

Canada's innovative biopharmaceutical industry and health research community are not only sources of scientific insight, expertise and therapeutics vital to public health; as Canada strives to develop its strength as a knowledge-based economy, they are also becoming increasingly vital to our future prosperity.



PharmaCare

Despite the stunning results of Canadian health research, Canada's biopharmaceutical industry questions whether Canada's policy environment is sufficiently robust to encourage continuing innovation and benefits generated by this knowledge-intensive sector.

So far in 2009, Canadian research teams reported that an eight-year-long study had identified a brain protein with the power to learn, and an associated medication – currently being tested in Alzheimer's patients – that may correct learning disabilities related to an absence of that protein. Scientists also identified the genetic underpinnings of one of the most common types of childhood brain cancer, a crucial first step in designing more effective, less toxic treatments to fight the deadly disease. Canadian researchers also identified a way to transform skin cells into stem cells with reduced potential risks to patients. The list goes on.

Together, these and myriad other extraordinary, Canadian-led research discoveries convey a clear message: Canada's research community is a

world leader with the potential to fuel an innovation-based economic renaissance.

But in today's competitive global climate, say experts, that leadership can only be sustained through significant investment supported by an informed policy environment.

"It is critical to the health of Canadians to support new and ongoing pharmaceutical and biotech research," says Jeffrey Devlin, general manager, Abbott Canada. "Abbott, for example, invests several million dollars each year in Canada through established partnerships with key universities and research centres, as well as community centres and family practices; we work with a total of 800 Canadian research sites. It's a symbiotic relationship: our support of Canadian infrastructure and research has created strong opportunities for research that Abbott and Canadians benefit from."

Collectively, says Paul Lévesque, president of Pfizer Canada, the biopharmaceutical industry invests more than \$1 billion annually in research and development in Canada, providing 20,000 jobs. "In these challenging economic

times, enhancing Canada's scientific research community is critical. Advancing R&D is the best way to bolster our country's competitiveness."

Health research also offers the potential to significantly enhance quality of life for current and future generations. "It comes down to fulfilling unmet needs for patients," says Mr. Devlin, noting that Abbott's research efforts include studies in several types of cancer tumours, neurocognitive disorders, and other diseases and ailments that either lack therapeutics or aren't as effectively addressed by treatments available today as they could be. "As the population continues to age, there will be new diseases and health issues, too, that present future unmet needs."

The goal of research investment, says Mr. Devlin, is "to turn our science into caring for patients, and do it in ways that have a significant benefits for the population, both in quality of life and the economy of the health care system."

Yet, access to care is a key issue across Canada, says Russell Williams, president of Rx&D, Canada's Research-

Based Pharmaceutical Companies. "For the last two years, Canadian patients who rely on public drug plans have only had access to one in five new medicines approved by Health Canada. Patients deserve better," he says. "Not only do we need to offer Canadians more choice for their individualized care, we need to provide a sustainable environment for the companies investing in the discovery of these new therapies."

Intellectual property protection must also be upheld and strengthened to match the policies of Canada's global competitors, says Mr. Williams. "Canada needs to reward innovation through public policies. It's really about taking a patient-focused approach to health care and, in doing so, we create the con-

ditions for attracting more research and investment to Canada."

Mr. Devlin agrees. "When intellectual property is compromised, it undermines previous research investment and puts future investments at risk. The development for new pharmaceuticals is long. You need IP protection that supports that long-term cycle."

On a positive note, Mr. Devlin says Canada's regulatory body provides very well understood guidelines and regulations concerning the conduct of research, and expects answers to fair questions. "We know we have to prove the value of the medicines we bring to market, and we do that by demonstrating their safety, cost effectiveness, improvements to quality of life, impact on productivity,

duration of care, and other measures that are answered through research."

Mr. Williams says, "Not only do we offer an economic solution, more importantly, we offer Canadians hope. Many are living longer, healthier and more productive lives because of the new innovative products the biopharmaceutical community has created."

Canada is full of talented researchers and innovators, says Mr. Williams, and is also home to some of the best research facilities in the world. "There is no doubt we have the ability to be leaders in global innovation. However, there is an urgent need for all governments to work together to provide a sustainable environment for Canadian researchers to flourish." ■

Time to build new era of prosperity is now, say pharma industry experts

Around the world, even as the economy continues to falter, policy-makers have the opportunity to help lay the foundation for the next era of economic development.

