovation that will lead to more personalized medicine, says Mr. Lucas. "Many institutions, such as the Ontario Genomics Institute and Genome Canada, are working to develop medications that treat specific patients with a specific genetic makeup, improving efficacy and reducing side-effects."



GlaxoSmithKline Canada president and CEO Paul Lucas says that while innovative medicines improve quality of life and extend life expectancy, a governmental preoccupation with reducing the cost of drugs, doctors and hospitals results in Canada not taking full advantage of today's pharmaceutical technologies. PHOTO: SUPPLIED

Using medicines more effectively will ease the burden on the health-care system and create a framework for tomorrow's innovation. "It is research underway today that will overcome the gaps that exist in treatment today – types of cancer for which little treatment now exists, multiple sclerosis, muscular dystrophy and diseases of age. Research partnerships between the life sciences industry and Canada's universities and hospitals underway today are focused on preventative and therapeutic vaccines that have the potential to prevent diseases such as cancer and Alzheimer's."

While Canadians hear a lot about the rising cost of prescription drugs, it is less widely known that patented brand-name medicines represent only about four per cent of the costs of the government-funded health-care system, he says. "The costs of new patented medicines have grown more slowly than physician, hospital and pharmacy costs for most of the last decade."

If Canada had built electronic medical records into the health-care system 10 years ago, the billions of dollars saved could have funded new treatments and prevention, he says.

"The same is true of medicine – it is innovation that will make the health-care system affordable."

numbers

Beyond providing medicines that improve people's lives, the contributions of Canada's innovative pharmaceutical-based industry add up economically, too.

50

Rx&D member companies

15,000

men and women directly employed

60,000

jobs supported across Canada directly and indirectly

27%

of all health science research and development in Canada is funded by Rx&D member companies

online? Visit canadapharma.org for more information.

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Our work gives hope –

Hope to millions suffering from chronic disease – prolonging life, easing pain. Our work delivers better health care and faster recoveries, through prevention as well as cure. Our work in Canada helps save lives here at home and around the world through innovative research into medicines and vaccines.



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