

The

INSIDE STORY[®]

DECEMBER 2017

What's
Inside

IN HEALTH CARE, ARTIFICIAL INTELLIGENCE IS THE FUTURE

PAGE 2

WHAT'S UP...

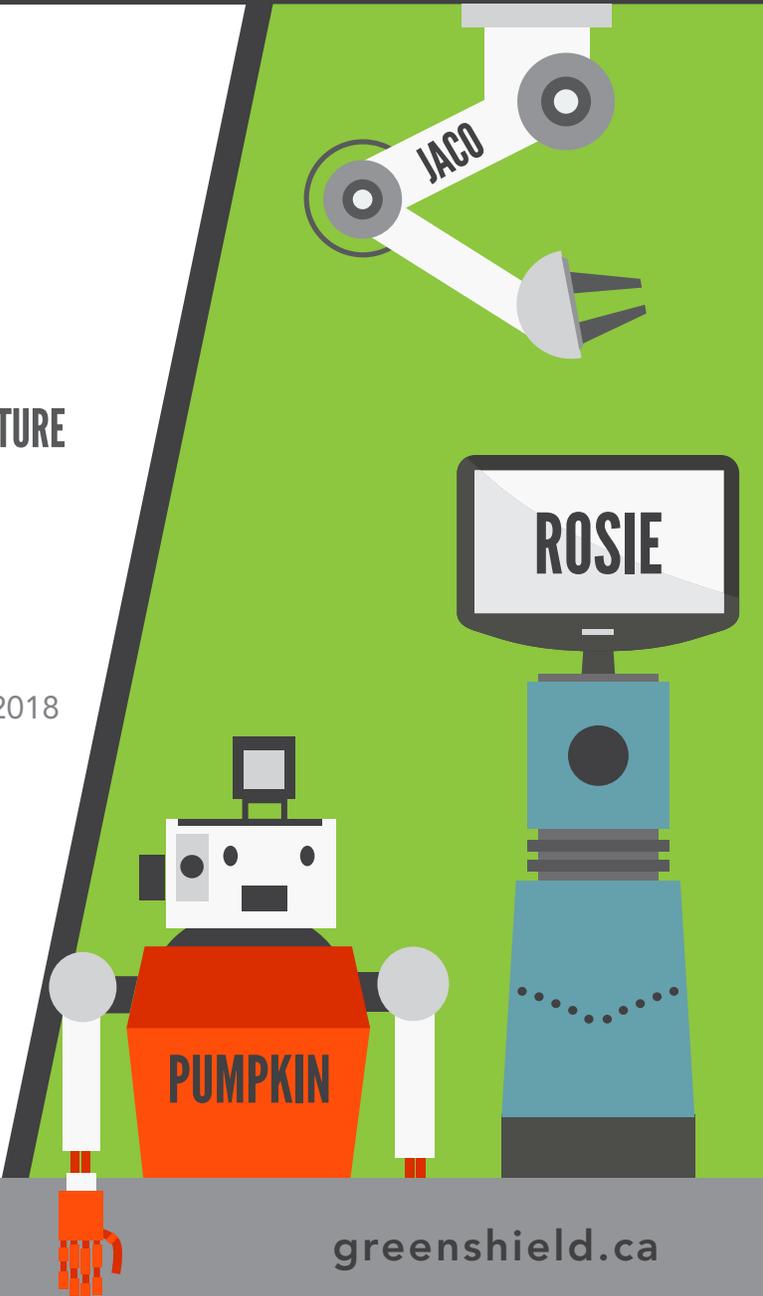
New! Alberta dental fee guide effective January 1, 2018

Medication synchronization improves adherence

High-price drugs accounted for 40% of patented drug sales in 2016

Prescription drugs are forecast to represent over 80% of Canada's drug spending in 2017

PAGE 8



IN HEALTH CARE, 2017 IS GOING OUT WITH A

BANG!

...AND ARTIFICIAL INTELLIGENCE WILL LEAD TO AN EVEN BIGGER BANG IN THE FUTURE

As always when wrapping up the year, the big question is: what will the future hold for helping plan members get the health care they need, and how will it affect benefits plans? The answer for years to come will increasingly include the role of artificial intelligence (AI) in health care. As you may recall, in the October 2017 edition of *The Inside Story*, we discussed how AI is set to impact all areas of insurance—with health benefits no exception. In fact, AI is a rapidly emerging field in health care...