"If we look for a silver lining," says David Meek, president of Novartis Pharmaceuticals Canada, "the economic downturn gives governments and industries a chance to step back and identify what has and has not worked in the past. Will we continue to invest heavily in industries that are not sustainable?"

The downturn provides an opportunity to foster knowledge-based sectors of our economy, says Mr. Meek, by ensuring our public policies reward innovation and improve the knowledge-based infrastructure. "When you have people, you'll have sick people, so the biopharmaceutical industry is a clear example of a sustainable sector. Canada has an opportunity to lead here, because we have world-class academic institutions, hospitals, companies and researchers."

In combination with the right policy framework, he says, this innovation infrastructure can lead to a sustainable competitive edge. "We need to ensure Canada is one of the leading jurisdictions in the world to embrace new and innovative medicines."

Watson Wyatt's Global Benchmark Survey of the major industrialized nations recently found Canada second-to-last in getting needed medicines to patients, he says. "We have a biologic drug called Lucentis that was



David Meek, president of Novartis Pharmaceuticals Canada, is among those calling for more public policies that reward innovation and support knowledge-based infrastructure. PHOTO: SUPPLIED

approved by Health Canada in July 2007. It treats age-related macular degeneration, a leading cause of blindness. Not only does it slow sight deterioration, it actually takes some patients from legally blind to no longer blind. Patients who lost their driver's licence because they were deemed to be legally blind can take this drug and drive again."

But the drug – approved 20 months ago – is only reimbursed to patients in Ontario and Quebec.

"This is one example of many," says Mr. Meek. "Canada has a good innovation climate, but we're competing against other countries throughout the world. When other markets such as China, Brazil and India offer friendlier climates for R&D, it hurts clinicians. Our health care system has many positives, but access to new and innovative medicines is a black eye." ■

Tom Brogan, president and founder of Brogan Inc., a company that uses provincial formulary and private drug plan data in pharmaceutical market research and analysis, says, "I think the provinces have lost sight of how valuable it is to bring new products to market. It was the drug industry, for example, that changed AIDS from a death sentence to a chronic illness. The government has been so concerned about costs that we might be losing sight of value."

In a country that values universal health care, current policies are also creating unequal access. For example, while drugs approved by Health Canada are almost universally approved for reimbursement by private drug plans, Mr. Brogan notes, "If the patient is a senior and counts on provincial drug formularies for access, there are significant hurdles."

"There is a huge amount of effort controlling the expense on drugs; but drugs make up only 10 per cent to 15 per cent of total health expenditure and are largely a cost savings vehicle."

Mr. Meek says, "We know from Columbia University research that every dollar invested in new medicines saves seven dollars elsewhere in the system."

"We have to stop thinking of medicines purely in terms of cost, and think about how much we can save on health-related expenses. Treating patients with the right medicines keeps them healthy and productive in whatever they're doing in their lives." ■



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CANADIAN INSTITUTES OF HEALTH RESEARCH



Dr. André Marette

Intent on finding a cure for two of the world's most pressing health issues – diabetes and cardiovascular diseases – Dr. André Marette is helping advance knowledge vital to the battle against these deadly afflictions, both of which are linked to obesity. His greatest accomplishment so far? "To have identified inflammatory and nutrient sensing pathways that promote insulin resistance, a key factor leading to diabetes and cardiovascular diseases in obese subjects," says Dr. Marette.

His current focus is advancing understanding of the causes of insulin resistance, diabetes and cardiovascular diseases. "We are focusing on molecular defects in the pathways modulating body weight, insulin sensitivity and the control of inflammation. We are also investigating how exercise and nutrients can positively impact these metabolic and vascular diseases."

In a study involving Finnish research as well as his colleagues at the University of Laval, Dr. Marette is also helping identify the metabolic determinants and genetic factors underlying the increased risk of diabetic subjects to develop cardiovascular complications.

Research partnerships yield added value

B.C.'s health research community gets booster shot

Promising therapeutic ideas can often end up stuck in a lab, stalled before they ever reach the development or testing phase, let alone the patients who need them. Members of Canada's biopharmaceutical, academic and public sectors alike, however, are giving those ideas a much needed boost, dedicating resources and expertise to fast-track the development of drugs and tests that will save lives and money.

