

HEALTH POLICY BRIEFING

MEDICAL IMAGING

Innovation in medical imaging can keep health care affordable

The technologies of our medical imaging innovators have strong potential to be part of the solution worldwide to the conundrum of the rising cost of health-care provision to an aging population with complex treatment needs, as well as in providing better patient care, with better overall health outcomes and quality of life.



BART SULLIVAN

As we age, the likelihood of acquiring chronic or potentially life-threatening conditions such as Alzheimer's and heart disease or breast and prostate cancer increases, as does the chance that we will need access to specialized technology to detect, properly diagnose and treat our ailments.

The number of seniors in Canada is increasing steadily. By 2051, about one in four Canadians is expected to be 65 or over. This is part of an unprecedented demographic transition globally in

which fewer babies are being born and life expectancy is increasing. We are also seeing a rise in chronic and deadly diseases in emerging economies. Along with the rest of the world, Canada needs to find effective solutions to respond to the medical realities of the coming decades, while grappling with the economic implications.

Medical imaging technologies have become foundational to health care. Options such as ultrasound, magnetic resonance (MR), positron emission tomography (PET), computed tomography (CT), mammography, and digital pathology are being used to more accurately detect, diagnose and treat a range of medical conditions.

Although these devices have many positive attributes, some of them are hugely expensive to purchase and operate, calling into

question their practicality and the wisdom of investing in potentially cost-inefficient equipment.

It would stand to reason that innovations that make the health-care experience less painful; facilitate easier and faster recovery times; provide greater accuracy and efficiency; and are more cost-effective would be wholeheartedly welcomed by the health-care system. New medical imaging technologies have the potential to enable this scenario.

For instance, increasingly, the imaging industry is focusing on developing software platforms that quickly and automatically process large quantities of data, which reduce the time and cost of completing certain tasks. Innovation in workflow automation such as image-guided biopsy and therapy as well as digital pathology optimizes the use of expensive equipment and practitioner time, which is crucial in our resource-constrained health care system.

Canada is known throughout the world for its expertise in medical imaging R&D. Between 1998 and 2011, \$1.03-billion of public funds were invested in this area. Our academic centres and spin-off companies are developing leading technologies that will change how we diagnose and treat disease. In 2011, the Centre for Imaging Technology Commercialization (CIMTEC) was created to capitalize on these investments by enabling and accelerating the translation of Canada's important and world-leading medical imaging innovations into commercial products for clinical use. Funded through the federal government's Centres of Excellence for Commercialization and Research (CECR) program, CIMTEC's overarching goal is to help researchers and companies bring their medical imaging innovations to market so

Canadians can reap the associated health and economic benefits. The centre is helping strengthen the Canadian medical imaging industry by providing a range of engineering, business development and clinical testing services for startup companies that will create cost-saving devices with the potential to corner a larger percentage of the multi-billion dollar global medical imaging market and develop and attract highly qualified people to high-value jobs in this country.

New medical imaging technologies face a number of hurdles; arguably, the most arduous is gaining acceptance from those footing the bill. A device may advance through the challenging process of acquiring regulatory approval, but if no one is willing to reimburse for the technology, it will simply lie fallow.

When making decisions about what new technologies to adopt, the provincial and public insurance groups that assign reimbursement codes are looking for products that demonstrate clinical utility and improved outcomes, but will also provide increased efficiency (i.e. reduce wait times) and cost savings. And, as prudent stewards of public funds, hospital administrators must make tough decisions about how to allocate budgets most effectively.

Dr. Aaron Fenster, CIMTEC's centre director, and director of imaging research laboratories at Robarts Research Institute at Western University, recently delivered a presentation at the United Nations about the future of medical imaging globally. Dr. Fenster says, "Reimbursement pressures are driving current trends in medical imaging technology innovation. Government and health care institutions are primarily interested in adopting new technologies that will increase their throughput, while decreasing their cost per pa-

tient." He adds, "To move customers' products closer to adoption, CIMTEC helps strengthen their value propositions by connecting them to clinicians who test their products and provide valuable feedback to increase the workflow efficiency and clinical utility of the device."