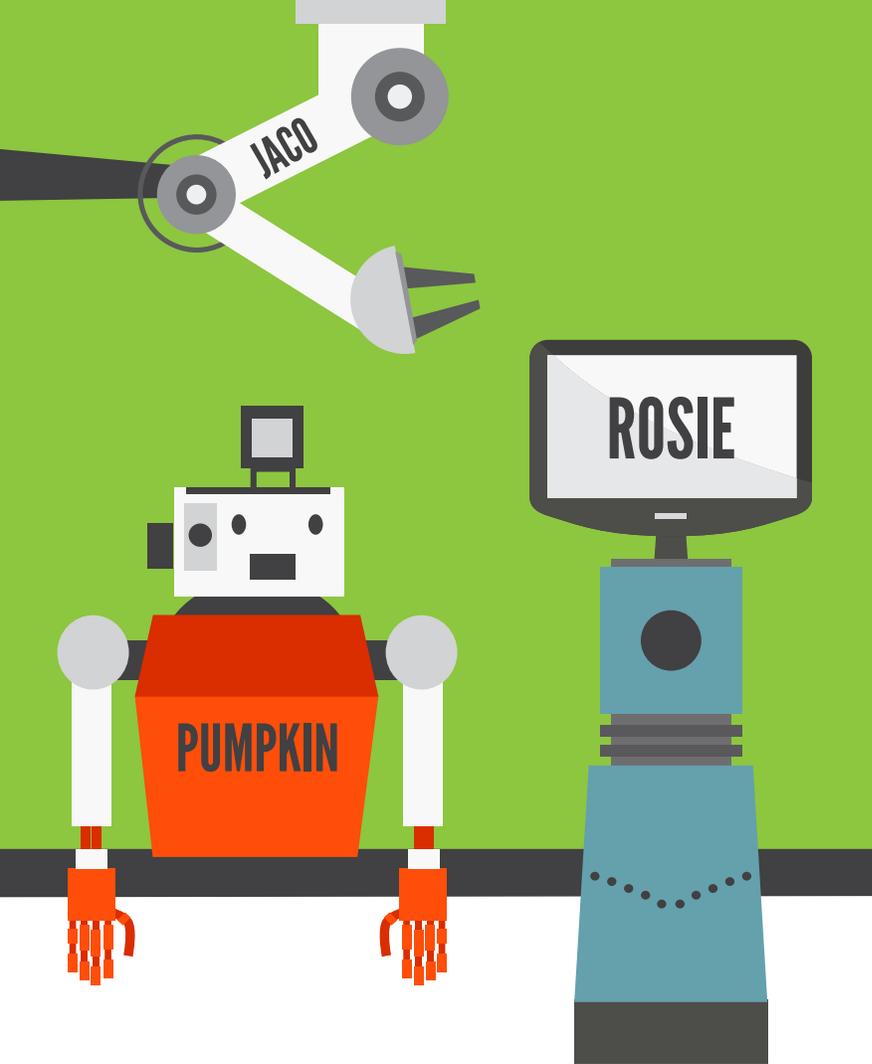
AI REFRESHER

Artificial intelligence (AI) isn't just one technology—but a range of technologies—all part of a field of study that involves various disciplines, including computer science, neuroscience, psychology, linguistics, and philosophy. As the name suggests, the goal of AI is to enable machines or software to replicate human thinking and as a result, behave in human-like ways.

For example, AI technologies are the “brains” behind machines and software that can analyze data and process information, plan, learn, reason, perceive, talk, make decisions, and take action. AI technologies can think and act like us—and in some cases, better than us.

And AI technologies can also think and act *for us*; for instance, write software, make weather predictions, compose music, play games, move objects, diagnose medical problems, provide care, and more... with much more to come.

A branch of AI we hear a lot about due to today's information explosion is machine learning (ML). It uses algorithms to mimic how humans learn by analyzing data and identifying patterns. And then just like humans, ML can make decisions to act in certain ways.