For example, in Canada, Pfizer invests up to \$150 million a year in the research and development of therapeutics, 70 per cent of which takes place outside of its own walls.

"At the moment, everybody is looking at a better way of harnessing the innovation and knowledge coming out of academic research institutions, and looking to accelerate the translation of this new knowledge into commercialized applications," says Bernard Prigent, vice president and medical director at Pfizer Canada.

Pfizer's action on this front includes its recent dedication of \$3 million to the Pfizer-CDRD Innovation Fund at the Centre for Drug Research and Development at the University of British Columbia.

"We've been successful in raising operating and infrastructure funds...but the Pfizer-CDRD Innovation Fund has allowed us to support six specific research projects, and will soon be funding three more," says Natalie Dakers, president and CEO of the CDRD.

Ms. Dakers says the cash infusion will assist CDRD in its focus – the advancement of medical discoveries that show potential to become new therapeutics.

She says it also serves as a new way for companies like Pfizer to interact with universities and identify promising technologies. "They are interested in academia because that's who comes up with new ways of approaching problems."

Dr. Prigent agrees, "We bring an industry perspective...and the more we can bring the various sectors together, to understand the common challenges and work together on key solutions, the faster we can help patients."

One project currently benefiting from the Innovation Fund is led by Aly Karsan, a professor in UBC's Department of Pathology and Laboratory Medicine. Dr. Karsan's team identified a first-in-class



Scientists Jonathan May and Shabnam Yazdi are among the academic researchers who work in the Centre for Drug Research and Development at UBC, a facility supported in-part by funding from Pfizer Canada. PHOTO: CDRD

molecule with the ability to promote angiogenesis – the development of new blood vessels.

Angiogenesis is crucial to healing wounds – a dangerous challenge for diabetic patients, who commonly develop foot ulcers. "Diabetics' wounds end up not healing because of a lack of blood supply," says Dr. Karsan. Diabetes is the number-one cause of non-traumatic leg amputations in the devel-

oped world.

"We've found something that works, but we needed the necessary data, expertise and funding to prove it was useful," he says. "CDRD helped us out with that."

Pfizer Canada is also partnering with the PROOF (Prevention of Organ Failure) Centre of Excellence for Commercialization and Research. UBC-hosted PROOF received \$1 million from Pfizer for

research into biomarkers – biological molecules that indicate disease.

The PROOF Centre's goal is to move away from drug-only strategies, towards biomarker-guided prevention and effective early detection of primary diseases that cause vital organ (heart, lung and kidney) failure.

"Pfizer holds the same objectives," says Bruce McManus, director of the

PROOF Centre, and professor of Pathology and Laboratory Medicine at UBC. "One of the projects we have had early success with, which will soon undergo a national trial, is focused on predictors of immune rejection of transplanted organs. We have learned a lot about how organ failure can be reversed by transplantation, and how blood biomarkers can indicate this 'cured' organ failure state."

Dr. McManus says these marker sets would enable transplant patients to be monitored in a much less-invasive, less-painful and less-costly manner.

"Current monitoring techniques require a biopsy of the actual organ," he says.

"PROOF is focused on this, not only because it is invasive, but because of the enormous cost – \$35 billion a year – to health care."

Dr. Prigent says, "There is clear value in establishing early partnerships with innovative models such as PROOF, CDRD and other initiatives. Pfizer's value proposition to Canadians is that we're more than medication. Going beyond pills and intervention, towards prevention initiatives, is a priority for us." ■

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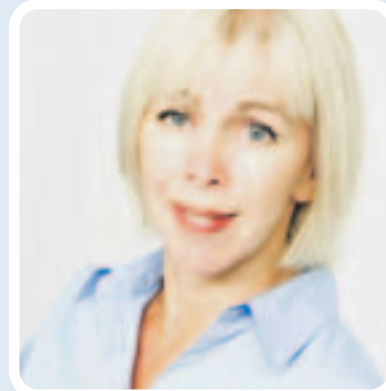
CANADIAN INSTITUTES OF HEALTH RESEARCH

Dr. Freda Miller

Based at Toronto's Hospital for Sick Children Research Institute, Canada Research Chair in Developmental Neurobiology Dr. Freda Miller is best known for her studies of neuronal stem cells and of neuronal growth, survival and apoptosis. Her fundamental discoveries have led to potential new therapies for human diseases.

