ANNUAL REPORT 2021

PATENTED MEDICINE PRICES REVIEW BOARD

Patented Medicine Prices Review Board
Conseil d'examen du prix des médicaments brevetés

Canada

The Patented Medicine Prices Review Board
Standard Life Centre, Box L40
333 Laurier Avenue West, Suite 1400
Ottawa, ON K1P 1C1

Tel.: 1-877-861-2350
Fax: 613-288-9643
TTY: 613-288-9654

Email: PMPRB.Information-Renseignements.CEPMB@pmprb-cepmb.gc.ca
Web: www.canada.ca/en/patented-medicine-prices-review.html
Twitter: @PMPRB_CEPMB

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STATISTICAL HIGHLIGHTS 2021

REGULATORY MANDATE

- 1,177 patented medicines for human use were reported to the PMPRB, including 59 new medicines.
- 2 Voluntary Compliance Undertakings were accepted as of December 31, 2021.
- $38 thousand in excess revenues were offset by way of payments to the Government of Canada, in addition to price reductions.

REPORTING MANDATE

SALES TRENDS:

- Sales of patented medicines in Canada were $17.4 billion in 2021, a slight decrease of 1.7% from the previous year.
- Patented medicines accounted for approximately 51.0% of the sales of all medicines in Canada in 2021.

PRICE TRENDS:

- The Consumer Price Index rose by 3.4%, while the national average transaction price for patented medicines increased by 0.4%.
- Canadian list prices were third highest among the 31 Organisation for Economic Co-operation and Development (OECD) countries, lower than prices in the US and Switzerland.

RESEARCH AND DEVELOPMENT

R&D-TO-SALES RATIOS REMAINED STEADY IN 2021:

- 3.4% for all patentees, unchanged from 2020.
- 3.5% for Innovative Medicines Canada members, unchanged from 2020.

R&D EXPENDITURES:

- $922.9 million in total R&D expenditures were reported by patentees, an increase of 12.2% over 2020.
- $735.9 million in R&D expenditures were reported by Innovative Medicines Canada members, an increase of 11.0% over 2020.

15 September 2022

The Honourable Jean-Yves Duclos, P.C., M.P.
Minister of Health
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister:

I have the pleasure to present to you, in accordance with sections 89 and 100 of the *Patent Act*, the Annual Report of the Patented Medicine Prices Review Board for the year ended December 31, 2021.

Yours very truly,

Mélanie Bourassa Forcier
Acting Chairperson

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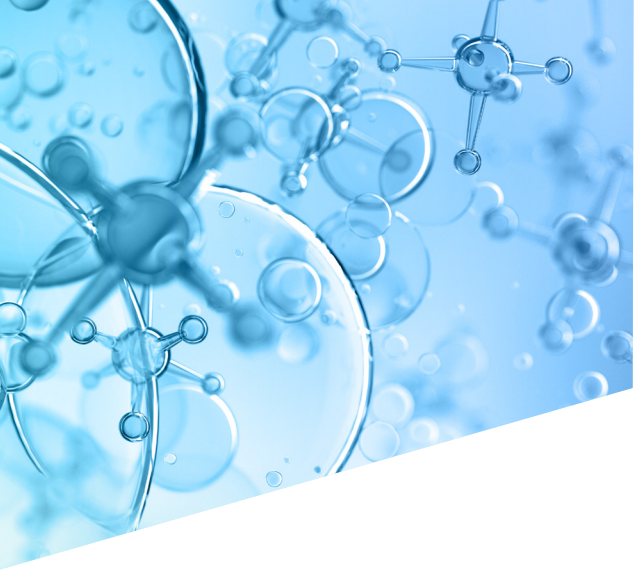
CHAIRPERSON'S MESSAGE

The Patented Medicine Prices Review Board (PMPRB) is an independent quasi-judicial body established by Parliament in 1987 under the *Patent Act* (the Act). The PMPRB's mandate is to protect and inform Canadians by ensuring that the prices of patented medicines sold in Canada are not excessive and by reporting on pharmaceutical trends.

Uncertainty has been the one constant in the lives of Canadians the past two tumultuous years, with the best laid plans of governments and individuals repeatedly upended by intensifying waves of the COVID-19 pandemic. However, in so far as the PMPRB is concerned, recent announcements by the Minister of Health with respect to the implementation of Health Canada's amendments to the *Patented Medicines Regulations* have finally brought certainty and predictability to policy questions that remained unsettled since the early days of the pandemic. Further predictability and clarity will emerge from the PMPRB's upcoming consultation on its new Guidelines later this year. Once the new Guidelines are in place, as always, the PMPRB will do its utmost to protect Canadians from excessively priced patented medicines through the responsible and efficient use of our regulatory powers.



In terms of the PMPRB's reporting mandate, this past year we continued to provide analytical support and expertise to our health partners under the broad umbrella of the National Prescription Drug Utilization Information System (NPDUIS) initiative. In addition to a great deal of behind-the-scenes analytical work on various pan-Canadian pharmaceutical policy initiatives, since the beginning of 2021, the PMPRB has published five analytical reports, one chartbook, and four presentations under the NPDUIS banner. These studies continue to highlight the pressures stemming from the increased use of higher-cost medicines in Canada. Over the last five years, sales of patented medicines have grown by an average of 2.2% per year, reaching $17.4 billion in 2021. High-cost medicines now account for 57.1% of these sales. As noted in this year's Annual Report, in 2021, the 20 top-selling patented medicines in Canada, which accounted for 40% of total patented medicine sales, had a median treatment cost of $42,616, nearly 60 times the median in 2012. In 2021, Canadian list prices of patented medicines were the third highest in the Organisation for Economic Co-operation and Development (OECD), behind only the US and Switzerland. These trends all serve to reinforce the significance the government's current suite of very ambitious pharmaceutical policy objectives, such as a national formulary, a strategy for drugs for rare diseases, and a national drug agency.

2021 was a year of significant change in senior leadership at the PMPRB, with Dr. Mitchell Levine's five-year term as the Chairperson of the Board coming to an end in November 2021. Although a permanent replacement has yet to be named, I and my fellow Board members look forward to finally turning the page on the multiyear effort to modernize our regulatory framework and working with our stakeholders and partners under new leadership to deliver as best we can on the PMPRB's mandate priorities.

Mélanie Bourassa Forcier
Acting Chairperson

ABOUT THE PATENTED MEDICINE PRICES REVIEW BOARD:

ACTING IN THE INTEREST OF CANADIANS

The Patented Medicine Prices Review Board (PMPRB) is an independent, quasi-judicial body established by Parliament in 1987 under the *Patent Act* (Act).

The PMPRB is a quasi-judicial administrative agency with a dual regulatory and reporting mandate. Through its regulatory mandate, it ensures that the prices of patented medicines sold in Canada are not excessive. The PMPRB also reports on trends in pharmaceutical sales and pricing for all medicines and on research and development (R&D) spending by patentees. In addition, at the request of the Minister of Health, pursuant to section 90 of the Act, the PMPRB conducts critical analyses of price, utilization, and cost trends for patented and non-patented prescription medicines under the National Drug Utilization Information System (NPDUIS) initiative. Its reporting mandate provides pharmaceutical payers and policy makers with information to make rational, evidence-based reimbursement and pricing decisions.

The PMPRB is part of the Health Portfolio, which includes Health Canada, the Public Health Agency of Canada, the Canadian Institutes of Health Research and the Canadian Food Inspection Agency. The Health Portfolio supports the Minister of Health in maintaining and improving the health of Canadians.

OUR MISSION

The PMPRB is a respected public agency that makes a unique and valued contribution to sustainable spending on pharmaceuticals in Canada by:

- Providing stakeholders with price, cost, and utilization information to help them make timely and knowledgeable pricing, purchasing, and reimbursement decisions; and
- Acting as an effective check on the prices of patented medicines through the responsible and efficient use of its consumer protection powers.

Protecting Consumers in a Complex Marketplace

(CADTH) Canadian Agency for Drugs and Technologies in Health; (CDR) Common Drug Review; (pCODR) pan-Canadian Oncology Drug Review; and (pCPA) pan-Canadian Pharmaceutical Alliance

Data source: PMPRB

Although part of the Health Portfolio, because of its quasi-judicial responsibilities, the PMPRB carries out its mandate at arm's length from the Minister of Health, who is responsible for the sections of the Act pertaining to the PMPRB. The PMPRB also operates independently of other healthcare-related bodies, such as:

- Health Canada, which approves medicines for marketing in Canada based on their safety, efficacy, and quality;
- federal, provincial and territorial (F/P/T) public drug plans, working collectively as the pCPA, which approve the listing of medicines on their respective formularies for reimbursement purposes; and
- the Common Drug Review and pan-Canadian Oncology Drug Review, administered by the CADTH, which recommend which new medicines should qualify for reimbursement by the pCPA.

The PMPRB is composed of public servants (Staff) who are responsible for carrying out the organization's day-to-day work, and Board Members, Governor-in-Council appointees who serve as hearing panel members in the event of a dispute between Staff and a patentee over the price of a patented medicine.

JURISDICTION

REGULATORY

The PMPRB reviews the price at which patentees (companies) sell their products to wholesalers, hospitals, pharmacies and other large distributors to ensure that this price is not excessive. This price is sometimes also known as the "factory gate" (ex-factory) price. The PMPRB does not regulate the prices of non-patented medicines.

1,177 PATENTED MEDICINES

were reported to the PMPRB in 2021.

The PMPRB's jurisdiction is not limited to medicines for which the patent is for the active ingredient or for the specific formulation(s) or uses the patentee sells the medicine for in Canada. Rather, its jurisdiction also covers medicines for which a patent "pertains", including patents for manufacturing processes, delivery systems or dosage forms, indications/use, and any formulations.

The Act requires patentees (which include any parties who benefit from patents regardless of whether they are owners or licensees under those patents and regardless of whether they operate in the "brand" or "generic" sector of the market) to inform the PMPRB of their intention to sell a new patented medicine. Upon the sale of a new patented medicine, patentees are required to file price and sales information at introduction and, thereafter, until all patents pertaining have expired. Patentees are not required to obtain approval of the price to be able to market their medicines. However, the Act requires the PMPRB to ensure that the prices of patented medicines sold in Canada are not excessive.

Staff review the prices that patentees charge for each individual strength and form of a patented medicine. If the price of a patented medicine appears to be potentially excessive, the patentee may volunteer to lower its price and/or refund its potential excess revenues through a Voluntary Compliance Undertaking (VCU). If this fails, the Chairperson may consider whether a hearing on the matter is in the public interest. At the hearing, a panel composed of Board members acts as a neutral arbiter between Staff and the patentee. If a Hearing Panel concludes, after hearing all of the evidence in light of the factors set out in section 85 of the Act, that the price of a patented medicine is/was excessive in any market, it can order the maximum ceiling price to be reduced to a non-excessive level. It can also order a patentee to make a monetary payment to the Government of Canada to offset the excess revenues earned and, in cases where the panel determines there has been a policy of excessive pricing, it can double the amount of the monetary payment.

REPORTING

As required by the Act, the PMPRB reports annually to Parliament through the Minister of Health on its price review activities, the prices of patented medicines and price trends of all prescription medicines, and on the R&D expenditures reported by pharmaceutical patentees.

OUR VISION

A sustainable pharmaceutical system where payers have the information they need to make smart reimbursement choices and Canadians can afford the patented medicines they need to live healthy and productive lives.

In addition, as a result of an agreement by the F/P/T Ministers of Health in 2001, and at the request of the Minister of Health, pursuant to section 90 of the Act, the PMPRB conducts critical analyses of price, utilization, and cost trends for patented and non-patented prescription medicines under the National Prescription Drug Utilization Information System (NPDUIS). The PMPRB publishes the results of NPDUIS analyses in the form of reports, posters, presentations, briefs, and chartbooks. This program provides F/P/T governments and other interested stakeholders with a centralized, objective, and credible source of information on pharmaceutical trends.

Among other initiatives under its reporting mandate, the PMPRB also hosts various forums, such as webinars, research forums, and information sessions, with academics and policy experts to discuss and disseminate research on emerging areas for study on pharmaceutical trends in Canada and internationally.

COMMUNICATIONS AND OUTREACH

The PMPRB takes a proactive and plain-language approach to its external communication activities. This includes targeted social media campaigns and more conventional (e.g., email and telephone) engagement with domestic, international, and specialized news media. The PMPRB is actively pursuing additional opportunities to leverage new and emerging media to communicate with its stakeholders and the Canadian public.

The PMPRB recognizes the importance of openness and transparency as we continue to work on modernizing the way we carry out our mandate. We communicate regularly, through various channels, about our progress, including projected timelines, and key milestones. Engagement with stakeholders will remain a central part of our multi-faceted communications approach. Reporting on our progress helps ensure we remain focused on delivering results.

GOVERNANCE

The Board consists of not more than five members who serve on a part-time basis. Board members, including a Chairperson and a Vice-Chairperson, are appointed by the Governor-in-Council. The Chairperson, designated under the Act as the Chief Executive Officer of the PMPRB, has the authority and responsibility to supervise and direct its work. By law, the Vice-Chairperson exercises all the powers and functions of the Chairperson when the Chairperson is absent or incapacitated, or when the office of the Chairperson is vacant.

The members of the Board, including the Chairperson, are collectively responsible for implementing the applicable provisions of the Act. Together, they establish the guidelines, rules, by-laws, and other policies of the PMPRB provided for by the Act (section 96) and consult, as necessary, with stakeholders including provincial and territorial Ministers of Health, representatives of consumer groups, the pharmaceutical industry, and others.

MEMBERS OF THE BOARD

Vice-Chairperson (Acting Chairperson)

Mélanie Bourassa Forcier
LLB., LL.L, MSc, LL.M., DCL

Mélanie Bourassa Forcier was appointed Vice-Chairperson of the Board on June 19, 2019, and has been Acting Chairperson since November 2021.

Professor Mélanie Bourassa Forcier is a lawyer and Full Professor in the Faculty of Law at the Université de Sherbrooke. She directs the Law and Health Policy, and Law and Life Sciences programs. She has expertise in Health governance and Ethics in Health Policy, Intellectual Property, Regulation of Digital Technologies, Technology Transfers and in Pharmaceutical Law and Policies. Over the years she has particularly concentrated her research on policies promoting the development, integration and access to innovation in the health care sector.

Professor Bourassa Forcier has published numerous books and articles on the subject of pharmaceutical regulation and health law. She holds a Ph.D. in Pharmaceutical Patent Law from McGill University, an MSc in International Health Policy from the London School of Economics and Political Science (concentration in Health Economics), a LL.M. in Law and Biotechnologies from the University of Montreal and an LL.L. from the University of Ottawa (summa cum laude).