THE HOSPITAL OF THE FUTURE IS ALREADY HERE

The Humber River Hospital that opened in Toronto in October 2015 is described as the first digital hospital in North America.

A “Command Centre” gathers real-time data from multiple systems across the hospital to provide a continuous “read out.” This alerts staff to everything from frontline issues like delays in patient care to operational issues like imbalances in staffing.

As a result, staff make better and more immediate decisions about prioritizing patient care and adjusting staffing—and ideally, avoiding care issues and service bottlenecks before they happen.

Also, robots prepare patient medications, as well as pick up medications and other supplies and deliver them to specific rooms in the hospital.

And unlike traditional radiology scanning where patients must move into different positions so that the machine can capture the right body angles—which can be painful for some patients—three robots painlessly adjust the patient.

So how is the hospital doing? According to a Canadian Institute of Health Information patient experience survey released in August 2017:

- Rated first for patient satisfaction among large community hospitals in Ontario.²
- Patient satisfaction score in 2016-17 was 11% higher than in 2015-16.³
- When asked “Would you recommend Humber River Hospital to family and friends?” 80% of patients replied “Yes.”⁴
- The hospital has also reduced its medication errors and length of hospital stays.⁵

What do Rosie, Jaco, and Pumpkin have in common?

They are all “intelligent robots” currently in use in Canada’s health care system.¹ Intelligent robots involve advanced electronics and computer programming plus they’re equipped with an “AI brain.” This enables intelligent robots to act like humans by, for example, interpreting complex data about a patient, determining required actions, and carrying out the actions.

Although initially expensive to develop, intelligent robots and other AI technologies are anticipated to lead to cost savings in health care. In fact, they represent an invaluable bang for our health care buck because these AI technologies are proving more accurate and more effective than humans. A wide range of AI technologies are being used now—or are under development—along the continuum of care:

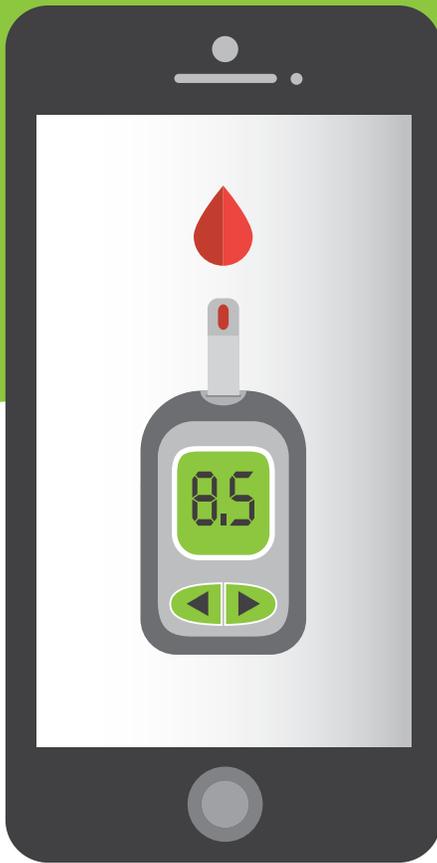
- **Enhanced disease diagnosis:** AI is outperforming health care specialists in the diagnosis and classification of skin and breast cancers. Researchers are working toward AI technologies that have the ability to integrate nearly all types of data to accurately diagnose different diseases.