"In one case, we discovered a novel stem cell from human skin that we are now developing for treatment of spinal cord injury. In another case, we defined proteins that are important for the survival of nerve cells following injury and during neurodegeneration," says Dr. Miller, noting this information was used to help develop a drug candidate for peripheral neuropathies in a biotech company called Aegera Therapeutics that she helped found.

Her current focus: "We are currently asking whether skin stem cells can be used therapeutically for things like spinal cord injury, and how and why neural stem cells that build your brain go wrong in genetic disorders that cause cognitive impairments such as mental retardation or autism."



Putting innovation into action

Building a healthy biopharmaceutical industry in Canada

By Russell Williams
President, Rx&D

Over the past year, our economic foundations have been shaken by a global economic and financial crisis. Canada has fared better than many other countries, but this turmoil has given pause for us to consider how we can attract the investment that will provide sustainable long-term growth for our economy.

Clearly, Canada must have a co-ordinated approach that builds on our strengths and creates secure, high paying jobs in the knowledge economy. As the industry that develops medicines and vaccines that improve and save lives, we have the potential to be key drivers in this new economy generating both greater health and more wealth for Canadians.

As a first step, we are proposing that the federal government create a Biopharmaceutical Sector Strategy aimed at growing the innovative biopharmaceutical industry in this country.

Let me be clear. This is not about asking for subsidies. It's about governments at all levels sitting down with industry and other economic and health stakeholders to create an action plan to attract more cutting-edge research and development (R&D).

There is exciting work being done today in the labs of our member companies. Scientists are working to find new and better ways to prevent and treat illnesses ranging from cancer to HIV/AIDS, diabetes, neurological disorders including Alzheimer's, heart



disease and stroke, and infectious diseases among others.

These are the next generation of treatments and cures that build on the successes of the past. As an example, think about the progress that has been made and the lives saved through development of new vaccines that have eliminated many deadly childhood diseases.

Currently, our member companies employ 20,000 Canadians and invest more than \$1 billion in R&D annually in Canada, often in partnership with hospitals and universities. Our challenge is to build on this success because in the global economy, R&D investment can go anywhere.

Why is it important that we do this now? The fact is that other jurisdictions, the United States as well as emerging markets like China and India, have their own co-ordinated plans to capture a greater share of the annual \$100-billion global investment of life sciences R&D. Canada must do the same or we risk being left behind.

Canada has many of the fundamental materials for suc-

cess, including highly skilled people and some of the finest research facilities in the world. What is lacking is a clear sense of direction, comprehensive co-ordination and a partnership approach.

All departments within government at all levels need to be pulling in the right direction, and we need to have the right people at the table to make it happen. We can begin by improving the safeguards for intellectual property, which will fuel innovation and promote the development of more innovative treatments and technologies here in Canada.

Canada must reduce the regulatory burdens of agencies such as the Common Drug Review and the Patented Medicines Prices Review Board. We need to train more scientists and provide improved tax incentives to encourage innovators to bring their new ideas to the marketplace.

Canadians who rely on public drug plans have access to, on average, only one in five of the new medicines and vaccines that are approved by Health Canada in the last two years. Patients in Canada deserve better. Improved and timely access should be part of the overall strategy.

The Globe and Mail declared in an editorial recently, "Research is a public good." We couldn't agree more.

Research in the field of biotechnology has the potential to improve the human condition exponentially whether we are talking about a zero emission car or a treatment that could one day cure cancer or Alzheimer's disease. Governments and industry

need to work as partners to harness this potential and make Canada a leader in life sciences.

Prior to his appointment as Rx&D president, Mr. Williams was a member of the Quebec National Assembly for nearly 15

years, including service as the Parliamentary Assistant to the Minister of Health and Social Services.

A picture of innovation

Rx&D represents 20,000 men and women in the innovative, knowledge-intensive, pharmaceutical industry. Its members contribute to the investment of over \$1 billion annually in health R&D.

- Rx&D member companies are the leading funder and performer of therapeutic products research and are the largest single source of health R&D research in the Canadian business enterprise sector.*
- Each year, Rx&D member companies invest more than \$1 billion dollars in research and development in Canada, including approximately \$160 million at hospitals and universities.
- Comprised of companies of all sizes, Rx&D member companies are part of the global pharmaceutical industry whose members are responsible for developing over 90% of medicines available today.
- In 2006, over 40% of R&D investments by Rx&D member companies (SR&ED eligible and non-eligible) were in basic research.**
- Every year, about one in five research dollars are invested in hospitals and universities***
- Over the last 25 years, R&D by the innovative pharmaceutical industry in Canada has risen over 1,700%.

