“Every day at hospitals across Canada, clinicians, machines and drugs work together to keep people alive. Medical records, images, research papers, textbooks and genomic information are scattered and not easily accessed. This information is growing faster than we can handle and analyze efficiently, and medical data is expected to double every 73 days by 2020,” says Nathalie Le Prohon, vice president, healthcare industry for IBM Canada in Montreal, Quebec. She spoke with editor Robbie Hartman, CEBS, about ways technology can help the health care industry manage that data and revolutionize the industry. Le Prohon presented “Transforming Health Care for the Next Generation” at the 2018 Canadian Health and Wellness Innovations Conference.

Why has the health care industry been slower than other industries in adopting technology?

There are several key reasons. The industry tends to be risk-averse. And with good reason—Unlike with other industries, technology changes in a clinical setting could easily result in bad health outcomes, possibly loss of life. Health care is an incredibly complex process involving many stakeholders including consumers, patients, providers, payers, insurers and employers. An infinite number of factors play a role in one’s health, creating large amounts of disparate data, most of which is stored in separate locations. Making a change to this complex landscape is very challenging. Also, the current Canadian funding model for health care is not conducive to encouraging new ways to deliver better health outcomes. Traditional investment models that measure return on investment are not easily applied within the industry, which is why it is always difficult to justify additional spending without readily agreed-upon outcomes.

Can you describe how artificial intelligence has the ability to transform health care?

Artificial intelligence (AI) has the ability to provide significant benefits to clinicians, patients and ultimately the entire Canadian health system. Systems using AI are created out of hardware, algorithms, design and expertise and can ingest data in all forms, understand it, learn from it and suggest solutions. AI systems have the potential to examine and organize a mind-boggling amount of information. Here are three ways AI can help deliver better health outcomes across the ecosystem: (1) From a clinician’s perspective, AI-enabled solutions can augment the capability of health care professionals, giving them the tools and information they need to perform their roles with the highest quality. They can have the most effective options at their disposal when deciding on the best course of treatment for their patients. (2) From a patient’s view, AI technology can deliver wellness apps and other ways to proactively manage one’s health and will encourage better consumer engagement in both health and wellness programs. (3) From a systemic standpoint, with our aging population and escalating
constraints on resources, we cannot sustain our current health care system. AI solutions will significantly reduce overall costs by changing how we view and deliver health care. Technology can help identify and address patient outcomes at a much earlier stage, improve and expedite diagnoses, and advance disease identification and prevention.

**What are some examples of innovations in service delivery already available through mobile devices and the cloud?**

We know that one of the causes of rising health care costs is people staying in hospitals and care facilities. While this is sometimes necessary for intensive care, in many cases patients stay in a hospital simply because they need monitoring and there is no effective way to do that outside of medical facilities or expensive in-home care. This is where Internet of Things (IoT) devices using cloud technology can extend health care to the home, giving patients freedom and control over their medical care while empowering medical professionals with high-quality data to provide better care. The adoption of IoT devices in the home with connected access to clinicians can dramatically improve and disrupt the health care ecosystem.

Here’s a Canadian-made example. Studio 1 Labs has turned bedsheets into clinical-grade patient monitors. Through data analytics, Studio 1 Labs is able to gather and interpret vital signs including heart rate, respiration rate, respiration quality, location and position to help monitor and predict the onset of clinical emergencies.

Medtronic has developed Sugar.IQ, a mobile app that helps diabetes patients predict and manage potential hypoglycemic events. Studies show that a diabetic’s life can be extended by up to eight years through better health management.

**In what ways can technology accelerate research and improve oncology treatment?**

Challenges in the treatment of cancer are numerous, including the need to interpret massive amounts of genetic data and literature to identify actionable targets. Decision support tools, with input from top oncologists, can rank treatment options and provide other support including care guidelines, drug information and literature references. Physicians can quickly review treatment options and then decide on the very best course of action for a newly diagnosed cancer patient. The University of North Carolina has reported that IBM Watson has identified new, previously unidentified treatments for 30% of their cancer patients.

In addition, there is a huge need to scale oncology decision support and access to clinical trials for many more patients. Clinical trial matching can expedite patient screening for eligibility. Mayo Clinic has reported that this tool has brought the time down from 30 minutes to eight minutes for a research coordinator to screen a patient for a clinical trial. The coordinator can now spend valuable time educating the patient on why participating in the clinical trial is so important.

**Can you identify some examples of how technology can predict health care needs such as disease outbreak or emergency room intakes?**

Let’s look at another example of made-in-Canada innovation at work. A small, Vancouver, British Columbia–based company, Fusion Genomics, is focused on reducing the impact of infectious disease through better diagnoses and detecting pandemics before they happen. It has developed a process to identify any known pathogen in a single test, giving doctors the potential to diagnose illnesses at a much faster rate. This is, in fact, precision medicine specifically for infectious diseases.
In Toronto, Ontario, St. Michael’s Hospital is using advanced data analytics and reporting to help with emergency room (ER) surges that put further pressure on overburdened resources and staff. Information includes health outbreaks in the downtown area, city events and changing weather patterns to help predict surges in ER visits so the hospital can better deliver emergency treatments.

**How can new technology help combat the opioid epidemic?**

Every day there is yet another news headline about the serious and growing opioid crisis. Across the country, this is having devastating effects on our families and communities. IBM Watson Health and MAP Health Management are now working together to improve the outcomes of people being treated for addiction. Here again we see mountains of health care data that sit in silos and leave treatment experts, care managers and health insurers in the dark. They can’t easily access and analyze unstructured data to identify who’s at risk and what type of help they need. Our new partnership will help tackle this gap in addiction treatment by using data and technology to understand which patients are at the greatest risk of relapse and to develop a personalized treatment plan.

**In what ways can technology help to reduce $2 trillion of waste in the $8 trillion health care industry?**

By encouraging innovation across the entire health care ecosystem, we can leverage leading-edge AI and cloud technologies to drive down health care costs. Costly tests, readmissions into the ER and long stays in acute care facilities can be tackled effectively. Our clinicians must have a fully integrated view of all patient data, including clinical, imaging, genomic and exogenous, from the outset. By accessing this data and having the right tools to better evaluate treatment options, our doctors can improve and expedite diagnoses and develop individual care plans. Equally important is the role played by the health care consumer. With an integrated view of their own health data, and given the right tools, patients can be much better engaged in the management of their own health and wellness.