- **Decreased challenges faced by imaging (x-rays, computed tomography, and magnetic resonance imaging):** AI technologies built to replicate humans in making imaging diagnoses are predicted to enhance imaging productivity issues and provide second opinions to catch mistakes. Ultimately, challenges with imaging like the increasingly high volume of patient data, the shortage of skilled radiologists, and high error rates, all have the potential to be tackled by AI technologies. In fact, in some cases, imaging diagnosis by AI technologies is already on par with, and even better than trained clinician decisions.
- **More effective surgeries:** Image-guided neurosurgical robotic arms directed by a surgeon from a nearby workstation are proving to be safer, less invasive, and more accurate than traditional surgery. Advantages include that robotic arms—that typically rely on CT and MR images and GPS—are more precise than a surgeon’s hand-eye coordination alone. In addition, robot-assisted surgeries reduce strain and fatigue for the surgeon.
- **Improved access to health care in rural and remote areas:** Remote presence robotic systems are also known as telerobotics and telepresence robots. A physician can activate a robot remotely to check in at the nursing station and then head off to the patient’s room to interview them. Then, with help from a health care worker and by attaching peripheral devices like ultrasounds and electrocardiograms (ECGs), the robot examines the patient. This improves access to care and reduces travel costs, while also decreasing disruption compared with patients having to travel to urban areas to receive care.
- **Reduced need for home health care services:** Assistive robotic arms that attach to electric wheelchairs—and activated by a joystick, chin, head or eye controller, sip or puff mechanism, and even brain-to-computer interface—enable patients to perform routine tasks. This decreases reliance on caregivers while at the same time enhances independence and quality of life. And then there are robots directly caring for patients and other interactions... keep reading...
- **Enhanced surgery training:** Medical students training to perform surgeries can experience more authentically what surgery is like by practicing with surgical tools that use AI technology. These intelligent tools mimic real surgeries by replicating the sensation of what the actual interaction is like between surgical tools and human tissue such as the pressure on the tools.
- **Operational improvements:** AI technologies can help improve various behind-the-scenes aspects of health care, which ultimately can lead to enhancing the patient experience. For example, AI technologies that analyze data can gain insights leading to improvements in staff workflows that translate into faster patient care.

With benefits of AI technologies like these, it’s no wonder the Senate of Canada authorized its Committee on Social Affairs, Science and Technology to develop the 2016 report called *Challenge Ahead – Integrating Robotics, Artificial Intelligence and 3D Printing Technologies into Canada’s Healthcare Systems*. The report concludes that AI technologies “are going to change the way Canadians live and specifically, the way healthcare is delivered.”⁸

Clearly, we’re seeing the value of AI in diagnosis, patient care, and patient outcomes, but for GSC a burning question is: *How can AI make inroads regarding preventing diseases and more effectively managing them?* Diseases like diabetes—which is now described as a global epidemic. In fact, the International Diabetes Federation just released new estimates on the prevalence of diabetes around the world. One in 11 adults globally are currently living with diabetes; this is 10 million more than in 2015. Canada is seeing more than 60,000 new cases of diabetes each year and type 2 diabetes is one of the fastest growing diseases in Canada.⁶

...And GSC plan member data mirrors the global and national statistics with a high incidence of diabetes. Fortunately, type 2 diabetes can be prevented or postponed—as well as more effectively managed—by making healthy lifestyle choices. So what role can AI play in diabetes health management?⁷



THE ROLE OF TECHNOLOGY IN DIABETES IS GROWING...

- Researchers reviewed studies of nine different apps designed to improve self-management of type 2 diabetes. The apps provide personalized feedback on data like blood glucose, food intake, and physical activity. The apps were successful in helping diabetics reduce blood sugar levels.⁹
- Using data provided by chest sensors on patients with type 1 and type 2 diabetes—that record an ECG signal and respiration rate—researchers used machine learning to develop models that could recognize and predict abnormal blood glucose levels. Pilot project results included 78% accuracy recognizing glycemia with type 1 and 76% with type 2. And 84% accuracy in predicting glycemia for patients with type 1 diabetes and 88% for patients with type 2.¹⁰
- An artificial pancreas is under development that will be able to calculate insulin dosage based on a patient's physiology and real-time data like their blood sugar levels, food intake, and activity level.¹¹

As Bill elaborates, “That’s where AI can help make sense of data so that the insights can lead to interventions to help prevent diabetes and improve its management for plan members. And from the plan sponsor and insurer perspective, also help decrease costs.”

Amos adds that “in terms of GSC’s plan member data, it’s important to think much broader than just aggregate claims data because AI technologies like machine learning allow us to gain insights from widely varied sources. For instance, to develop a diabetes health management intervention, GSC claims data that reflect plan members who take diabetes medications is invaluable. However, it’s important to look at any and all information that indicates how plan members behave. For instance, we’re also looking at GSC’s aggregate call centre log data, as well as GSC’s web portal use—any plan member information that is available, given confidentiality. Then we use machine learning to apply an algorithm to the data to find patterns.”