Carolyn Kobernick,
B.C.L., LL.B.

Carolyn Kobernick was appointed Member of the Board on June 13, 2014.

Ms. Kobernick is a lawyer and former public servant. Prior to her retirement in 2013, Ms. Kobernick had been Assistant Deputy Minister of Public Law for the Department of Justice since 2006. As principal counsel to the Minister of Justice and Attorney General of Canada, Ms. Kobernick was instrumental in the development and delivery of policy for the Department of Justice. In addition to identifying key strategic, legal, and operational matters, she tackled cross-cutting national issues as the liaison between the Department of Justice and other government organizations.

Ms. Kobernick holds a B.C.L. and LL.B. from McGill University and is a member of the bar of Ontario. In 2012 she obtained a Certificate in Adjudication for Administrative Agencies, Boards and Tribunals from the Osgoode Hall Law School and the Society of Ontario Adjudicators and Regulators.

Dr. Ingrid Sketris
BSc (Pharm), PharmD,
MPA (HSA),
Clinical Toxicology Residency

Dr. Ingrid Sketris was appointed Member of the Board on June 29, 2018.

Dr. Sketris is a licensed pharmacist and a professor at the College of Pharmacy, Dalhousie University, with cross appointments to Medicine and Health Administration.

Dr. Sketris received her Doctor of Pharmacy in 1979 from the University of Minnesota, followed by her residency in Clinical Toxicology at the University of Tennessee Centre for the Health Sciences. She also received a Master of Public Administration/Health Services Administration from Dalhousie University.

She is a leader in pharmacy, and has served as President of the Association of Faculties of Pharmacy of Canada and as a board member of the Canadian Council for Accreditation of Pharmacy Programs.

Dr. Sketris is a Fellow of the Canadian Society of Hospital Pharmacists, the American College of Clinical Pharmacy and the Canadian Academy of Health Sciences. She was previously elected to the US National Academies of Practice.

Matthew Herder
B.Sc. (hons), LL.B., LL.M., J.S.M.

Matthew Herder was appointed Member of the Board on June 29, 2018.

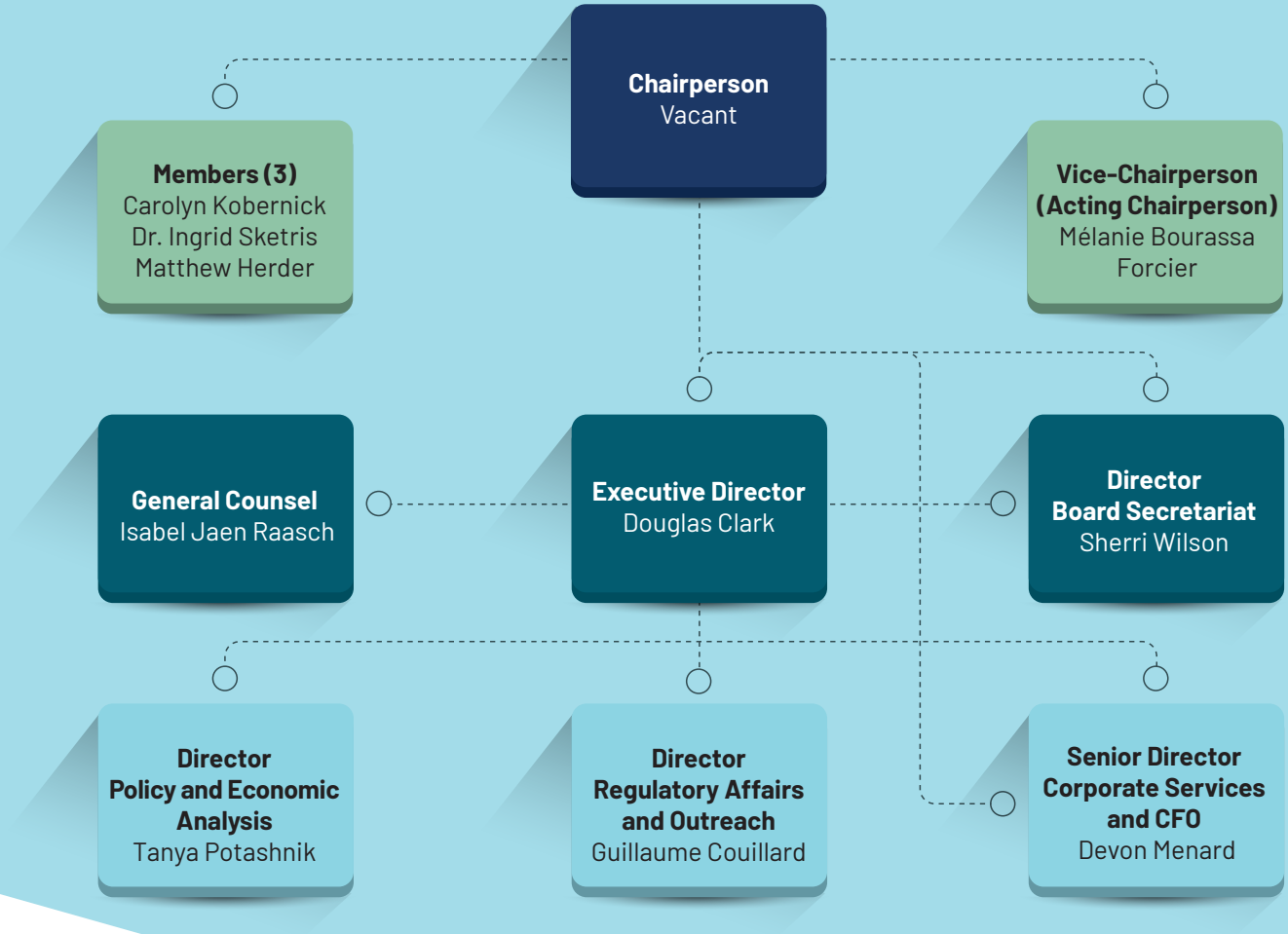
Mr. Herder is the Director of the Health Law Institute at Dalhousie University as well as an Associate Professor in the Department of Pharmacology in the Faculty of Medicine, with a cross-appointment to the Schulich School of Law.

Mr. Herder's research focuses on biomedical innovation policy, with a particular emphasis on intellectual property rights and the regulation of biopharmaceutical interventions. His work is often interdisciplinary and policy-oriented, and he has received grants from the Canadian Institutes of Health Research and the Royal Society of Canada, in addition to appearing as an expert witness before several Parliamentary committees on pharmaceutical regulation and policy.

Prior to arriving at Dalhousie, Mr. Herder was the Ewing Marion Kauffman Foundation Legal Research Fellow at New York University's School of Law. He was a Law Clerk at the Federal Court of Canada and was admitted to the Law Society of Upper Canada. Mr. Herder holds a Master of the Science of Law degree from Stanford Law School as well as two law degrees from Dalhousie University.

ORGANIZATIONAL STRUCTURE AND STAFF

PMPRB Organizational Chart



Executive Director

The Executive Director is responsible for advising the Board and for the leadership and management of Staff.

Regulatory Affairs and Outreach

The Regulatory Affairs and Outreach Branch reviews the prices of patented medicines sold in Canada; ensures that patentees are fulfilling their filing obligations; encourages patentees to comply voluntarily with the PMPRB's Guidelines; implements related compliance policies; and investigates complaints into the prices of patented medicines.

Policy and Economic Analysis

The Policy and Economic Analysis Branch develops policy and strategic advice; leads stakeholder consultations and makes recommendations on possible amendments to the PMPRB's Guidelines; conducts research and analysis on the prices of medicines, pharmaceutical market developments, and R&D trends; and publishes studies aimed at providing F/P/T governments and other interested stakeholders with centralized, objective, and credible information in support of evidence-based policy.

Corporate Services

The Corporate Services Branch provides advice and services in relation to human resources management; facilities; procurement; health, safety and security; information technology; and information management. It coordinates activities pursuant to the *Access to Information Act* and the *Privacy Act*, and is responsible for strategic planning and reporting. It is also responsible for financial planning and reporting, accounting operations, audit and evaluation, and liaising with federal central agencies on these topics.

Board Secretariat

The Board Secretariat manages the Board's meeting and hearing processes, including the official record of proceedings.

General Counsel

The General Counsel advises the PMPRB on legal matters, leads the legal team representing Staff in proceedings before the Board, and liaises with counsel for the Attorney General in PMPRB-related proceedings before federal and provincial courts.

BUDGET

In 2021-22, the PMPRB had a budget of $18.9 million and an approved staff level of 85 full-time equivalent employees.

TABLE 1. Budget and Staffing

	2020-21	2021-22	2022-23
Budget*	$17,804,400	$18,892,322	$17,003,213
Salaries and employee benefits	$10,054,721	$10,175,540	$10,164,617
Operating	$2,491,893	$2,510,296	$2,375,235
Special Purpose Allotment†	$5,257,786	$6,206,486	$4,463,361
Full Time Employees (FTEs)	87	85	84

* Budget amounts are based on the Main Estimates.

† The Special Purpose Allotment is reserved strictly for external costs of public hearings (legal counsel, expert witnesses, etc.). Unspent funds are returned to the Consolidated Revenue Fund.

REGULATING PRICES OF PATENTED MEDICINES:
INFORMING ON PMPRB REGULATORY ACTIVITIES

Medical advancements have introduced many innovative new medicines to the Canadian marketplace to improve existing treatments and to treat conditions that previously had no pharmaceutical therapy. However, many of these new medicines come at a very high cost. Since 1987, pharmaceutical costs in Canada have grown at an average annual rate of 4.1%,[1] outpacing all other health care costs and growing at well over three times the pace of inflation. At 13.9% of total health care spending, pharmaceuticals now rank ahead of spending on physicians.[2] About 1 in 5 Canadians reports having no prescription medicine coverage and many more are under-insured or face high deductibles or co-pays. Almost 1 in 10 Canadians have had to forego filling a prescription medicine in the past year for reasons related to cost.[3]

The PMPRB protects the interests of Canadian consumers by ensuring that the prices of patented medicines sold in Canada are not excessive. It does this by reviewing the prices that patentees charge for each individual patented medicine and by ensuring that patentees reduce their prices and pay back excess revenues, where appropriate.

REPORTING REQUIREMENTS

By law, patentees must file information about the sale of their medicines in Canada. The Act and the *Patented Medicines Regulations* (Regulations) set out the information required and Staff reviews pricing information on an ongoing basis until all relevant patents have expired.

The *Compendium of Policies, Guidelines and Procedures (Guidelines)* details price tests and triage mechanisms used by Staff when it reviews and investigates the prices of patented medicines. The Guidelines are not binding and were developed in consultation with stakeholders, including the provincial and territorial Ministers of Health, consumer groups, and the pharmaceutical industry. When an investigation suggests that the price of a patented medicine is excessive, the patentee may seek to close the investigation by volunteering to lower its price and/or refund its potential excess revenues

through a Voluntary Compliance Undertaking (VCU). If the patentee chooses not to submit a VCU and the investigation remains open, the Chairperson may consider whether a hearing on the matter is in the public interest. If such a hearing is held before a panel composed of Board members ("Hearing Panel") and that Hearing Panel concludes, after hearing all of the evidence in light of the factors set out in section 85 of the Act, that the patented medicine was priced excessively in any market, an order may be issued to the patentee requiring that (1) the maximum ceiling price of the medicine be reduced to a non-excessive level; and/or (2) that measures be taken to offset any excess revenues that may have been earned through sales of the patented medicine at an excessive price. Copies of the Act, the Regulations, and the Guidelines are available on the PMPRB's website.

OUR MOTTO

Protect, Empower, Adapt.

FAILURE TO REPORT

Access to timely and accurate information regarding the sale of patented medicines is necessary for the PMPRB to fulfil its regulatory mandate. Therefore, patentees and former patentees are required to submit this information to the PMPRB. The information that must be submitted is set out in section 82 of the Act and in the Regulations. In 2021, two medicines were reported to the PMPRB for the first time despite being patented and sold prior to 2021 (see Table 2, Failure to Report the Sale of Patented Medicines).

FAILURE TO FILE PRICE AND SALES DATA (FORM 2)

Failure to file refers to the complete or partial failure of a patentee to file the information required by the Act and the Regulations to the PMPRB. There were no Board Orders issued for failure to file in 2021.

TABLE 2. Failure to Report the Sale of Patented Medicines

Patentee	Brand name	Medicinal ingredient	Year medicine reported to the PMPRB as under PMPRB's jurisdiction	Year medicine reported to the PMPRB with subsequent patent
Fresenius Kabi	Omegaven (2 DINs*)	Fish oil triglycerides	2009, 2010	
CSL Behring Canada Inc.	Hizentra† (2 DINs*)	Subcutaneous immune globulin (human)	2017	

* Drug Identification Numbers (DINs)

† The two Hizentra DINs (02463059 and 02463067) were first reported to the PMPRB in 2020, however they were not included in the 2020 Annual Report as they were reported after the cut-off date for inclusion.

Data source: PMPRB

SCIENTIFIC REVIEW

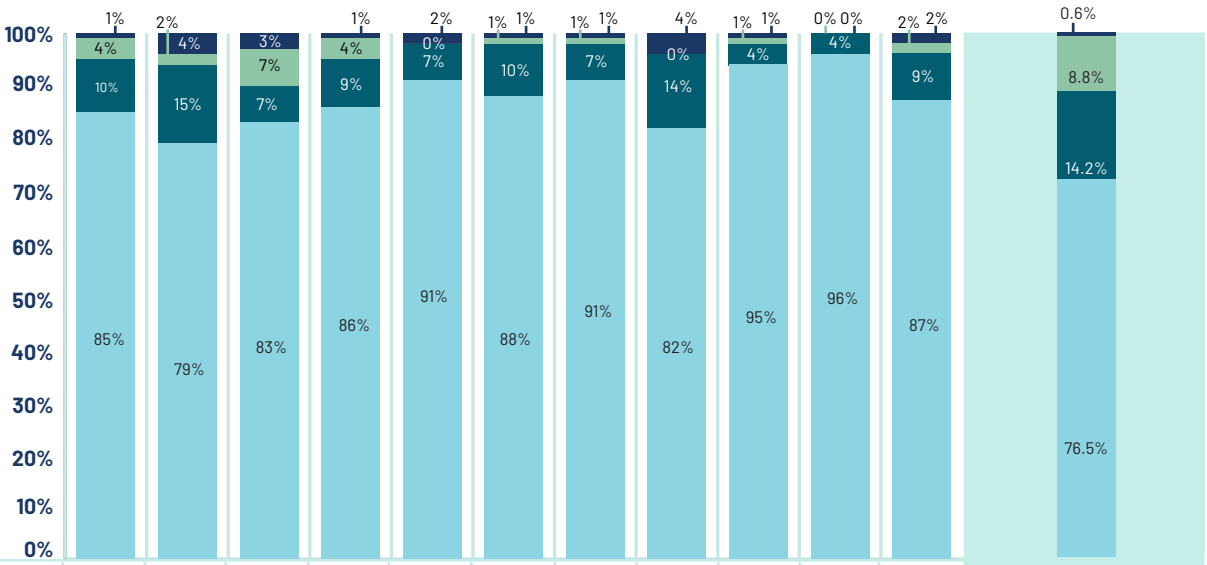
HUMAN DRUG ADVISORY PANEL

A scientific evaluation is done on all new patented medicines as part of the price review process. The PMPRB established the Human Drug Advisory Panel (HDAP) to provide advice to Staff. The HDAP conducts an evaluation to provide clinical context pertaining to the scientific information that is being considered by Staff. HDAP members review and evaluate the appropriate scientific information available, including any submission by a patentee about the proposed level of therapeutic improvement, the selection of comparator medicines, and comparable dosage regimens.