*Statistics Canada Science Statistics, Estimates of total spending on R&D in the health field in Canada, 1989 to 2006, March 30, 2007
** Deloitte 2007 statistical survey of Rx&D member companies
*** PMPRB Annual Reports

New research program addresses issues in inflammatory arthritis care

Often dismissed as joint aches associated with aging, inflammatory arthritis is, in fact, the leading cause of long-term disability in this country and affects one in seven Canadians of all ages. A new research effort is now helping improve patient care for people living with this debilitating affliction.

Inflammatory arthritis care in Canada faces a looming crisis. The disease is not easily diagnosed, and Canada currently faces a shortage of rheumatologists – the specialists who treat the disease and who are best able to make a diagnosis. This means that Canadians are waiting longer to see a specialist, and many are left without the care they need.

To help tackle these issues, Abbott Canada spearheaded the creation of a novel research fund, endorsed by the Canadian Rheumatology Association (CRA). This new non-profit body, called CIORA – Canadian Initiative for Outcomes in Rheumatology cAre – is a competitive grant for pioneering programs designed to tackle the three identified barriers to care: earlier referral to a rheumatologist, comprehensive care for diagnosed patients and general awareness of inflammatory arthritis.

"CIORA focuses on finding practical solutions to real-life problems," explains Montreal rheumatologist Dr. Paul Haraoui, the chair of CIORA. "This money is for solving specific issues in the daily practice of rheumatology that can lead to better care for our patients."

As Dr. Haraoui explains, these small grants – between \$30,000 and \$70,000 – are not easy to find from regular funding sources, which is what makes the CIORA program unique.

"Rheumatologists need help to better manage the number of patients that are referred to them. We are not seeing the most critical patients as quickly as we need to, and there have got to be better ways of working across the health care system," he says.

In just two years, the program has already funded close to 20 projects yielding several examples of improvements to patient care. In one case, Dr. Majed Khraishi of St. John's, Newfoundland, trained his nurse to provide additional support to his patients, such as explaining their medications and side-effects. This freed up more of Dr. Khraishi's time to diagnose and treat new patients. His research is now being translated into a curriculum for "physician extenders," such as nurses, to be trained through the CRA.

Dr. Andy Thompson of London, Ontario, used a CIORA grant to create a new referral tool that has greatly decreased the wait period for critical patients – those with suspected inflammatory arthritis. That tool is also being shared across Canada.

"These projects are quite unique," explains CIORA member Dr. Janet Pope. "The great thing is that they can be used in other provinces or regions where they can be adapted to the particular environment of the region."

Inflammatory arthritis care in Canada faces a looming crisis. Canadians are waiting longer to see a specialist, and many are left without the care they need.

It is hoped that these results will help to lower the barriers to arthritis care.

"It is very important to fund this kind of practical research in Canada for the betterment of all patients afflicted with inflammatory arthritis," said Jeff Devlin, general manager, Abbott Canada. "We are already seeing how this type of grass-roots research is changing patient care for the better."



We believe strongly in investing in our country's economy. With our focus on bringing important new medicines to Canadians patients, Novartis Pharmaceuticals Canada has grown steadily in recent years and is ranked 5th largest research-based pharmaceutical company.



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Dr. Kenneth Rockwood

Dalhousie University Professor of Geriatric Medicine Dr. Kenneth Rockwood's expertise in dementia, delirium and frailty is helping advance knowledge and therapeutics focused on age-related afflictions such as Alzheimer's disease. He considers the stochastic model of aging, which he developed with his colleague Arnold Mitnitski, his greatest achievement so far. This landmark model mathematically describes how people age. "People usually start off fit, but then gradually build up deficits, until at some point they become frail. Then deficit accumulation accelerates – the faster it goes, or the more deficits people have, the more likely they are to die," says Dr. Rockwood. "I am excited by the idea that we can understand something fundamental, at a mathematical level, and be able to apply it to what I see with my patients." His current research is examining whether brain aging parallels what happens in a whole person. "Deficits accumulate with amazing reproducibility, to which we can give precise numbers. These numbers describe their health (fitness, frailty) state, including their risk of dying, so I aim to understand what people look like clinically in relation to the numbers that describe their level of fitness/frailty."