Next, as Bill describes, “From the patterns, we create what are called classification models that categorize how different plan members behave—like plan members who are at risk of developing diabetes versus those who are effectively managing diabetes versus those struggling with effective management.”

And then, Amos continues, “Based on the models, additional AI technologies can make decisions regarding how to interact with plan members to deliver diabetes interventions. This is where the data insights move into action and when we get to this stage, the AI technologies will be able to deploy interventions tailored to the plan member’s specific diabetes management issues—and at a large scale. So AI allows interventions to reach all plan members who need help.”

From our discussion with Amos and Bill, it’s clear that the future seems bright for diabetes prevention and management regarding the possibilities of how AI can help. However, as more and more AI technologies are being developed, numerous issues will have to be addressed.



IF ARTIFICIAL INTELLIGENCE DISAGREES WITH THE DOCTOR'S DIAGNOSIS OR METHOD OF TREATMENT, WHO DOES THE PATIENT BELIEVE AND WILL THE DOCTOR BE PREPARED TO ACCEPT THAT PERHAPS THE ROBOT HAS GOT IT RIGHT?



Bumps along the AI road

In addition to the obvious issue of privacy regarding the use of personal data, AI in health care faces a number of significant issues. For instance, a major debate is the issue of potential job loss versus job creation. Where do you draw the line between benefits of a human—for example in surgeries and patient care—versus benefits of a robotic arm or a humanoid robot?

In terms of barriers to adoption of AI in health care, experts predict a main concern will continue to be ethical issues. For instance, surrounding the delegating of medical decision-making to machines, the report from the chair of the Senate of Canada explains, “Above all we will have to educate both health care workers and their patients to build trust in these new and developing technologies. For example, if artificial intelligence disagrees with the doctor’s diagnosis or method of treatment, who does the patient believe and will the doctor be prepared to accept that perhaps the robot has got it right?”

Just scratching the surface

To sum up, we turned to our very own Ned Pojskic, GSC’s pharmacy strategy leader, who feels that “it’s early days; what we need to see is AI evolve to the point where the technology can deliver very targeted interventions customized for each plan member. This is how health management interventions will become relevant to each individual and be motivating for those who, for example, are struggling with managing diabetes. As a result, these very highly sophisticated AI technologies will help GSC change the trajectory of diabetes—as well as other chronic conditions—to promote prevention and, as needed, more effective diabetes management.”

Sources:

^{1,8,11}“Canadian healthcare system must brace for a technological revolution,” The Senate of Canada media release, October 31, 2017. Retrieved November 2017: <https://sencanada.ca/en/newsroom/soci-challenge-ahead/>. “The Senate of Canada’s ground-breaking study on the role of Robotics, 3D Printing and Artificial Intelligence in the Health Care System,” The Senate of Canada infographic. Retrieved November 2017: <https://sencanada.ca/en/newsroom/soci-challenge-ahead/#infographic>. “Senators learn about robotics, artificial intelligence in the health-care system,” The Senate of Canada, May 29, 2017 – Parliament of Canada. Retrieved November 2017: <https://sencanada.ca/en/sencaplus/news/senators-learn-about-robotics-artificial-intelligence-in-the-health-care-system>. “Integrating Robotics, Artificial Intelligence and 3D Printing Technologies into Canada’s Healthcare Systems,” The Senate of Canada, Standing Senate Committee on Social Affairs, Science and Technology, October 2017. Retrieved November 2017: https://sencanada.ca/content/sen/committee/421/SOCI/reports/RoboticsAI3DFinal_Web_e.pdf.

^{2,3,4,5}“CIHI: Humber Leads Large Community Hospitals in Patient Satisfaction,” Canadian Institute of Health Information media release, September 20, 2017. Retrieved November 2017: <https://www.hrhfoundation.ca/blog/cihi-humber-leads-large-community-hospitals-in-patient-satisfaction/>.

⁶“New IDF figures show continued increase in diabetes across the globe, reiterating the need for urgent action,” International Diabetes Federation media release, November 14, 2017. Retrieved November 2017: <https://www.idf.org/news/94:new-idf-figures-show-continued-increase-in-diabetes-across-the-globe,-reiterating-the-need-for-urgent-action.html>.