The HDAP evaluates the therapeutic benefit of new patented medicines according to the following definitions:

- **Breakthrough:** A medicine that is the first one sold in Canada to effectively treat a particular illness or effectively address a particular indication.
- **Substantial Improvement:** A medicine that, relative to other medicines sold in Canada, provides substantial improvement in therapeutic effects.
- **Moderate Improvement:** A medicine that, relative to other medicines sold in Canada, provides moderate improvement in therapeutic effects.
- **Slight or No Improvement:** A medicine that, relative to other medicines sold in Canada, provides slight or no improvement in therapeutic effects.

FIGURE 1. Percentage and Number of New Patented Medicines Reviewed, by Therapeutic Benefit



Number of New Patented Medicines Reviewed	2012 Intro	2013 Intro	2014 Intro	2015 Intro	2016 Intro	2017 Intro	2018 Intro	2019 Intro	2020 Intro	2021 Intro*	Overall 2012-2021	Overall 2012-2021 Revenue Share
Slight/No Improvement	70	91	86	73	116	70	98	62	71	22	759	76.8%
Moderate improvement	8	17	7	8	9	8	8	11	3	1	80	14.4%
Substantial Improvement	3	2	7	3	0	1	1	0	1†	0	18	8.3%
Breakthrough	1	5	3	1	3	1	1	3	1	0	19	0.6%

* Assessment as of March 31, 2022

† Correction: Xospata - 40 mg/tablet (DIN 2495058) should have been included as "Moderate Improvement" in 2020.

Data source: PMPRB

Figure 1 shows the distribution of new patented medicines introduced from 2012 to 2021 by their level of therapeutic benefit. The largest percentage of patented medicines (87%) introduced since 2012 were categorized as "Slight or No Improvement" in therapeutic benefit over existing therapies.[4]

The "Overall 2012–2021" bar represents the therapeutic benefit breakdown for all new patented medicines introduced from 2012 to 2021. The "Overall 2012–2021 Revenue Share" bar illustrates the revenue share by therapeutic benefit for all new patented medicines introduced from 2012 to 2021.

PRICE REVIEW

The PMPRB reviews the average price (net of reported discounts and deductions) of each strength of each individual dosage form of each patented medicine. In most cases, this unit is consistent with the Drug Identification Number(s) (DIN, DINs) assigned by Health Canada at the time the medicine is approved for sale in Canada.

NEW PATENTED MEDICINES REPORTED TO THE PMPRB IN 2021

For the purpose of this report, a new patented medicine in 2021 is defined as any patented medicine or new dosage form or strength of a patented medicine first sold in Canada, or previously sold but first patented, between December 1, 2020, and December 1, 2021.

There were 59 new patented medicines for human use reported as sold in 2021. Some are one or more strengths of a new active substance and others are new presentations of existing medicines. Of these 59 new patented medicines, one (1.7%) was sold in Canada prior to the issuance of the Canadian patent that brought it under the PMPRB's jurisdiction. Table 3 shows the year of first sale for this medicine.

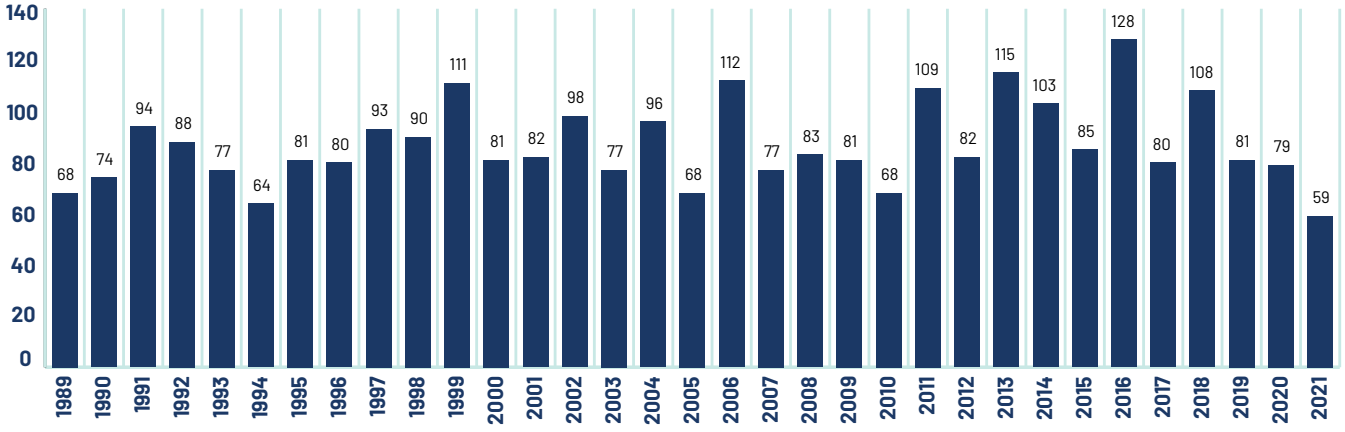
TABLE 3. Number of New Patented Medicines for Human Use in 2021 by Year First Sold

Year first sold	Number of medicines
2014	1
Total	**1**

Data source: PMPRB

The list of New Patented Medicines Reported to PMPRB is available on the PMPRB's website. This list is updated yearly upon the release of the Annual Report and includes information on the status of the review (i.e., whether the price of the medicine is under review, within the Guidelines, under investigation, or subject to a VCU or Notice of Hearing). Figure 2 illustrates the number of new patented medicines for human use reported to the PMPRB from 1989 to 2021.

FIGURE 2. Number of New Patented Medicines for Human Use



Data source: PMPRB

Of the 59 new patented medicines, the prices of 23 had been reviewed as of March 31, 2022:

- 12 were found to be within the thresholds set out in the Guidelines and, as such, did not trigger investigations;[5]
- 3 were at a level that appeared to exceed the thresholds set out in the Guidelines by an amount that did not trigger investigations;
- 7 were at levels that appeared to exceed the thresholds set out in the Guidelines and resulted in investigations being commenced; and
- 1 was the subject of a Voluntary Compliance Undertaking.

For a complete list of the 59 new patented medicines and their status, see Appendix 2 .

PRICE REVIEW OF EXISTING PATENTED MEDICINES FOR HUMAN USE IN 2021

For the purpose of this report, existing patented medicines include all patented medicines first sold and reported to the PMPRB prior to December 1, 2020.

At the time of this report, there were 1,118 existing patented medicines:

- 771 were priced within the thresholds set out in the Guidelines and, as such, did not trigger investigations;
- 162 had prices that appeared to exceed the thresholds set out in the Guidelines by an amount that did not trigger investigations;
- 162 were the subject of investigations;
- 7 were under review;
- 11 were the subject of a Voluntary Compliance Undertaking;
- 4 were the subject of a hearing; and
- 1 was subject to a Stayed Price Reduction Order (Stay Order).

Table 4 provides a summary of the status of the price review of the new and existing patented medicines for human use in 2021.

TABLE 4. Patented Medicines for Human Use Sold in 2021—Status of Price Review as of March 31, 2022

	New medicines introduced in 2021	Existing medicines	Total
Total	**59**	**1,118**	**1,177**
Within Guidelines Thresholds	12	771	783
Under Review	36	7	43
Does Not Trigger Investigation	3	162	165
Under Investigation	7	162	169
Subject to Voluntary Compliance Undertaking (VCU)	1	11	12*
Price Hearing	0	4	4
Subject to Price Reduction Order (Stayed)	0	1	1

* The terms and conditions of previous years VCUs that have carried over into 2021 are not captured in this count.

Data source: PMPRB

UPDATE FROM THE 2020 ANNUAL REPORT

- 5 of the patented medicines for human use that were reported as under review in the 2020 Annual Report remain under review.
- 41 of the 166 investigations reported in the 2020 Annual Report resulted in one of the following:
  - the closure of the investigation where it was concluded the price was within the thresholds set out in the Guidelines;
  - a VCU by the patentee to reduce the price and offset excess revenues through a payment and/or a reduction in the price of another patented medicine (see "Voluntary Compliance Undertakings"); or
  - a public hearing to determine whether the price was excessive, including any remedial Order determined by the Board (see "Hearings").

PATENTED OVER-THE-COUNTER MEDICINES, PATENTED GENERIC MEDICINES, AND PATENTED MEDICINES FOR VETERINARY USE

Staff only review the prices of patented over-the counter medicines, patented generic medicines, and patented veterinary medicines when a complaint of excessive pricing has been received. No such complaints were received in 2021.

VOLUNTARY COMPLIANCE UNDERTAKINGS AND HEARINGS

VOLUNTARY COMPLIANCE UNDERTAKINGS

A VCU is a promise by a patentee to reduce its price(s) and/or offset any potential excess revenues from the sale of a patented medicine that is subject to an investigation. The Guidelines set out procedures for patentees to submit a VCU. The consideration of a VCU is an administrative procedure and does not constitute an admission or determination by the PMPRB that the price submitted by the patentee, or used to calculate a revenue offset, is not excessive. However, the acceptance of a VCU by the Chairperson will result in the closure of an investigation.

In 2021, the Chairperson approved the closure of investigations based on the receipt of two VCUs. In addition to price reductions for certain medicines, potential excess revenues totaling $38,309.14 were offset by way of a payment to the Government of Canada.

As of May 31, 2022, the Chairperson had approved the closure of five investigations after the receipt of two additional VCUs that resulted in price reductions.

TABLE 5. Voluntary Compliance Undertakings in 2021 up to May 31, 2022

Patented medicine (brand name)	Therapeutic use	Patentee	Date of approval	Offset of potential excessive revenues	
				Price reduction	Payment to the government
VCUs in 2021					
Neratinib (sold under trade name Nerlynx) (1 DIN)	An oral protein kinase inhibitor approved for the extended adjuvant treatment of women with early-stage hormone receptor positive, HER2 overexpressed/amplified breast cancer within one year after completion of trastuzumab-based adjuvant therapy.	Knight Therapeutics Inc.	March	x	
Lemborexant (sold under trade name Dayvigo) (2 DINs)	For the treatment of insomnia, characterized by difficulties with sleep onset and/or sleep maintenance.	Eisai Limited	October	x	$38,309.14
Total as of December 31, 2021					**$38,309.14**

...Continued

Patented medicine (brand name)	Therapeutic use	Patentee	Date of approval	Offset of potential excessive revenues	
				Price reduction	Payment to the government
VCUs in 2022 as of May 31, 2022					
Burosumab (sold under trade name Crysvita) (3 DINs)	For the treatment of X-linked hypophosphatemia (XLH), and for the treatment of FGF23 related hypophosphatemia in tumor-induced osteomalacia (TIO).	Ultragenyx Pharmaceuticals Inc.	February	x	
Fremanezumab (sold under trade name Ajovy) (2 DINs)	For the prevention of migraine in adults who have at least four migraine days per month.	Teva Canada Innovation	February	x	
Total as of May 31, 2022					**$38,309.14**

HEARINGS

The PMPRB holds hearings into two types of matters:

- excessive pricing; and
- failure to file–jurisdiction.

EXCESSIVE PRICING

When an investigation into the price of a patented medicine is completed, and the matter is not resolved, the Executive Director may submit a report to the Chairperson. The Chairperson may decide to issue a Notice of Hearing if he or she is of the opinion that it is in the public interest. During a hearing, submissions and evidence from the parties are heard by a Hearing Panel consisting of at least two Board members. The Hearing Panel determines whether a patented medicine is being, or has been, sold at an excessive price in any market in Canada by taking into consideration the available information relating to the factors set out in section 85 of the Act. If the Hearing Panel finds the price is excessive, it can issue an order to reduce the maximum ceiling price of the patented medicine in question (or of another patented medicine of the patentee) and/or to offset revenues received as a result of the excessive price. Judicial review of Board decisions can be sought in the Federal Court of Canada.

In January 2019, the PMPRB announced it would hold a public hearing in the matter of the price of the patented medicine cysteamine bitartrate sold under the trade name Procysbi by Horizon Therapeutics Canada. The purpose of this hearing was to determine whether the medicine has been, or is being, sold in any market in Canada at a price that, in the Board's opinion, is or was excessive: and, if so, what order, if any, should be made to remedy the excessive pricing. The hearing was held over several weeks in late 2020-early 2021 and a decision on the matter is pending.

FAILURE TO FILE–JURISDICTION

When it is the opinion of Staff that a patentee has failed or refused to provide the PMPRB with the pricing, sales, or revenues and like information required by law, the Executive Director may submit a report to the Chairperson. The Chairperson may decide to issue a Notice of Hearing if he or she is of the opinion that it is in the public interest to hold a hearing to determine whether the patentee has, in fact, breached the reporting requirements of the Act and Regulations. If the Hearing Panel finds, as the result of a public hearing, that the patentee has failed to report the required information, the Hearing Panel can order the patentee to file the required pricing and sales information.

There were no new failure to file hearings as of March 31, 2022.

On May 7, 2020, the Board issued its decision on re-determination on its decision dated

December 19, 2016, whereby the Board originally found that Canadian Patent No. 2,478,237 pertains to the patented medicine adapalene sold under the trade name Differin and ordered Galderma to file the required information for the period between January 1, 2010, and March 14, 2016. The Board's decision on redetermination again ordered Galderma to file the required information for the period between January 1, 2010, and March 14, 2016. On August 11, 2020, Galderma Canada Inc. filed an application for judicial review of the Board's May 7, 2020 decision on redetermination (T-906-20).

SUMMARY

Excess revenues totaling $38,309.14 were offset by payments to the Government of Canada through VCUs and Board Orders in 2021 and up to May 31, 2022.