A prescription for Canada's prosperous knowledge-based economy

Q&A with Paul Lévesque
President, Pfizer Canada

How is the current downturn impacting Canada's economic future?

Job losses in traditional bulwarks such as the auto and forestry sectors show that Canada needs to adapt to an increasingly integrated global community. In my opinion, in addition to focusing on these traditional sectors, Canada must also move towards a knowledge-based economy. The biopharmaceutical sector is one of Canada's most promising pillars in this emerging sector.

What policy action would you advise?

Decision-makers in Ottawa should take a long-term approach to the global financial crisis and position Canada for future success. We need to prepare our future generations to compete and succeed on the global stage. We must think about how to make our workforce smarter and more efficient. Education is the first key. Investing in new technologies is the second.

Adequate support for research and development (R&D) must also be central to any long-term economic strategy Ottawa develops. The federal government's Advantage Canada economic plan and its Science and Technology Strategy acknowledge the

importance of enhancing the country's scientific research community. Advancing R&D is vital for Canada to bolster its competitiveness.

Have you seen any recent positive signals on this front from Ottawa?

Considering the federal government's strong belief in supporting R&D, I'm confident that they will support the creation of an innovative biopharmaceutical sector task force to examine, develop and enhance our industry. The role of the task force would be to create a fulsome strategy that will see this country emerge as a leader in job creation and an engine of the global economy. Such a task force would also lead to new medical breakthroughs and help to improve the health and wealth of Canadians nationwide.

Can you elaborate?

Globally, the private sector is investing \$100 billion in biopharmaceutical and life sciences R&D each year. As Canada is only attracting 1% of the global investments, a biopharmaceutical sector task force would identify regulatory and legislative measures that would allow Canada to attract a greater share of these investments. The strategy would also help translate scientific discoveries into medicines and technologies that Canadians can sell to the world.



Pfizer Canada president Paul Lévesque is among industry leaders calling for a biopharmaceutical task force to identify regulatory and legislative measures that would allow Canada to attract a greater share of the \$1 billion invested each year in life sciences R&D worldwide. PHOTO: SUPPLIED

Describe the pharmaceutical industry's contributions presently in Canada?

The biopharmaceutical industry invests more than \$1 billion annually in R&D – which represents 1% of the global investment – and provides for 20,000 direct jobs and close to 100,000 indirect ones. In addition, our industry supports many governmental and academic initiatives such as disease management programs or university chairs in research, and has significant philanthropic programs that support the communities in which we work and live.

How does Canada measure up internationally?

Canada already has many of

the ingredients needed for future success, including some of the best scientists, hospitals, universities and research facilities in the world. Yet, more investments are needed. Data shows that Canada compares favourably when it comes to discoveries measured by the number of publications, but far less with reference to innovation, measured by the number of new Canadian technologies commercialized in our country and abroad.

What other issues do you see hampering Canada's competitiveness?

As a proud Canadian and Quebecer charged with attracting investments to Canada and our institutions,

I am troubled by the erosion of the Canadian investment climate and the impact it is having on R&D investments. Industry-focused sectoral strategies have worked in other jurisdictions – notably in the United States and the European Union. Emerging nations such as Brazil, India and China are now attracting investment money by creating highly competitive policy environments that support knowledge-based sectors. They are seeing the benefits. We are facing global competition for attracting investments to Canada and unless we address this situation seriously, new emerging countries will hurt our competitiveness.

How might Canada turn this tide?

The biopharmaceutical industry is asking federal and provincial governments to enact policy changes that would form the foundation for future generations of viable jobs that respond directly to growing competition from emerging economies such as China and India.

Is this an appropriate time for such action?

Yes. An economic crisis is difficult and painful, but it also brings a unique opportunity for Canadians to regroup and develop a vision that goes beyond the current crisis.

Anything else to add?

As Wayne Gretzky once observed: "A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be." We need to adopt this approach by devising a winning strategy for the knowledge-based economy that will anticipate future trends and generate better health and greater wealth for all Canadians.

A native of Quebec City and graduate of l'Université Laval and McGill University, Mr. Lévesque is the president of Pfizer Canada, the Canadian operation of Pfizer Inc., the world's leading pharmaceutical company and one of the world's leading investors in research & development.