⁷Type 2 diabetes – Government of Canada, Diabetes. Retrieved November 2017: <https://www.canada.ca/en/public-health/services/diseases/type-2-diabetes.html>.

⁹“Do Mobile Phone Applications Improve Glycemic Control (HbA1c) in the Self-management of Diabetes? A Systematic Review, Meta-analysis, and GRADE of 14 Randomized Trials,” Can Hou, Ben Carter, Jonathan Hewitt, Trevor Francisa, and Sharon Mayor, Diabetes Care, Volume 39, November 2016 – US National Library of Medicine and National Institutes of Health. Retrieved November 2017: <https://www.ncbi.nlm.nih.gov/pubmed/27926892>.

¹⁰Artificial Intelligence for Diabetes, 1st ECAI Workshop on Artificial intelligence for Diabetes at the 22nd European Conference on Artificial Intelligence (ECAI 2016), Beatriz López, Pau Herrero, and Clare Martin, August 30, 2016. Retrieved November 2017: <http://www.ecai2016.org/content/uploads/2016/08/W7-AID-2016.pdf>.

NEW! ALBERTA DENTAL FEE GUIDE EFFECTIVE JANUARY 1, 2018

In November 2017, the Alberta Dental Association and College introduced a new dental fee guide to take effect on January 1, 2018. GSC will be implementing it for all group and individual plans on that date.

It is important to note that specialist fees were **not** included in this fee guide, only general practitioner fees. As a result, for specialist procedures that are also listed under the new general practitioners' fee guide, GSC will follow our standard practice of using that fee plus 20% when the service is provided by a specialist. For procedures not listed in the general practitioners' fee guide, we will continue to use the fees previously established and used by GSC.

For plan sponsors who have a fixed fee guide for the province of Alberta, the current and previous fee guides (prior to the new one on January 1, 2018) will not change. If a plan sponsor has instituted a fee guide lag, current fees will remain in place until the 2018 fees become effective. For example, if a group has a one-year fee-guide lag, GSC will use the fees loaded for Alberta in 2017 for claims dated 2018. For claims dated 2019, the 2018 fee guide will be used.

To view the dental fee guide posted on the Alberta government's website, visit <https://www.alberta.ca/dental-fees.aspx>. If you have any additional questions, please contact your GSC account executive.

MEDICATION SYNCHRONIZATION IMPROVES ADHERENCE

As you know from GSC health studies, the incidence of chronic conditions continues to rise, and it's common for plan members to have several chronic conditions often requiring multiple medications. In addition, GSC data reveal that medication non-adherence is a major issue. Keeping track of refills and having to make multiple pharmacy visits to get refills can contribute to non-adherence. Fortunately, there's good news: evidence indicates that medication synchronization can have a dramatic impact on adherence to maintenance medications, in some cases up to a 15% improvement.

You may recall from the spring 2016 edition of *Follow the Script*[®] that GSC is supporting pharmacists to provide medication synchronization services. Medication synchronization is when the pharmacist coordinates refills so plan members who are taking a number of different medications can refill all their prescriptions at the same time. Here's how it works:

- **Without medication synchronization:** Plan members taking multiple chronic medications typically refill each medication on a different cycle—this results in multiple trips to the pharmacy. For example, they may refill one medication at the beginning of the month, but refill a second medication mid-month, and then refill a third one at the end of the month. That's three trips to the pharmacy during each fill cycle meaning greater potential for delays in refills and non-adherence.
- **With medication synchronization:** By consulting their pharmacist, the plan member arranges to pick up all three refills on the same refill date—the sync date. At first, getting all the drugs aligned to the sync date may require a few refills of smaller quantities. This is possible because, to facilitate medication synchronization, GSC allows pharmacists to bypass our maintenance drug policy that requires dispensing a three-month supply for maintenance drugs through the use of a medication-synchronization override code. By not restricting the number of days supply in these very specific circumstances, the pharmacist is able to line up each plan member's prescriptions to fall on one common refill date every three months. As a result, the plan member can pick up all of their refills on the same day of every third month resulting in a more predictable refill schedule and higher long-term adherence.

Medication synchronization requires ongoing monitoring by the pharmacist to keep everything in sync. For example, the addition of new drugs or an unexpected hospitalization may throw the process out of sync and resynchronization may be necessary.