Since 1993, 162 VCUs have been accepted. In addition, 31 notices of hearing have been issued, 14 of which were resolved through settlements prior to the hearing on the merits and 17 of which were subject to a full public hearing on the merits (10 related to allegations of excessive pricing and 7 related to allegations of failure to file). These measures resulted in price reductions and the offset of excess revenues by additional price reductions and/or payments to the Government of Canada. Over $210 million has been collected through VCUs, settlements, and Board Orders through payments to the Government of Canada.

MATTERS BEFORE THE FEDERAL COURT, FEDERAL COURT OF APPEAL, AND SUPREME COURT OF CANADA OR OTHER COURTS

A-237-19: on October 20, 2017, Alexion Pharmaceuticals Inc. filed an application for judicial review of the Board's decision dated September 20, 2017, in respect of its finding that the patented medicine eculizumab sold under the trade name Soliris was being sold at an excessive price in Canada and ordering Alexion to lower its price (currently stayed) and make an excess revenue payment of $4,245,329.60. The Board's decision was found to be reasonable by the Federal Court via a decision dated May 23, 2019. Alexion has appealed the Federal Court's decision in the Federal Court of Appeal. The Federal Court of Appeal heard the appeal of the Board Panel's decision in October 2020. The Federal Court of Appeal granted Alexion's appeal on July 29, 2021, and remitted the matter to the Board for redetermination. On June 21, 2022, the matter was settled through a Board order granting a discontinuation of the redetermination and related settlement agreement.

T-906-20: on January 18, 2017, Galderma Canada Inc. filed an application for judicial review of the Board's decision dated December 19, 2016. In that decision the Board found that Canadian Patent No. 2,478,237 pertains to the patented medicine adapalene sold under the trade name Differin and ordered Galderma to file the required information for the period between January 1, 2010, and March 14, 2016. The Federal Court granted Galderma's judicial review application on November 9, 2017, and quashed the Board's decision. On November 21, 2017, the Attorney General appealed the Federal Court's grant of the judicial review application. On June 28, 2019, the Federal Court of Appeal granted the appeal and issued its decision sending the matter back to the Board for redetermination. The Board's decision on redetermination, issued on May 7, 2020, again ordered Galderma to file the required information for the period between January 1, 2010, and March 14, 2016. On August 11, 2020, Galderma Canada Inc. filed an application for judicial review of the Board's May 7, 2020, decision on redetermination (T-906-20). The Board Panel's redetermination in this matter is under judicial review by the Federal Court.

T-1419-20: on November 23, 2020, Innovative Medicines Canada and nineteen individual pharmaceutical companies brought an application in Federal Court for judicial review of the PMPRB's decision to issue new Guidelines on October 23, 2020 (then slated to come into effect in July 1, 2021). The application seeks a declaration that the new Guidelines are ultra vires the Patent Act and an order quashing and setting aside the decision of the PMPRB to issue the new Guidelines. The hearing on the matter was scheduled for May 2-3, 2022, but was subsequently adjourned.

There are no PMPRB-related matters before the Supreme Court of Canada.

Two challenges related to PMPRB legislation were commenced in 2019:

T-1465-19: on September 6, 2019, Innovative Medicines Canada (I.M.C.) and sixteen individual pharmaceutical companies brought an application in Federal Court to judicially review s. 4 (new factors), s. 6 and Schedule (new basket of countries), and ss. 3(4) (new net price calculation) of the 2019 *Amendments to the Patented Medicines Regulations* on the basis that they were ultra vires the regulation-making power contained in the *Patent Act*. The Federal Court issued its decision on June 29, 2020, and held that the amendments in s 4, s. 6 and the Schedule are intra vires the *Patent Act*, but that the amendment in ss. 3(4) is not. On September 10, 2020,

I.M.C. and the individual pharmaceutical companies filed a Notice of Appeal with respect to the Federal Court decision. The Attorney General of Canada has also filed a cross-appeal in respect of the invalidated amendments. This appeal is currently pending.

No. 500-17-109270-192. Merck et al. v Canada (Attorney General): on August 22, 2019, six individual pharmaceutical companies brought an application for judicial review in Quebec Superior Court challenging the constitutionality of ss. 79-103 of the *Patent Act*. In its decision issued on December 18, 2020, the Quebec Superior Court found the amendments to subsections 4(4)a) and 4(4)b) that would update the net price calculation to require patentees to include discounts and rebates provided to third parties unconstitutional and of no force or effect. The Court found the rest of the Regulations, including the other amendments, and the relevant sections of the *Patent Act* constitutionally valid. The pharmaceutical company applicants filed a Notice of Appeal with respect to the Superior Court of Quebec's decision on January 25, 2021 and the Attorney General of Canada has also filed a cross-appeal in respect of the invalidated amendments. The Quebec Court of Appeal granted the appeal in part and dismissed the cross-appeal on February 18, 2022.

TABLE 6. Status of Board Proceedings in 2021 up to July 4, 2022

Allegations of Excessive Pricing				
Medicine	**Indication/ use**	**Patentee**	**Issuance of notice of hearing**	**Status**
Eculizumab (sold under trade name Soliris)	Paroxysmal nocturnal hemoglobinuria Atypical hemolytic uremic syndrome	Alexion Pharmaceuticals Inc.	January 20, 2015	Board Order: September 27, 2017 Found the price of Soliris was and is excessive under Sections 83 & 85 of the Act Payment of excess revenues: $4,245,329.60 * Application for Judicial Review and subsequent appeal: see below. Matter (redetermination) discontinued on June 21, 2022, following a settlement agreement.
Cysteamine bitartrate (sold under trade name Procysbi)	Nephropathic cystinosis	Horizon Therapeutics Canada	January 14, 2019	Hearing held in 2020-2021 and decision is pending.

Allegation of Failure to File				
Medicine	**Indication/ use**	**Patentee**	**Issuance of notice of hearing**	**Status**
Adapalene (sold under trade names Differin and Differin XP)	Acne	Galderma Canada Inc.	(redetermination)	Board Order: May 7, 2020. Galderma to file the required information for the requested period. * Application for Judicial Review and prior litigation: see below.

...Continued

Judicial Review of Board Decisions and Appeals pending as of March 31, 2022				
Medicine	**Indication/ use**	**Applicant**	**Issue**	**Date of notice of hearing/status**
Eculizumab (sold under trade name Soliris)	Paroxysmal nocturnal hemoglobinuria Atypical hemolytic uremic syndrome	Alexion Pharmaceuticals Inc.	Allegations of excessive pricing	Application for Judicial Review. Court File T-1596-17 (Re. Board Panel's decision of September 20, 2017): Decision issued May 23, 2019. Notice of Appeal (Federal Court of Appeal) filed on June 21, 2019. Court File A-237-19: Appeal granted, matter sent to Board for redetermination.
Adapalene (sold under trade names Differin and Differin XP)	Acne	Galderma Canada Inc.	Failure to file (jurisdiction)	Application for Judicial Review. Court File T-83-17 (Re. Board Panel's decision of December 19, 2016): Decision issued November 9, 2017 quashing in part Board Panel's decision. Notice of Appeal (Federal Court of Appeal) filed on November 21, 2017. Court File A-385-17. Decision issued on June 28, 2019. Matter sent for redetermination by the Board. Redetermination decision issued on May 7, 2020. Application for Judicial Review. Court File T-906-20 (Re. Board Panel's Decision of May 7, 2020) filed on August 11, 2020. Matter pending.
N/A	N/A	Innovative Medicines Canada et al	*Vires* of new Guidelines issued by the PMPRB in October 2020.	Application for Judicial Review. Court File T-1419-20: Hearing on the matter currently adjourned.

ENDNOTES

[1] 4.1% growth in drug spending is the average growth rate in drug spending as calculated from the Canadian Institute for Health Information (CIHI), National Health Expenditure Trends, 1975 to 2021 Series C data.

[2] CIHI, National Health Expenditure Trends, 2021

[3] A Prescription for Canada: Achieving Pharmacare for All, Final Report of the Advisory Council on the Implementation of National Pharmacare, June 2019

[4] Prior to 2010 the PMPRB categorized new medicines as follows:

- Category 1 – is a new DIN of an existing dosage form of an existing medicine, or a new DIN of another dosage form of the medicine that is comparable to the existing dosage form.
- Category 2 – is one that provides a breakthrough or substantial improvement. It is a new DIN of a non-comparable dosage form of an existing medicine or the first DIN of a new chemical entity.
- Category 3 – is a new DIN of a non-comparable dosage form of an existing dosage form of an existing medicine, or the first DIN of a new chemical entity. These DINs provide moderate, little or no therapeutic advantage over comparable medicine. This group includes those new medicines that are not included in Category 2.

[5] The criteria for commencing an investigation have been developed with the intention of making the most efficient use of the PMPRB's human and financial resources.

The fact that the price of a patented medicine is not subject to an investigation does not necessarily mean that its price is not excessive and vice-versa. It only means that the investigation criteria under the Guidelines have not been met in the particular circumstances.

KEY PHARMACEUTICAL TRENDS:

MORE EXPENSIVE MEDICINES CONTINUE TO INFLUENCE SALES

Pharmaceutical spending is influenced by many factors, including price, utilization, the entry of newer, more expensive medicines, and the loss of market exclusivity for older patented medicines. In 2021, there was a sizable increase in the volume of patented medicines sold, as well as a moderate rise in the sales of higher-cost medicines. At the same time, some key top-selling medicines stopped reporting sales to the PMPRB, and as a result, the total spending on patented medicines decreased slightly by 1.7%. Canadian list prices of patented medicines remained among the highest in the Organisation for Economic Co-operation and Development (OECD), ranking third, well behind the US and just marginally lower than Switzerland.

The PMPRB is responsible for reporting on trends in pharmaceutical sales and pricing for all medicines, patented and non-patented, and for reporting research and development spending by patentees.

Under the Regulations, patentees are required to submit detailed information on their sales of patented medicines, including quantities sold, gross ("list") and net prices, and net revenues. The PMPRB uses this information to analyze trends in the sales, prices,[6] and use of patented medicines.[7] This section provides key trends, including analyses of Canadian national, public, and private payer markets for all medicines. Note that any reference to sales in this section should be interpreted as sales revenues unless otherwise noted.

OVER ONE QUARTER ($6.1 BILLION)

of Canadian pharmaceutical sales in 2021 were for medicines that previously but no longer report to the PMPRB

TRENDS IN SALES OF PATENTED MEDICINES

Canadians spend much more on patented medicines today than they did a decade ago. Over the last five years, sales of these medicines have grown by an average of 2.2% per year, reaching $17.4 billion in 2021. This section looks at the most important factors driving the change in sales revenues from 2020 to 2021 and compares them to trends from previous years.

TRENDS IN SALES REVENUES

Between 2020 and 2021, there was a modest $297 million (1.7%) decrease in the sales of patented medicines. Figure 3 reports on trends in the sales of patented medicines from 1990 to 2021. While there has been a ten-fold increase in annual sales over the last 30 years, the year-over-year rate of change within that period has varied. This trend is highlighted by the five-year compound annual growth rate given in Figure 3(b).

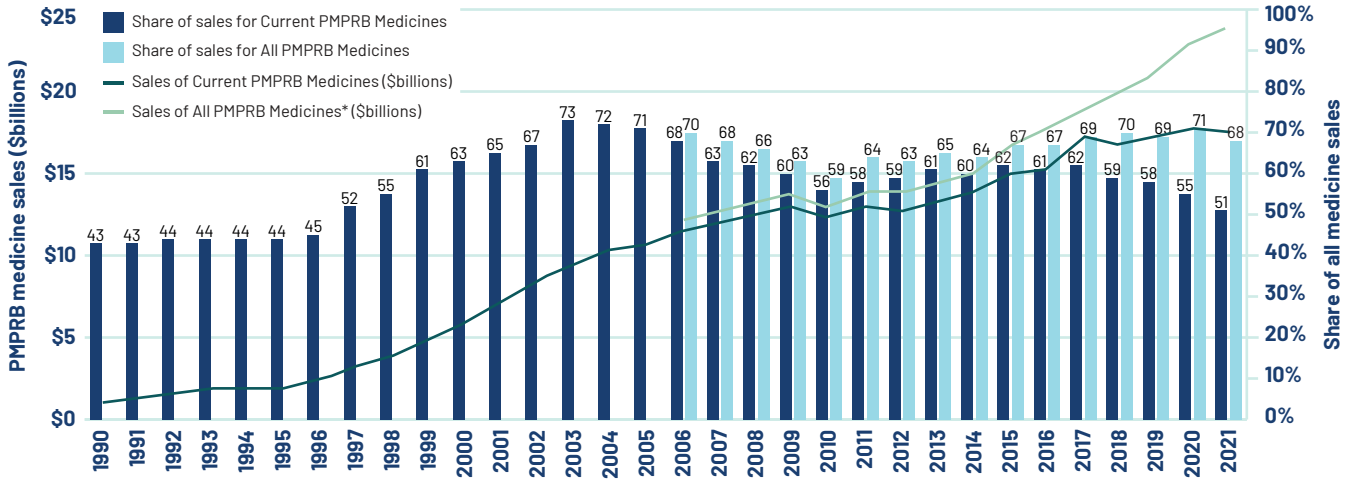
Figure 3(a) gives the sales of patented medicines as a share of overall medicine sales. This share reached a peak of 72.7% in 2003. In 2021, patented medicines accounted for 51.0% of the sales of all medicines in Canada.

DISCLAIMERS

1. Although select statistics reported in the KEY PHARMACEUTICAL TRENDS section are based in part on data obtained under license from the MIDAS® database and the Private Pay Direct Drug Plan database proprietary to IQVIA Solutions Canada Inc. and/or its affiliates ("IQVIA"), the statements, findings, conclusions, views, and opinions expressed in this Annual Report are exclusively those of the PMPRB and are not attributable to IQVIA.
2. To provide a broader perspective on pharmaceutical trends in Canada, summaries of the results of National Prescription Drug Utilisation Information System (NPDUIS) analyses have been included as additional "Brief Insights" throughout this section. A variety of public and licensed data sources are used for NPDUIS analytical studies. Many of these sources do not differentiate between patented and non-patented generic medicines; in these instances, the general term "generic" is used to include both. NPDUIS is a research initiative that operates independently of the regulatory activities of the PMPRB.