For example, prostate procedures are currently performed using a systematic pattern-based approach that often results in poor discernment of the location and extent of disease. This necessitates return visits for additional anxiety-inducing biopsies. CIMTEC has world-class expertise in minimally invasive 3D image-guided interventions and is helping several of its customers develop new imaging technologies that either focus on combining high-quality MR or CT images with the much cheaper and more versatile ultrasound, or other variations on ultrasound imaging that substantially improve targeted biopsy and treatment options. The upshot is fewer appointments, more effective treatment with shorter recovery times, and overall better quality of life as a result of minimally invasive procedures as opposed to traditional open surgery.

Because of Canada's strong investment in the sector, the technologies of our medical imaging innovators have strong potential to be part of the solution worldwide to the conundrum of the rising cost of health-care provision to an aging population with complex treatment needs, as well as in providing better patient care, with better overall health outcomes and quality of life.

Bart Sullivan is the CEO of the Centre for Imaging Technology Commercialization, a Centre of Excellence for Commercialization and Research, federally funded through the Networks of Centres of Excellence.

news@hilltimes.com

INNOVATION

Spreading innovation key to health-care sustainability



MAUREEN O'NEIL

Improving health care across Canada is no easy task. Growing rates of chronic diseases ranging from cardiovascular disease to diabetes and chronic obstructive pulmonary disease (COPD), an aging population and steadily rising costs are straining systems that were built for a different era. The question facing governments and the health-care sector is: How can we improve health care for Canadians while getting better value for the money we spend?

Canada will spend \$215-billion on health care this year—a steadily growing amount that now accounts for more than 40 per cent of many provincial budgets. Despite the best efforts of governments and health-care leaders, delivering the highest quality health care at an affordable

cost remains a challenge. This situation is not unique to Canada. Other developed nations are grappling with these challenges too.

Fortunately, in every corner of the country dedicated physicians, nurses, researchers and managers are developing innovative ways of providing excellent patient care while bending the cost curve. However, too often these leading practices aren't shared and implemented across regional, provincial and territorial boundaries for the benefit of all Canadians. We must move from isolated pockets of excellence to excellence for all.

At the Canadian Foundation for Healthcare Improvement (CFHI), we help to deliver better health care more efficiently. Our federally funded not-for-profit organization collaborates with health-care providers, managers and executives in hospitals, health regions and provincial-territorial health ministries. We help spread innovative and cost effective health-care solutions across provincial and territorial lines—ensuring that best practices are adopted from Vancouver to

Yellowknife and St. John's.

Currently, CFHI is supporting more than 100 projects spanning every province and territory, focusing on issues ranging from chronic disease management to hospital wait times and improved care in northern and remote communities. These projects are delivering tangible results to patients while also alleviating financial pressures. With an annual budget of \$10-million, we help our partners implement innovations that have the potential to save the health-care system more than \$1-billion a year.

A great example of the innovative work we're spreading nationwide is the INSPIRED Approaches to COPD initiative, which provides 19 health-care organizations in all 10 provinces with funding, educational materials and tools needed to improve the care of people living with advanced COPD and support their caregivers. COPD is the fourth leading cause of death in Canada and a major driver of hospital visits. One-in-four Canadians over the age of 35 can expect to be

diagnosed with the disease during their lifetime.

The INSPIRED COPD Outreach Program™, first developed at Capital Health in Halifax, offers hospital-to-home outreach, including home visits, access to a telephone hotline, self-management education, a plan to guide treatment at home, psychosocial and spiritual care support, and advance care planning for end-of-life. Care closer to home translates into less reliance on hospital-based services. By lowering patients' use of hospital care by 60 per cent, the INSPIRED team freed up nearly \$1-million—more than three times the annual operating costs of the program.

Another example of a patient-centered innovation spreading across the country is our initiative to curb the inappropriate use of antipsychotic medications in long-term care facilities and improve care for residents with dementia. This initiative grew out of the knowledge that one-in-three long-term care residents in Canada is on antipsychotic

medication without a diagnosis of psychosis from a physician. CFHI is supporting 15 health-care teams across the country in their efforts to address this worrisome trend. The teams are benefitting from the advice of experts at the Winnipeg Regional Health Authority who successfully lowered by more than a quarter their use of these medications. The initiative helps health-care providers identify patients who may benefit from non-drug therapies like recreational activities to treat behavioural issues associated with dementia.

These are true pan-Canadian initiatives that involve leading health-care organizations in every province. By developing innovative approaches to tackling our most pressing health-care challenges, and spreading those innovations throughout the country, CFHI is a catalyst for collaboration and positive change.

Maureen O'Neil, O.C., is president of the Canadian Foundation for Healthcare Improvement.

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