Merck Frosst Centre for Therapeutic Research

Canadian research centre to focus on infectious diseases

Dr. Joe Vacca, interim site head at the Merck Frosst Centre for Therapeutic Research, says a Merck & Co. initiative to reorganize its worldwide research sites is

resulting in a new focus on infectious diseases at Canada's largest private biopharmaceutical research facility

The veteran chemist, who has helped pioneer a number

of ground-breaking therapeutics, says despite the challenges of managing this change, the potential rewards are worth the effort.

"In the past, work on one

disease area was split among various sites around the world, but with leadership at each of the different sites, the system had its inefficiencies," says Dr. Vacca. "By going to the one-

site model for each disease area, there will be synergies that we didn't have before."

Dr. Vacca says the challenges surrounding this re-focus mostly involve getting the right scientists onto the right sites. Ultimately, he says that the Merck Frosst Centre for Therapeutic Research, located in Montreal, is searching for and planning to hire an additional 40 staff members in the area of chemistry.

Research at the centre will focus on three key areas: treatments that inhibit the replication of the HIV virus; treatments that inhibit the Hepatitis C virus (Merck now has a compound that is in phase two of development); and new antibacterial compounds to deal with the troubling issue of antibiotic resistance.

Dr. Vacca was one of the inventors of the drug Crixivan, one of the first HIV protease inhibitor compounds to hit the market. "We started working on it in 1988; it was discovered in 1992 and came out on the market in 1996," he says. "Usually it takes a lot longer to get a drug to market, but because of the epidemic that was going on, the drugs to treat HIV were put through the registration process at an accelerated rate."

Having also been involved in the development of Isentress, the first approved HIV integrase inhibitor, and in phase-three trials with Telcagepant, a migraine treatment, Dr. Vacca says there are certain frustrations around getting a new drug to the patients it will benefit.

"Of course we want a strict approval process because we want all due diligence to be done, with benefits and risks rigorously evaluated. But, once you have approval to market the drug, then it is up to the provinces to decide if they will reimburse for the medicine," he says. "Because of limited provincial drug

"In the past, work on one disease area was split among various sites around the world, but with leadership at each of the different sites, the system had its inefficiencies."

budgets, it is challenging to gain reimbursement. We hope the provinces will embrace new strategies that will encourage the availability of innovative drugs that benefit patients."

With regard to his new role at Merck Frosst, Dr. Vacca says he's very enthusiastic about being there. "I came to Merck Frosst because of the challenge of introducing the whole site to the infectious disease and antiviral area. As a chemist, throughout my education and career, some of the best chemistry in the literature has come out of Merck Frosst."

The company is currently best known for its development of the drug Singulair, a treatment of asthma. "It is those success stories that attract good scientists to the company. It has a good track record and is very successful."



When it comes to your health, knowledge is the best medicine

Our 20,000 employees are committed to the research and development of new medicines and vaccines and making them available to Canadians. These discoveries help you care for your family and loved ones. But all the discoveries cannot replace a healthy lifestyle. To find out about how our involvement goes beyond our discoveries, visit www.canadapharma.org

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Dr. Arya M. Sharma

Finding better strategies and treatments for patients with severe obesity is the focus of Dr. Arya Sharma's research. An internationally regarded Professor of Medicine, and Chair in Obesity Research and Management at the University of Alberta, Dr. Sharma considers his greatest achievement so far has been "demonstrating the fact that obesity needs to be addressed as a chronic progressive condition, which, if untreated, results in a wide range of other chronic diseases." Dr. Sharma also introduced a new clinical staging system for obesity, an important milestone in treatment.

Beyond his scientific pursuits, Dr. Sharma is determined to find funding to sustain the Canadian Obesity Network, which was started in 2006 with funding from the federal Networks of Centres of Excellence program. "The network, with over 3,500 professional members, is currently the largest network of Canadian obesity researchers, health professionals, students and other stakeholders in Canada, and is focused on addressing the biggest health problem of our time."

Canada health check-up

According to Health Canada's 2008 Report on the State of Public Health in Canada, the majority of Canadians enjoy good to excellent physical and mental health.

The report also notes, however, that Canadians continue to experience high rates of injury, chronic or infectious diseases and addictions. The following snapshots offer insight into some of Canada's top health concerns, ways to help guard against them, and Canadian health research findings helping make a difference.