FIGURE 3. Trends in Patented Medicine Sales, 1990 to 2021

(a) Patented medicine share of all medicine sales: Current PMPRB Medicines and All PMPRB Medicines*

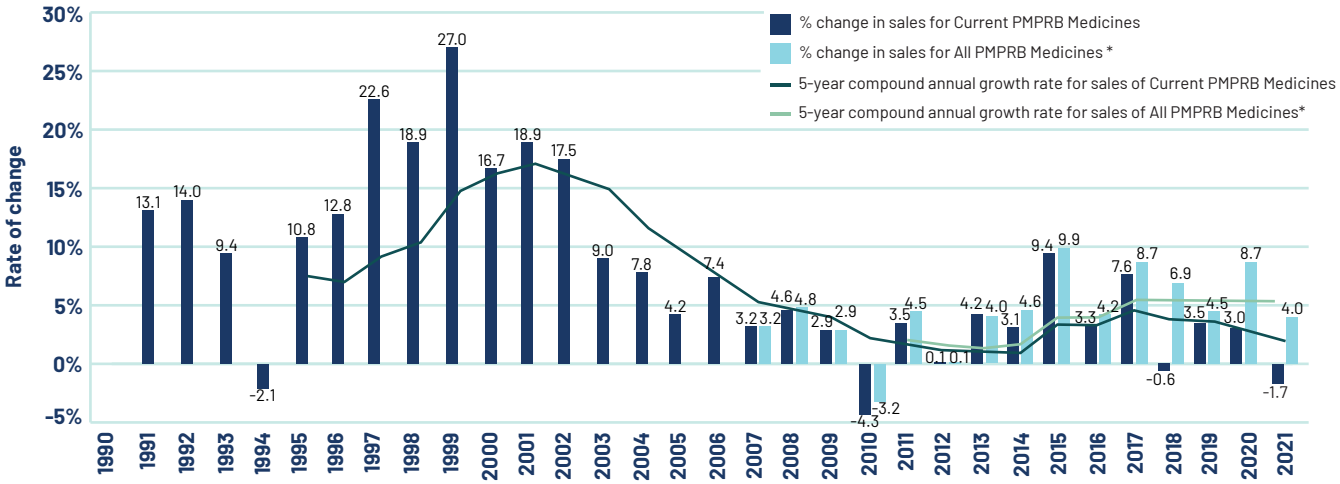


Note: To account for revised submissions from patentees, sales are recalculated for the five years preceding the current Annual Report year. If the data has been revised, the values reported here may differ from those presented in earlier Annual Reports.

* Includes sales of currently patented medicines and medicines that once reported to the PMPRB but are no longer reporting a patent.

Data source: PMPRB; MIDAS® database, 1990–2021, IQVIA (all rights reserved)

(b) Rate of change in patented medicine sales: Current PMPRB Medicines and All PMPRB Medicines*

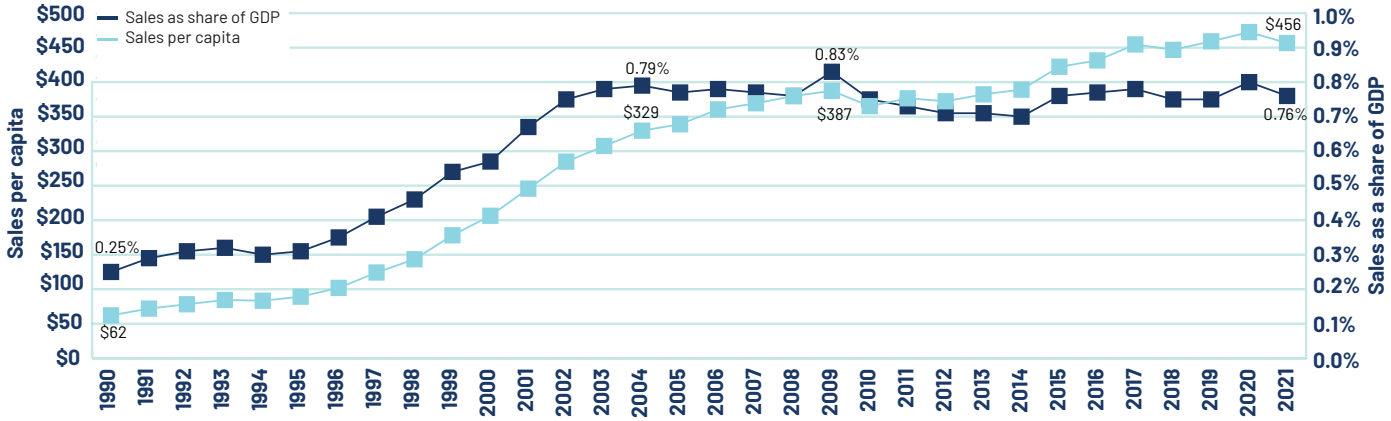


Note: As data is updated each year, historical results may not exactly match those reported in previous editions.

* Includes sales of currently patented medicines and medicines that once reported to the PMPRB but are no longer reporting a patent.

Data source: PMPRB; MIDAS® database, 1990–2021, IQVIA (all rights reserved)

(c) Patented medicine sales per capita and as a share of GDP: Current PMPRB Medicines



Data source: PMPRB; Statistics Canada; OECD

The trends in sales per capita and sales as a percentage of the gross domestic product (GDP) show the increasing importance of patented medicines in the Canadian economy. Overall, per capita sales of patented medicines rose from $61.60 in 1990 to $456.14 in 2021, while sales as a percentage of GDP rose from 0.25% in 1990 to 0.76% in 2021 [Figure 3(c)].

To highlight the continuing impact of patented medicines, Figures 3(a) and 3(b) also provide results for "All PMPRB Medicines". This broader category includes all medicines, current and historic, that ever reported sales to the PMPRB. Historically, medicines have experienced a substantial decrease in market share upon loss of patent protection; however, that same effect has not been observed in a number of the medicines that have stopped reporting to the PMPRB in recent years.

Sales for All PMPRB Medicines rose by 4.0% in 2021, reaching $23.5 billion or 68% of the sales of all medicines in Canada. Medicines that previously reported to the PMPRB accounted for estimated sales of $6.1 billion, or 26.0% of all sales. This is considerably more than a decade ago when medicines that formerly reported to the PMPRB accounted for $0.9 billion, or 4.2% of all sales.

A complete table of the data presented in Figure 3 for patented medicines currently reporting to the PMPRB is included in Appendix 3 .

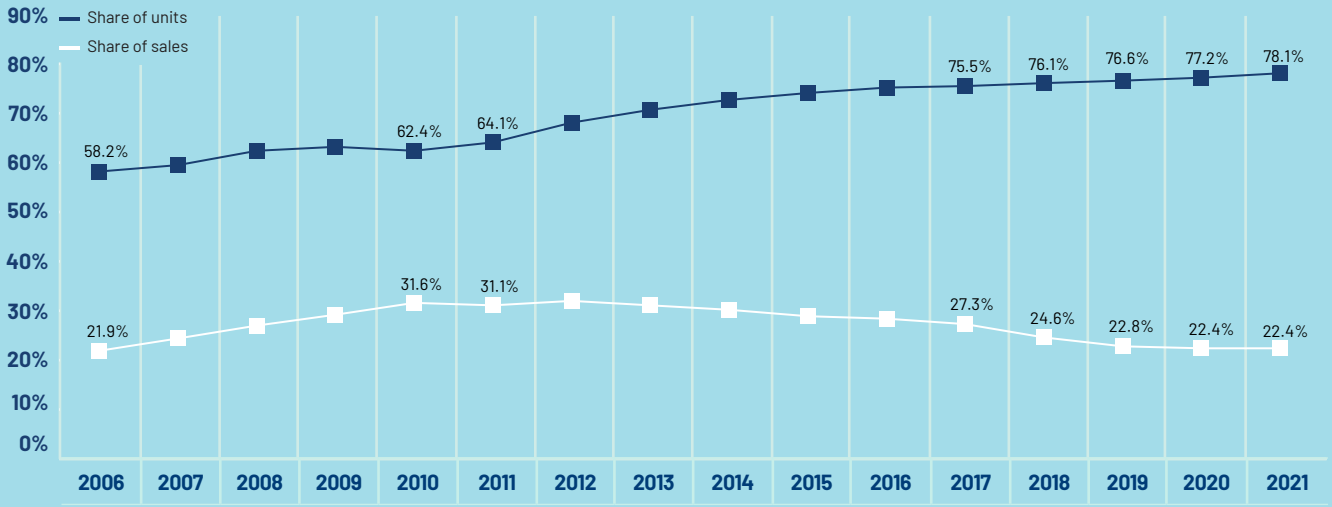
BRIEF INSIGHTS: TRENDS IN THE SALES OF GENERIC MEDICINES

While sales of patented medicines decreased by 1.7% in 2021, retail sales of generic medicines rose by 7.3%, from $5.48 billion in 2020 to $5.88 billion in 2021. This is a notable increase over the generally low or negative rates of change observed since 2010, which were due in large part to the introduction of price-setting policies initiated by individual provincial governments and through the pan-Canadian Pharmaceutical Alliance (pCPA).

In 2018, the introduction of a five-year joint agreement between the pCPA and the Canadian Generic Pharmaceutical Association (CGPA) reduced the prices of 67 generic medicines to 10% or 18% of their reference brand price, driving expenditures down to virtually the same level as in 2010, even as generics continued to grow as a share of units sold in the retail pharmaceutical market (Figure 4).

As the prices of generic medicines begin to stabilize, the return to higher rates of sales growth in 2021 reflect a sustained increase in the use of generics over the previous year.

FIGURE 4. Generic Share of the Canadian Pharmaceutical Retail Market, 2006 to 2021



Note: The results reflect prescription sales in the national retail market based on manufacturer ex-factory list prices.

Data source: MIDAS® database, 2006–2021, IQVIA (all rights reserved)

[NPDUIS Report: *Generics360, 2018* – graph updated to include data up to 2021]

DRIVERS OF THE GROWTH IN SALES REVENUES

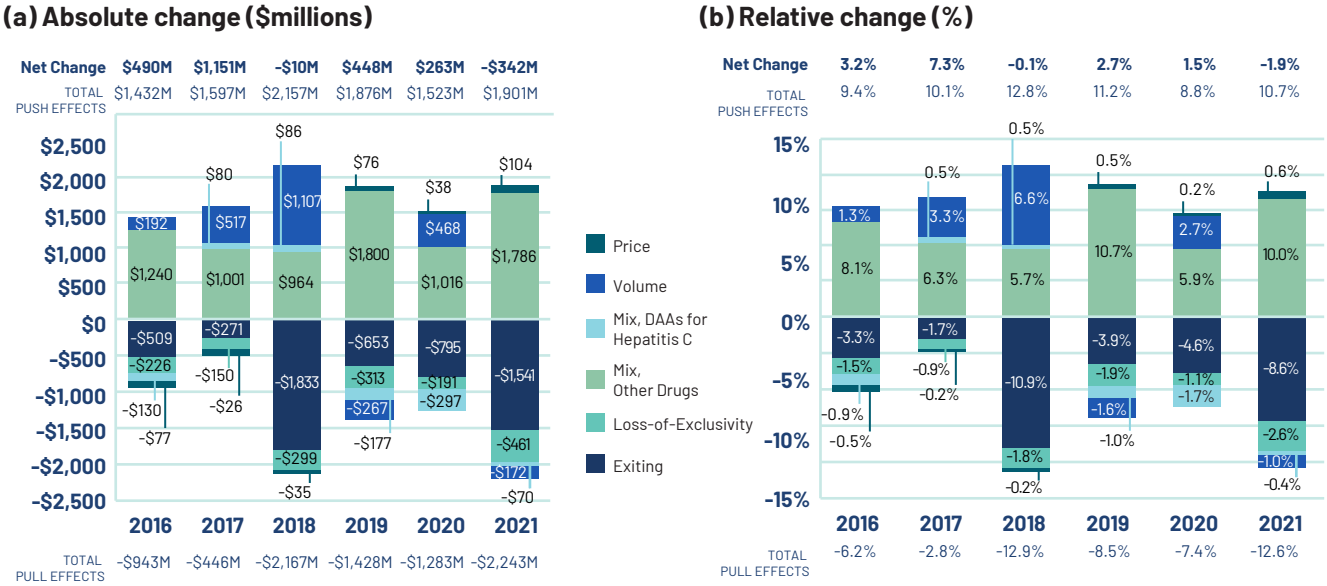
The growth in the sales revenues of patented medicines is influenced by changes in several key factors:

- **Volume effect:** changes in the quantity or amount of patented medicines sold.
  - This effect focuses on established medicines that were on the market for the period analyzed. Increases in the population, changes in demographic composition (e.g., shifts in the age distribution), increases in the incidence of disease, and changes in prescribing practices are among the factors that may contribute to this effect.
- **Mix effect:** shifts in use between lower- and higher-cost patented medicines.
  - This effect applies to both new medicines and those that were already on the market. The switch to new higher-priced medicines, the use of new medicines that treat conditions for which no effective treatment previously existed, and changes in prescribing practices are among the factors that may contribute to this change.
- **Exiting effect:** previously patented medicines that have stopped reporting sales revenues to the PMPRB or are no longer sold in Canada.
- **Loss-of-exclusivity effect:** medicines that have lost market exclusivity and are open to some level of generic competition but are still patented.
- **Price effect:** changes in the prices of existing patented medicines.
  - This effect applies to both increases and decreases in the prices of patented medicines over the time period analyzed.

Some factors, such as the mix effect, will generally put an upward pressure on sales, while others, such as the loss-of-exclusivity effect, have the opposite effect.

Figure 5 summarizes the major factors that drove the year-by-year change in patented medicine sales[8] between 2016 and 2021 (a) in absolute dollar amounts, and (b) as proportions of the overall annual change in sales. In addition to the standard sales drivers, the emergence of novel medicines that have a significant influence on sales may be monitored as a separate effect. For example, direct acting antiviral (DAA) treatments for hepatitis C are presented separately to

FIGURE 5. Key Drivers of Change in the Sales of Patented Medicines, 2016 to 2021



Note: When multiple factors change simultaneously, they create a residual or cross effect, which is not reported separately in this analysis, but is accounted for in the total cost change.

Values may not add to the net change due to rounding and the cross effect.

As this model uses various measures to isolate the factors contributing to growth, the net change reported here may differ slightly from the reported overall change in the patented medicines market reported in Figure 3(b).