For more information, contact your GSC account executive.

HIGH-PRICE DRUGS ACCOUNTED FOR 40% OF PATENTED DRUG SALES IN 2016

A main responsibility of the Patented Medicine Prices Review Board (PMPRB) is to ensure that the costs of the brand-name drugs sold in Canada are not excessive. According to the PMPRB 2016 annual report, between 2006 and 2016 the number of drugs with an annual cost of at least \$10,000 per patient increased by over 200%. These drugs now account for 40% of brand-name drug sales as compared to 7.6% in 2006. In addition, sales of brand-name drugs in 2016 increased by 2.6% to \$15.5 billion.

The report also indicates that Canadian brand-name drug prices were fourth-highest when placed among the seven countries—known as the PMPRB7—that are compared to Canada by the PMPRB. Higher than Canada are the United States, Germany, and Switzerland, and lower than Canada are the U.K., France, Sweden, and Italy.

In terms of other PMPRB activities in 2016, enforcement by the PMPRB resulted in pharmaceutical patent holders having to reduce prices and to pay over \$5 million in excess revenues back to the government of Canada. As of March 31, 2017, there were 101 ongoing PMPRB investigations into possible excessive drug pricing.

For more information and to access the report, visit <http://pmprb-cepmb.gc.ca/news.asp?a=view&id=201>.

PRESCRIPTION DRUGS ARE FORECAST TO REPRESENT OVER 80% OF CANADA'S DRUG SPENDING

The Canadian Institute for Health Information (CIHI) report—*Prescribed Drug Spending in Canada, 2017: A Focus on Public Drug Programs*—indicates that total drug spending in Canada in 2017 is forecast to be \$39.8 billion. This expenditure will be financed by:

- Provincial/territorial programs: \$12.4 billion, \$339 per capita
- Federal direct drug subsidy programs: \$0.76 billion, \$21 per capita
- Social security funds: \$1.3 billion, \$36 per capita
- Private health insurance: \$12.1 billion, \$329 per capita
- Households or individuals paying out of pocket: \$13.3 billion, \$362 per capita

Prescription drugs are forecast to represent 85.2% of total drug expenditure, and non-prescription drugs are expected to account for 14.8%.

Some public health spending trends are similar to what GSC is experiencing. For instance, in public plans, biologics to treat conditions such as rheumatoid arthritis and Crohn's disease continue to account for the highest proportion of drug spending. In addition, new and expensive hepatitis C drugs accounted for almost two-thirds of growth in 2015.

In GSC plans, plan members taking high-cost drugs represent very high costs, but a low proportion of plan members. This is similar in public plans where the two per cent of individuals for whom a drug program paid \$10,000 or more accounted for about one-third of spending in 2016. The proportion of public drug program spending on high-cost individuals continues to rise.

For more information on the CIHI report, visit <https://www.cihi.ca/en/prescribed-drug-spending-in-canada>.

December
Haiku

AI is coming
Warning... next edition may
Be robot written

Bonus!

December Haiku

Our expert writers
Did not find the first haiku
Amusing at all



Best wishes for a happy and healthy 2018!

GSC CUSTOMER SERVICE CENTRE 2017 HOLIDAY HOURS

Monday, December 25	CLOSED
Tuesday, December 26	CLOSED
Wednesday, December 27	8:30 a.m. to 8:30 p.m. ET
Thursday, December 28	8:30 a.m. to 8:30 p.m. ET
Friday, December 29	8:30 a.m. to 8:30 p.m. ET
Monday, January 1	CLOSED

Our regular business hours (8:30 a.m. to 8:30 p.m. ET) resume on Tuesday, January 2, 2018.

**FITBIT
WINNER**

Congratulations to **M. KELMAN**, of **BRAMPTON, ON**, the winner of our monthly draw for a Fitbit. Through this contest, one name will be drawn each month from plan members who have registered for Plan Member Online Services for that month.



greenshield.ca

Windsor	1.800.265.5615	Vancouver	1.800.665.1494
London	1.800.265.4429	Montréal	1.855.789.9214
Toronto	1.800.268.6613	Atlantic	1.844.666.0667
Calgary	1.888.962.8533	Customer Service	1.888.711.1119