Alzheimer's

Approximately 500,000 Canadians are living with Alzheimer's disease or a related dementia – more than 71,000 of them under the age of 65 and approximately 50,000 under the age of 60.

Some risk factors for Alzheimer's disease cannot be controlled (aging and genetics), but healthy living and a healthy brain are very much connected. Challenging your brain with games, hobbies and other activities helps, as do exercise, a

healthy lifestyle and protecting your head by wearing a helmet during sports.

Alzheimer Society-supported research studies include one aimed at reducing the production or facilitating the elimination of the toxic "Abeta" protein, which causes degeneration in the Alzheimer brain. This research is helping identify drugs to promote the reconstruction of brain circuitry damaged by the disease. Another study is examining behavioural training strategies that could help offset memory loss in Alzheimer patients.

Source: The Alzheimer Society of Canada

Arthritis

Arthritis is the leading cause of disability in Canada, affecting nearly 4.5 million people. Perhaps the biggest misconception about arthritis is that it's a disease of the elderly; nearly three of every five people with arthritis are under the age of 65. Arthritis is also a devastating reality for one in 1,000 children.

The pain and disability of arthritis take a toll on indi-

viduals, their families, the health care system and the Canadian economy, with annual costs of more than \$4 billion in health care expenses and lost work days.

Maintaining a healthy body weight and physical activity can help prevent the onset and worsening of arthritis.

Since 1948, The Arthritis Society has invested more than \$165 million towards life-changing research to find treatments and a cure. Current studies of genetic and environmental factors influencing childhood arthritis are providing vital insight.

Source: The Arthritis Society

Cancer

Some 40 per cent of Canadian women and almost 45 per cent of men will develop cancer during their lifetimes; approximately one of every four Canadians will die from cancer.

At least half of all cancers can be prevented through healthy living and policies that protect the health of Canadians. Maintaining a healthy diet, weight and daily exercise while avoiding tobac-

co, alcohol and ultraviolet rays help reduce risk. Reporting health changes to your doctor or dentist and following safety instructions when using hazardous materials are advised.

Between 1947 and 2009, the National Cancer Institute of Canada has invested more than \$1 billion in research. The result of this and other research: today 62 per cent of people diagnosed with cancer survive, compared to only 25 per cent in the 1940s.

Source: The Canadian Cancer Society at cancer.ca

Diabetes

Diabetes is the world's fourth leading cause of death, affecting some 246 million people globally, including 2.4 million Canadians.

According to the Canadian Diabetes Association, serious complications (such as cardiovascular disease, kidney and eye disease) can be prevented by early identification and treatment of risk factors. People with diabetes who are at risk of developing heart disease are recommended treatment to lower their LDL cholesterol, increase resistance

exercise, quit smoking and reduce their fat intake.

The Canadian Diabetes Association is part of the Cardiovascular Complications Diabetes Strategy, a five-year, \$9-million initiative aimed at advancing understanding of the cardiovascular complications of type 1 and type 2 diabetes. The association also supports the work of acclaimed researchers such as Dr. Ravi Retnakaran, in the hope of revealing factors that contribute to diabetes.

Source: The Canadian Diabetes Association

Heart disease and stroke

Most of us have been touched by heart disease and stroke, if not personally, then through someone we love.

There are an estimated 70,000 heart attacks each year in Canada, and a stroke occurs every 10 minutes in our country, making these afflictions Canada's leading causes of hospitalization. Further, every seven minutes someone in Canada dies from heart disease or stroke, making them the leading causes of

death among Canadians too. Today, over 1.5 million Canadians have heart disease or are living with the effects of a stroke.

The costs aren't just human. Considering expenditures on physician services, hospital care, as well as lost wages and decreased productivity, heart disease and stroke costs the Canadian economy more than \$22 billion annually.

Fortunately, there are ways to help avoid the risk. Topping the list, the Heart and Stroke Foundation of Canada advises quitting smoking, and for people to keep their cholesterol, blood pressure and blood sugar levels normal. Exercising regularly, reducing stress and maintaining a healthy diet and weight are also recommended.

Research is making a difference. Among the Heart and Stroke Foundation-funded studies that generated headlines last year was a breakthrough by Queen's University researchers into how regulating a single enzyme may lead to new drug therapies that will help prevent heart attacks and strokes.

Source: The Heart and Stroke Foundation of Canada



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