Data source: PMPRB

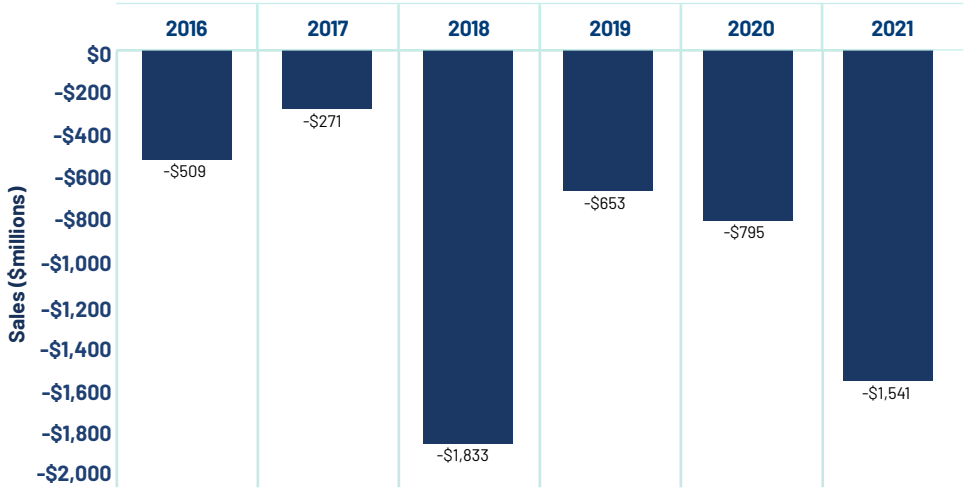
show the continued impact of their large-scale entry onto the market in 2014 and 2015. As the influence of the DAA treatments on expenditures has since stabilized, this will be the last year the PMPRB will report their effect separately. Please consult previous reports to view the full historical data.

Changes in the prices of patented medicines have played a minor role in the growth in patented medicine sales over the last several years, suggesting that, on average, the prices of existing patented medicines are fairly stable. However, this does not reflect the overall increases in treatment costs due to the entry of newer, higher-priced patented medicines, the impact of which is captured by the mix effect.

The shift to new higher-cost patented medicines has been a major driver of sales growth in recent years. In 2021, the use of higher-cost patented medicines other than DAAs put an upward pressure on expenditures of $1.8 billion (push effect of 10.0%). While growth was observed in many therapeutic areas, the increase in sales of "antineoplastic and immunomodulating agents" exceeded that of any other class. These medicines, which include oncology treatments, accounted for more than 44% of all patented medicine sales in 2021. Results by therapeutic class are discussed in further detail in the upcoming sections.

Counterbalancing the upward sales pressure from the mix effect, there was a moderate market segment shift as some high-selling medicines stopped reporting their sales to the PMPRB. The exiting effect accounted for a pull effect of $1.54 billion (-8.6%) on sales in 2021. Figure 6 illustrates the change in the impact of the exiting effect since 2016 and identifies the 10 top-selling medicines that stopped reporting to the PMPRB in 2021.

FIGURE 6. Pull Effect on Patented Medicine Sales from the Exiting Effect, 2016 to 2021



Top-selling medicines that stopped reporting to the PMPRB in 2021	
Ozempic	-$301M
Symbicort	-$266M
Spiriva	-$126M
Crestor	-$116M
Mezavant	-$50M
Lipitor	-$47M
Cipralex	-$47M
Viagra	-$41M
Synagis	-$27M
Alvesco	-$26M

Note: If a medicine stops reporting a patent mid-way through the year, its impact may be reflected in the exiting effect in more than one reporting year.

The amounts reported in any given year may not reflect an entire year's worth of sales for these medicines.

Data source: PMPRB

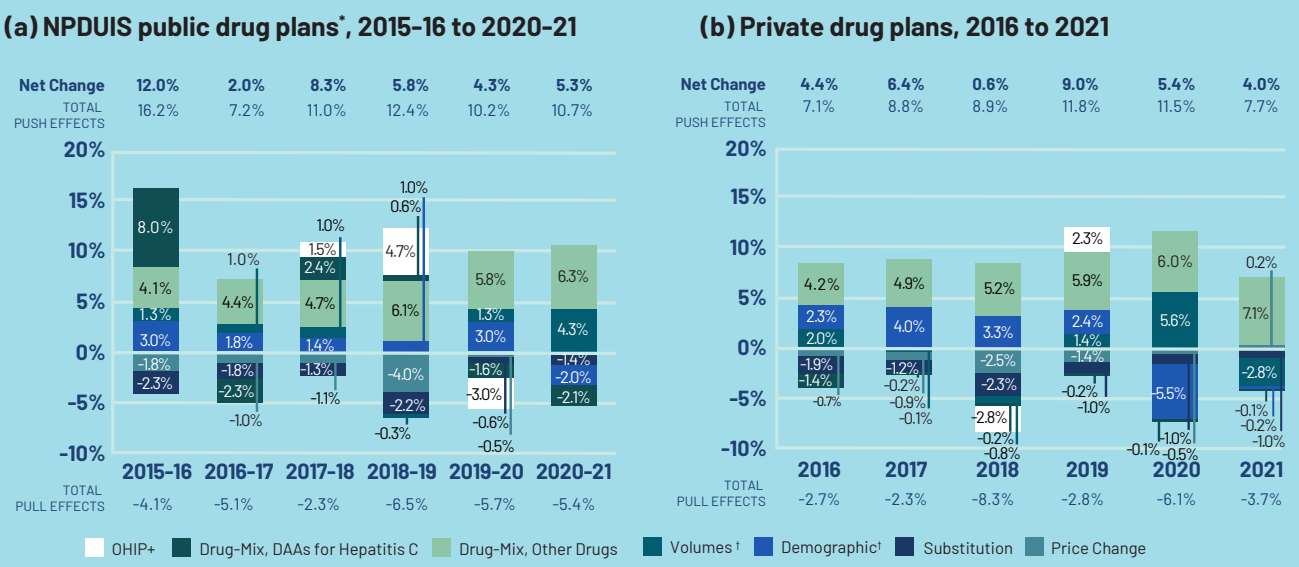
BRIEF INSIGHTS: COST DRIVERS OF PUBLIC AND PRIVATE DRUG PLANS

Canadian public drug plans and private insurers together account for over three quarters of all prescribed drug spending in Canada.[i] This includes sales for all products reimbursed by the plan, including but not limited to patented and non-patented brand medicines, patented and non-patented generic medicines, and non-patented single-source medicines.

Drug costs, including markups, represent the largest component of prescription drug expenditures and have the greatest influence on overall trends. Drug costs rose by 5.3% in public plans in 2019/20 and 4.0% in private plans in 2020.

The increasing use of higher-cost medicines is the primary cost driver for Canadian public and private drug plans. Over the past several years, higher-cost medicines (other than DAAs for hepatitis C) have exerted a consistent and significant upward pressure on expenditures, accounting for a 6.3% contribution toward

FIGURE 7. Medicine Cost Drivers



Note: Public plans report on a fiscal year basis and private plans report on the calendar year. This has an impact on the magnitude of the effect of policies such as the OHIP+ program or the generic pricing initiative introduced in 2018, for which most of the impact on public plans was felt in the 2018-19 fiscal year.

When multiple factors change simultaneously, they create a residual or cross effect, which is not reported separately in this analysis, but is accounted for in the total cost change.

Values may not add to the net change due to rounding and the cross effect.

* British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon, and the Non-Insured Health Benefits Program

† A temporary partial data discontinuity from the private drug plans data supplier in 2021 influenced the results for the demographic and volume effects. As such, the next Annual Report may include a revised estimate of these effects for 2021.

Data source: NPDUIS database, Canadian Institute for Health Information; IQVIA Private Pay Direct Drug Plan database

[i] Canadian Institute for Health Information. 2020. *Prescribed Drug Spending in Canada, 2020: A Focus on Public Drug Programs.* Ottawa, ON: CIHI. Available: https://www.cihi.ca/sites/default/files/document/prescribed-drug-spending-in-canada-2020-report-en.pdf

[NPDUIS Report: *CompassRx 2020/21*; NPDUIS Poster: Pressures behind the Rising Costs in Canadian Private Drug Plans, 2018 – graph updated to 2021]

drug costs in public plans in 2020-21 and 7.1% toward private plan costs in 2021.

The significant downward force exerted by generic pricing policies implemented in 2018 under the price change effect has stabilized, no longer offsetting the increasing cost pressures from the drug-mix effect. The pull-down effect from substitution became stronger than price effect, pulling drug costs down by 1.4% of public plans in 2020-21 and 1.0% of private plans in 2021. Additional savings are expected to be realized in the substitution effect in coming years as a result of recent biosimilar policy changes in many public drug plans, as well as initiatives introduced by some private payers aimed at promoting switching from biologic originators to available biosimilars. With a strong market for biologics in Canada, these efforts may act as a means of offsetting the mounting pressure from higher-cost medicines.

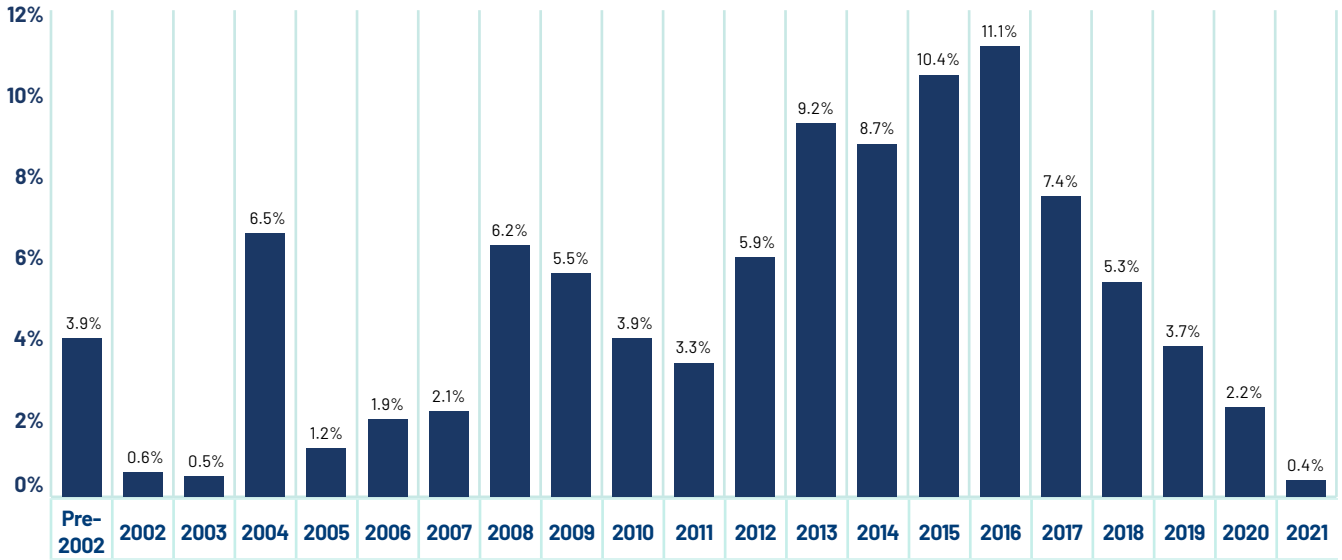
For public plans, a decrease in the number of active beneficiaries during the COVID-19 pandemic resulted in a pull effect of -2.0% on drug costs while a sizable increase in the number of claims per patient pushed overall spending upward by 4.3% over the same period. This rise was captured in the volume effect. Ontario OHIP+ program spending was consistent with 2019-20, and as such had little impact on drug cost growth in 2020-21.

NEWER MEDICINES DRIVING SALES REVENUES

Figure 8 breaks down the 2021 sales of patented medicines according to the year in which the medicine was first issued a Notice of Compliance (NOC) by Health Canada. Throughout the latter part of the 1990s and early 2000s, sales growth was largely driven by a succession of new "blockbuster" medicines that ultimately achieved very high sales volumes. As the patents for these medicines expired, their share of sales gradually decreased.

The introduction of new higher-cost medicines such as biologics, oncology medicines, and treatments for hepatitis C has accounted for a growing share of sales in recent years. Humira, which was issued an NOC in 2004, was the top-selling medicine in 2021, accounting for $887.8 million (5.1%) of total patented medicine sales (Table 8). Similarly, many new medicines introduced over the last decade also made the list of top-sellers in 2021, including Eylea (2013), Imbruvica (2014), Jardiance (2015), and Keytruda (2016).

FIGURE 8. Share of 2021 Sales of Patented Medicines by Date of First Notice of Compliance (NOC)



Data source: PMPRB

HIGHER-COST MEDICINES DRIVING SALES REVENUES

Over the last decade, there has been a notable shift in pharmaceutical development toward more specialized medicines, with an increasing number of higher-cost medicines entering the market and accounting for a substantial share of sales.

In 2021, the trend in the shift to new or higher-cost medicines continued to put an upward pressure on overall patented medicine sales. The top 10 medicines contributed $800 million to the increase in sales (Table 7). Most of these medicines had an average annual treatment cost greater than $10,000.[9]

TABLE 7. Top 10 Medicines Contributing to the Increase in Patented Medicine Sales, 2020 to 2021

Medicinal ingredient (Trade name)	ATC*	Date of first NOC†	Sales ($millions) 2020	Sales ($millions) 2021	Absolute change in sales ($millions) 2020–2021	Avg. annual treatment cost‡ 2021
Pembrolizumab (Keytruda)[E]	L01	May-15	$370.5	$525.7	$155.2	$46,848
Aflibercept (Eylea)	S01	Nov-13	$555.3	$673.6	$118.3	$9,824
Empagliflozin (Jardiance)	A10	Jul-15	$262.1	$346.0	$83.9	$729
Ustekinumab (Stelara)	L04	Dec-08	$328.6	$410.1	$81.5	$25,139
Dupilumab (Dupixent)	D11	Nov-17	$101.3	$174.1	$72.8	$18,453
Onasemnogene abeparvovec (Zolgensma)[E]	M09	Dec-20	$8.6	$72.8	$64.2	$2.8M§
Apixaban (Eliquis)	B01	Dec-11	$373.3	$435.5	$62.2	$762
Risankizumab (Skyriz)	L04	Apr-19	$73.1	$132.2	$59.1	$17,617
Bictegravir/emtricitabine/tenofovir alafenamide (Biktarvy)	J05	Jul-18	$135.7	$188.7	$53.1	$10,861
Lisdexamfetamine dimesylate (Vyvanse)	N06	Feb-09	$229.0	$278.6	$49.5	$736
Total top 10 medicines**			**$2,437.5**	**$3,237.3**	**$799.8**	

Note: Highlighted medicines were also identified as top contributors in 2020.

E: Expensive drugs for rare diseases (EDRDs), defined as a medicine with an orphan designation from the European Medicines Agency or the US Food and Drug Administration, as well as a treatment cost exceeding $100,000 per year or $10,000 per 28-day cycle for oncology.

* Level 2 of the Anatomic Therapeutic Chemical (ATC) Classification system maintained by the World Health Organization.

† Date of first Notice of Compliance or Notice of Compliance with Conditions issued by Health Canada.

‡ The annual treatment cost was calculated based on the average annual cost per active beneficiary in selected private drug plans. This amount may be underestimated.

§ Zolgensma cost is reflective of a one-time gene therapy treatment.

** Values may not add to totals due to rounding.

Data source: PMPRB, IQVIA Private Pay Direct Drug Plan database, 2021

While Table 7 reports the top 10 medicines contributing to the increase in the sales of patented medicines, Table 8 compares the 10 top-selling patented medicines in 2012 and 2021, along with their treatment costs. The shift towards higher-cost medicines is also evident in the list of top-selling patented medicines. Over the last 10 years, the average treatment cost of the top 10 medicines increased from $9,365 in 2012 to $23,121 in 2021. In 2021, four of the top 10 medicines were biologics, with annual treatment costs ranging from $9,284 to $46,848, while two of the top-selling non-biologic medicines in 2021 had an annual treatment cost exceeding $60,000. With collective annual sales of $4.7 billion, these 10 medicines accounted for over one quarter of the total sales for all patented medicines in 2021.

TABLE 8. Treatment Costs for the 10 Top-Selling Patented Medicines, 2012 and 2021

2012						2021					
Medicinal ingredient (Trade name)	ATC*	Date of first NOC†	Avg. annual treatment cost	Sales ($M)	Share of patented sales	Medicinal ingredient (Trade name)	ATC*	Date of first NOC†	Avg. annual treatment cost	Sales ($M)	Share of patented sales
1. Infliximab (Remicade)	L04A	01-Jun	$23,080	$397	3.1%	1. Adalimumab (Humira)	L04A	04-Sep	$18,997	$888	5.1%
2. Adalimumab (Humira)	L04A	04-Sep	$14,115	$366	2.8%	2. Aflibercept (Eylea)	S01L	13-Nov	$9,284	$674	3.9%
3. Ranibizumab (Lucentis)	S01L	07-Jun	$7,879	$311	2.4%	3. Lenalidomide (Revlimid)E	L04A	08-Jan	$62,914	$538	3.1%
4. Etanercept (Enbrel)	L04A	00-Dec	$13,115	$292	2.3%	4. Pembroli-zumab (Keytruda)E	L01X	15-May	$46,848	$526	3.0%
5. Pregabalin (Lyrica)	N03A	05-Jun	$673	$219	1.7%	5. Apixaban (Eliquis)	B01A	11-Dec	$762	$436	2.5%
6. Escitalopram oxalate (Cipralex)	N06A	04-Dec	$370	$210	1.6%	6. Ustekinumab (Stelara)	L04A	08-Dec	$25,139	$410	2.4%
7. Rituximab (Rituxan)	L01X	00-Mar	$12,622	$199	1.5%	7. Ibrutinib (Imbruvica)E	L01X	14-Nov	$65,147	$350	2.0%
8. Tiotropium bromide monohydrate (Spiriva)	R03B	02-Nov	$441	$182	1.4%	8. Empagliflozin (Jardiance)	A10B	15-Jul	$729	$346	2.0%
9. Trastuzumab (Herceptin)	L01X	99-Aug	$20,868	$175	1.4%	9. Rivaroxaban (Xarelto)	B01A	08-Sep	$656	$296	1.7%
10. Ezetimibe (Ezetrol)	C10A	03-May	$493	$167	1.3%	10. Lisdexam-fetamine dimesylate (Vyvanse)	N06B	09-Feb	$736	$279	1.6%
Total top 10 medicines‡			**$9,365 ($7,147)§**	**$2,517**	**19.6%**	**Total top 10 medicines‡**			**$23,121 ($20,836)§**	**$4,740**	**27.3%**
Total patented medicines				**$12,885**		**Total patented medicines**				**$17,446**	

Note: Biologic medicines are highlighted.

E: Expensive drugs for rare diseases (EDRDs), defined as a medicine with an orphan designation from the European Medicines Agency or the US Food and Drug Administration, as well as a treatment cost exceeding $100,000 per year or $10,000 per 28-day cycle for oncology.

* Level 3 of the Anatomic Therapeutic Chemical (ATC) classification system maintained by the World Health Organization.

† Date of first Notice of Compliance or Notice of Compliance with Conditions issued by Health Canada.

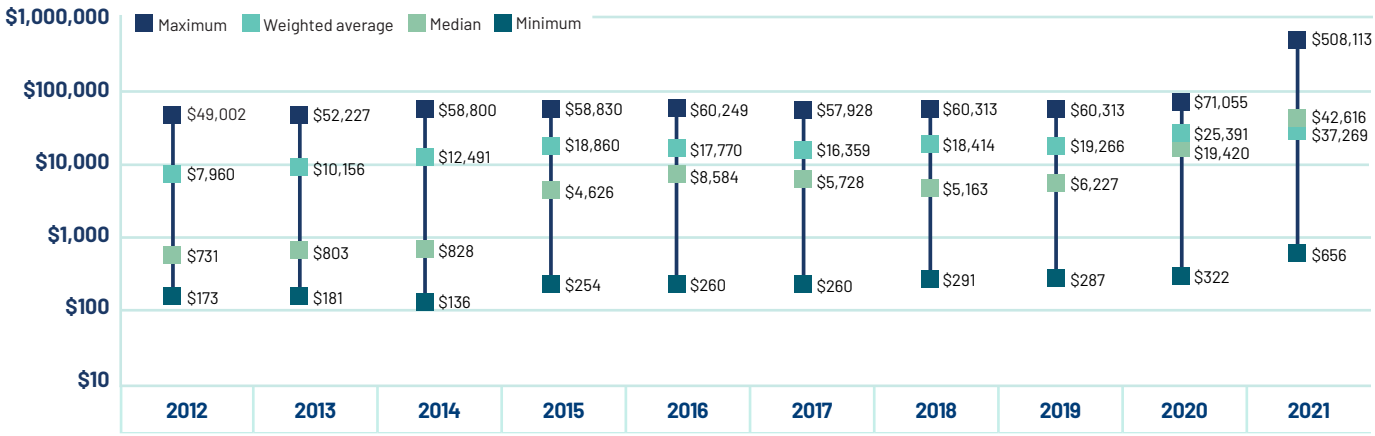
‡ Values may not add to totals due to rounding.

§ Sales-weighted average annual treatment cost ($)

Data source: PMPRB, IQVIA Private Pay Direct Drug Plan database, 2021

Figure 9 details the trend in the treatment costs of patented medicines since 2006. For many years, the majority of the 20 top-selling patented medicines had annual treatment costs under $1,000, but in recent years, costs for the top-sellers have soared into the thousands or tens of thousands of dollars. In 2021, the top 20 medicines, which accounted for 39.6% of patented medicine sales, had a median annual treatment cost of $42,616, nearly 60 times the median in 2012.

FIGURE 9. Annual Treatment Costs for the 20 Top-Selling Patented Medicines, 2012 to 2021



Data source: PMPRB; IQVIA Private Pay Direct Drug Plan database, 2012–2021

Figure 10 shows that high-cost medicines represent an increasingly significant share of the total sales of patented medicines, rising steeply from 17.3% in 2012 to 57.1% in 2021. This growth was evident in all ranges of annual treatment costs ($10,000 to $20,000; $20,000 to $50,000; $50,000 to $100,000; and $100,000 and over), with medicines in the highest cost band climbing from 0.6% to 5.0% of sales over the same period. Despite the sharp increase in their share of costs, less than 1% of the population use these medicines.

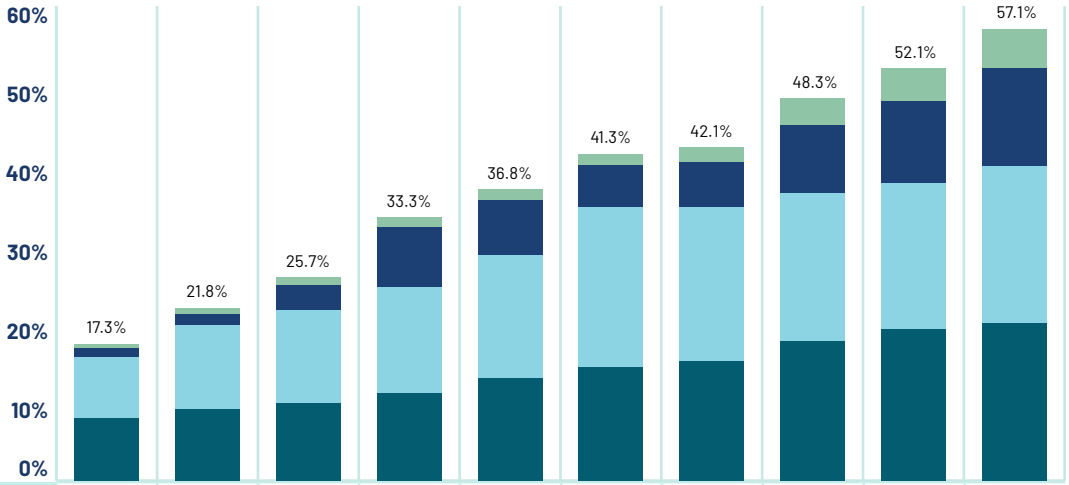
High-cost treatments continue to dominate the pharmaceutical landscape

The 20 top-selling medicines in 2021 had a

MEDIAN ANNUAL TREATMENT COST OF $42,616,

nearly 60x the median in 2012

FIGURE 10. Share of Sales for High-Cost Patented Medicines by Annual Treatment Cost, 2012 to 2021



Share of sales (%)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
$10K to $20K	7.9	9.1	9.8	11.0	12.9	14.4	15.1	17.6	19.2	19.9
$20K to $50K	7.7	10.5	11.7	13.4	15.6	20.2	19.4	18.7	18.4	19.8
$50K to $100K	1.1	1.4	3.2	7.7	6.9	5.2	5.8	8.6	10.4	12.4
$100K+	0.6	0.8	1.0	1.2	1.4	1.5	1.8	3.4	4.1	5.0
Total*	17.3	21.8	25.7	33.3	36.8	41.3	42.1	48.3	52.1	57.1
High-cost medicines	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Cost ($millions)	$2,882	$3,624	$4,284	$5,549	$6,141	$6,864	$6,996	$8,330	$9,124	$9,956
Total no. of medicines	92	105	116	129	143	150	162	172	189	201
$10K to $20K	37	39	40	42	44	47	49	52	57	60
$20K to $50K	40	45	50	58	68	69	73	71	74	74
$50K to $100K	6	11	15	17	18	20	24	29	35	38
$100K+	9	10	11	12	13	14	16	20	23	29
Avg. treatment cost ($thousands)	$38.1	$37.8	$41.4	$44.8	$43.5	$42.7	$45.8	$51.8	$53.9	$59.0
Estimated treatment population (thousands)	136.9	167.2	186.9	222.4	254.1	284.8	285.8	331.3	349.8	370.3
Share of total Cdn population	0.39%	0.48%	0.53%	0.62%	0.70%	0.77%	0.78%	0.88%	0.92%	0.97%

Note: The methodology for this analysis was revised in 2018, and as such, historical results may not match those reported in earlier editions.

* Values may not add to totals due to rounding.

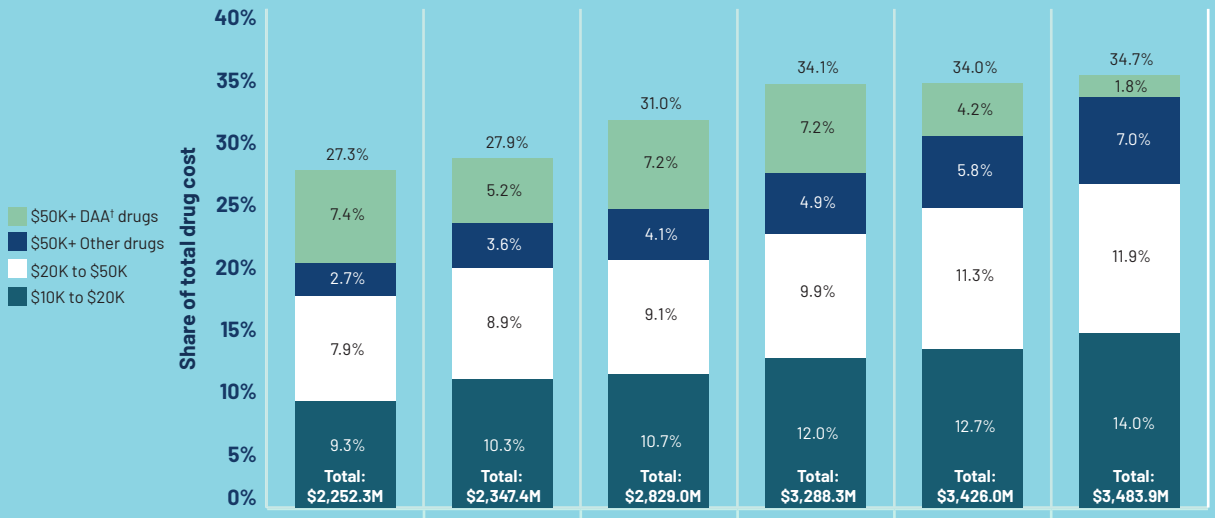
Data source: PMPRB; IQVIA Private Pay Direct Drug Plan database, 2012–2021

BRIEF INSIGHTS: HIGH-COST MEDICINES IN PUBLIC DRUG PLANS

High-cost medicines account for approximately 35% of all public drug plan expenditures. This is lower than the share for patented medicines reported in Figure 10 because public plan costs also include non-patented generic and non-patented single-source medicines.

Public plans reimbursed 135 high-cost medicines in fiscal year 2020-21, while private drug plans reimbursed 247 high-cost medicines in calendar 2021.

FIGURE 11. Trends in the Number and Share of High-Cost Medicines, NPDUIS Public Drug Plans*, 2015-16 to 2020-21



	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Total no. of medicines‡	95	103	107	121	130	135
Share of active beneficiaries	1.58%	1.73%	1.75%	1.72%	2.12%	2.51%
Share of prescriptions	0.28%	0.30%	0.34%	0.38%	0.40%	0.42%

Note: High-cost medicines are defined as having an annual treatment cost greater than $10,000. If medicines reach this threshold in any given year, they are included in the count for all other years. Thus, the number and composition of high-cost medicines in any given year may vary depending on the time of analysis.

The number of oncology medicines and other high-cost medicines covered by public plans may be underestimated, as some are reimbursed through specialized programs, such as cancer care, that are not captured in the data.

Values may not add to totals due to rounding.

* British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon, and the Non-Insured Health Benefits (NIHB) Program. Results for 2020-21 do not include the NIHB program.

† DAA: Direct-acting antivirals for the treatment for hepatitis C, which were launched in 2014 and 2015. See earlier cost driver analysis (Figure 7) for more information.

‡ The total number of high-cost medicines reimbursed by the NPDUIS public drug plans is calculated using prescription drug utilization data, which includes claims for all medicines funded by public plans, and does not necessarily reflect the number of medicines listed on the formularies for these plans.

Data source: NPDUIS database, Canadian Institute for Health Information (fiscal year data)

[NPDUIS Report: *CompassRx 2020/21* (pre-publication results)]

High-cost medicines continue to account for an increasing share of all patented medicine sales

Over the last decade, the number of medicines with

AVERAGE ANNUAL TREATMENT COSTS OF OVER $100,000

more than tripled from 9 to 29.

These medicines now account for 5.0% of all patented medicine sales.

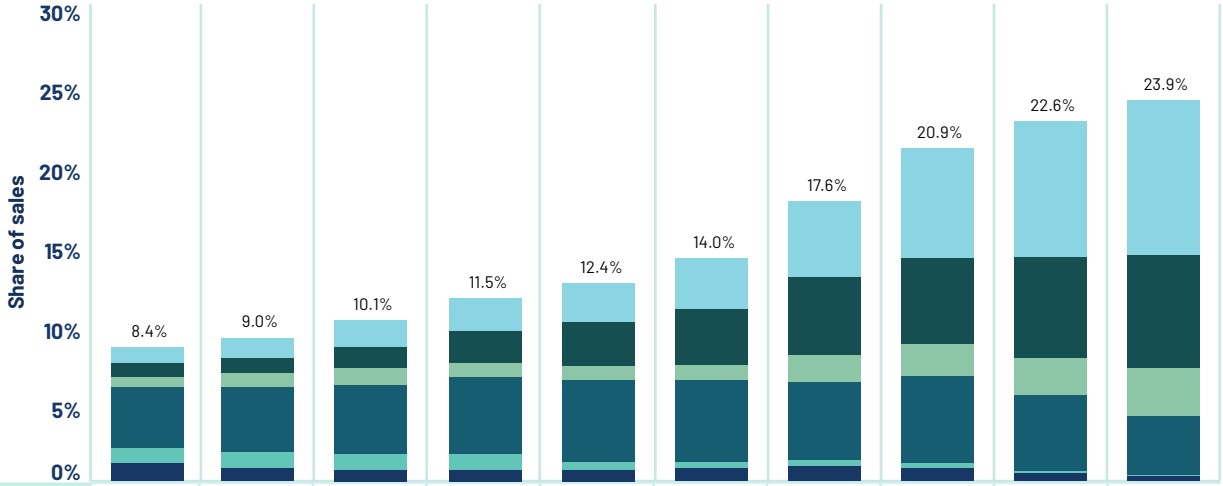
The shift toward higher-cost treatments is especially evident in oncology medicines. Figure 12 shows the share of total sales for patented oncology medicines by treatment cost based on a standard 28-day treatment regimen.[10]

The number of patented oncology medicines with 28-day treatment costs over $7,500 rose from 10 to 58 between 2012 and 2021, now accounting for 16.8% of total patented medicine sales.

As a result, the average treatment cost for oncology medicines in 2021 was $13,478, double the average cost in 2015 and close to four times that in 2006.

Many treatment regimens use multiple medicines resulting in even higher treatment costs per beneficiary. The dual pressures of increasing average treatment costs and growing utilization mean that this therapeutic area is likely to continue to grow as a proportion of patented medicine sales.

FIGURE 12. Share of Sales for Patented Oncology Medicines by 28-day Treatment Cost, 2012 to 2021



Share of sales (%)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other*	1.1	0.8	0.7	0.7	0.7	0.8	0.9	0.8	0.5	0.3
<$2.5K	1.0	1.0	1.0	1.0	0.5	0.4	0.4	0.3	0.1	0.1
$2.5K to $5.0K	3.8	4.1	4.3	4.8	5.1	5.1	4.9	5.5	4.8	3.7
$5.0K to $7.5K	0.6	0.9	1.1	0.9	0.9	1.0	1.7	2.0	2.3	3.0
$7.5K to $10.0K	0.9	0.9	1.3	2.0	2.8	3.5	4.9	5.4	6.4	7.1
$10.0K+	1.0	1.3	1.7	2.1	2.4	3.2	4.8	6.9	8.5	9.7
Total†	8.4	9.0	10.1	11.5	12.4	14.0	17.6	20.9	22.6	23.9
Oncology medicines	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Cost ($millions)	$1,379	$1,520	$1,678	$1,898	$2,050	$2,324	$2,939	$3,584	$3,947	$4,172
Total no. of medicines	56	60	69	72	77	80	91	94	105	113
Other*	9	9	11	10	10	10	10	9	16	7
<$2.5K	16	13	12	12	10	10	8	7	6	7
$2.5K to $5.0K	14	15	16	17	17	17	18	18	19	21
$5.0K to $7.5K	7	8	12	12	14	13	15	16	16	20
$7.5K to $10.0K	5	7	9	10	13	15	19	21	22	25
$10.0K+	5	8	9	11	13	15	21	23	26	33
Avg. 28-day treatment cost	$5,090	$5,564	$6,210	$6,656	$6,699	$7,039	$7,680	$9,320	$ 13,304	$13,478
Estimated treatment population (thousands)	578.7	589.0	607.6	600.1	464.9	468.6	512.5	567.1	562.8	561.6
Share of total Cdn population	1.67%	1.68%	1.71%	1.68%	1.28%	1.27%	1.37%	1.51%	1.48%	1.47%

Note: The methodology for this analysis was revised in 2018 and 2019, and as such, historical results may not match those reported in earlier editions. These results reflect the total sales for patented medicines used in the treatment of cancer. While some of these medicines may also be used to treat other conditions, the data used for this analysis does not distinguish between indications, and thus, the reported sales may reflect some non-cancer use.

* Treatment costs for these medicines are not available.

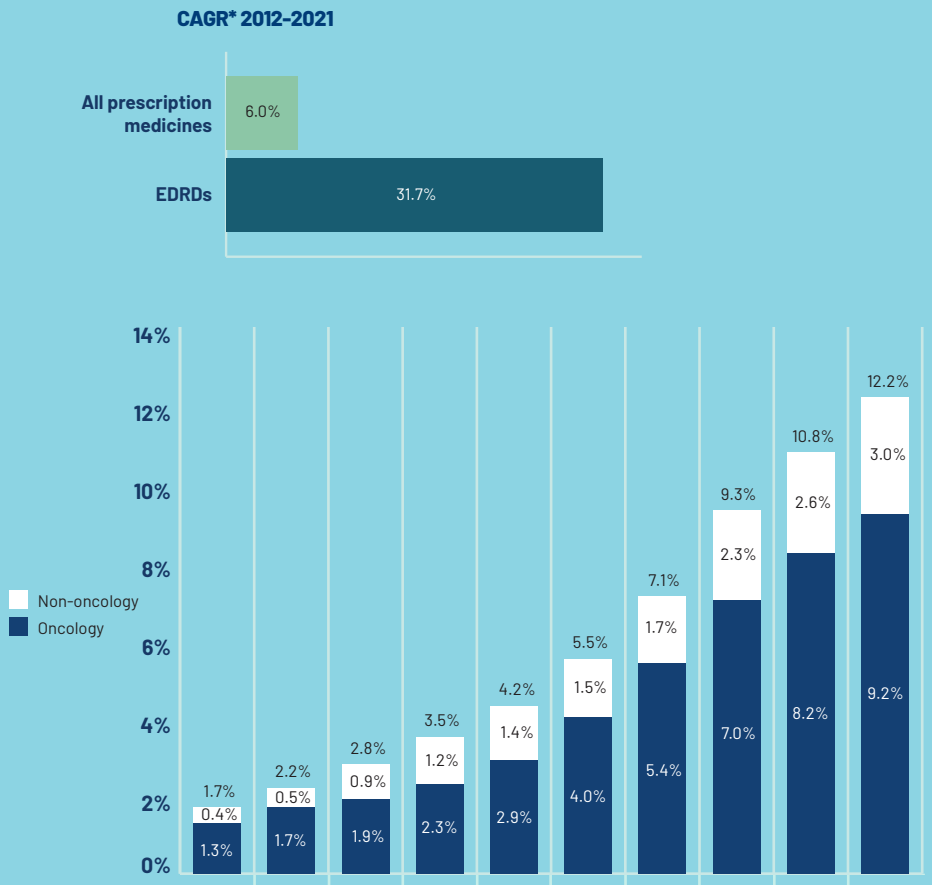
† Values may not add to totals due to rounding.

Data source: PMPRB; CADTH pCODR

BRIEF INSIGHTS: SPENDING ON EXPENSIVE DRUGS FOR RARE DISEASES

Expensive drugs for rare diseases (EDRDs) represent an increasing share of the Canadian pharmaceutical market, due to sales growth of existing medicines as well as the rapid pace of new launches, with at least 10 new EDRDs gaining approval each year since 2015. Growth in EDRD sales has vastly outpaced the total pharmaceutical market, rising from 1.7% of expenditures in 2012 to 12.2% in 2021. Three quarters of EDRD spending in 2021 was for oncology medicines.

FIGURE 13. EDRD Share of the Pharmaceutical Market in Canada, Oncology and Non-Oncology, 2012 to 2021



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cumulative no. of EDRDs approved	26	31	37	48	63	73	84	98	114	125
Sales per capita	$10	$12	$16	$22	$27	$37	$50	$70	$87	$104

Top-selling patented expensive drugs for rare diseases

Trade name (medicinal ingredient)	Sales ($millions) 2021
Revlimid (lenalidomide)	$537.7
Keytruda (pembrolizumab)	$525.7
Imbruvica (ibrutinib)	$349.5
Darzalex (daratumumab)	$254.3
Opdivo (nivolumab)	$249.6
Soliris (eculizumab)	$180.1
Tagrisso (osimertinib)	$178.4
Spinraza (nusinersen sodium)	$97.2
Imfinzi (durvalumab)	$92.1
Yervoy (ipilimumab)	$75.2

Note: The data for this analysis was updated and, as such, historical results may not match those reported in previous editions. The count of EDRDs for 2016–2020 has also been revised to include medicines newly classified as EDRDs.

For this analysis, EDRDs are defined as medicines with at least one orphan designation (by the US Food and Drug Administration or the European Medicines Agency) and estimated treatment costs exceeding $100,000 per year for non-oncology drugs or $7,500 per 28 days for oncology drugs.

* Compound annual growth rate (CAGR) of expenditures over the study period

Data source: PMPRB; MIDAS® database, 2012–2021, IQVIA (all rights reserved)

[NPDUIS Chartbook: *Expensive Drugs for Rare Diseases: Canadian Trends and International Comparisons, 2011–2020* – content updated for 2021]

TOP THERAPEUTIC CLASSES DRIVING SALES REVENUES

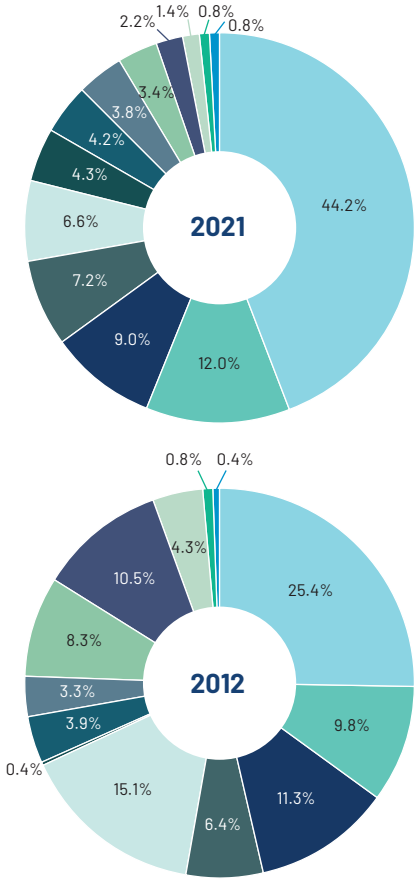
"Antineoplastics and immunomodulating agents", "alimentary tract and metabolism", and "general antiinfectives for systemic use and antiparasitic products" were the three top-selling therapeutic classes in 2021, accounting for close to two thirds of all patented medicine sales. The "antineoplastics and immunomodulating agents" class experienced a 7.3% increase in sales between 2020 and 2021 while "respiratory system products" had the greatest year-over-year decrease at -45.3%.

Figure 14 breaks down the sales of patented medicines in Canada by therapeutic class using level 1 of the World Health Organization's (WHO) Anatomical Therapeutic Chemical (ATC) system.[11] It compares the distribution of sales by therapeutic class in 2012 and 2021 and provides the rates of growth in sales for each class from 2020 to 2021.

The "antineoplastics and immunomodulating agents" class accounted for a much larger share of sales in 2021 (44.2%) than in 2012 (25.4%), as more oncology medicines entered the market over the past decade, many of which were high-cost. By contrast, the share of sales held by "cardiovascular system" medicines decreased dramatically from 10.5% to 2.2% over the same period, continuing the trend observed in previous years.

FIGURE 14. Sales of Patented Medicines by Major Therapeutic Class, 2021

Share of Sales, 2021 versus 2012



Therapeutic class	2021 sales ($millions)	Growth*: 2021/2020, $millions (rate in %)	2021 share of sales (%)
L: Antineoplastics and immunomodulating agents	$7,710.6	$524.8 (7.3%)	44.2%
A: Alimentary tract and metabolism	$2,101.3	-$376.9 (-15.2%)	12.0%
J: General antiinfectives for systemic use and P: Antiparasitic products†	$1,565.2	-$101.5 (-6.1%)	9.0%
B: Blood and blood forming organs	$1,264.3	$87.1 (7.4%)	7.2%
N: Nervous system	$1,156.8	$46.9 (-4.2%)	6.6%
V: Various	$753.1	$271.5 (56.4%)	4.3%
S: Sensory organs	$738.1	-$33.8 (-4.4%)	4.2%
M: Musculo-skeletal system	$664.6	$61.3 (10.2%)	3.8%
R: Respiratory system	$590.1	-$489.4 (-45.3%)	3.4%
C: Cardiovascular system	$384.4	-$168.0 (-30.4%)	2.2%
G: Genito-urinary system and sex hormones	$246.1	-$99.9 (-28.9%)	1.4%
D: Dermatologicals	$136.2	-$7.1 (-4.9%)	0.8%
H: Systemic hormonal preparations	$134.5	-$12.1 (-8.3%)	0.8%
All therapeutic classes‡	**$17,445.5**	**-$297.0**	**100%**

* Medicines that stop reporting their sales to the PMPRB can factor into growth rates for the relevant therapeutic areas. Please refer to Figures 5 and 6 for a discussion on medicines that exited the patented market in 2021.

† These groups have been combined for reasons of confidentiality.

‡ Values may not add to totals due to rounding.

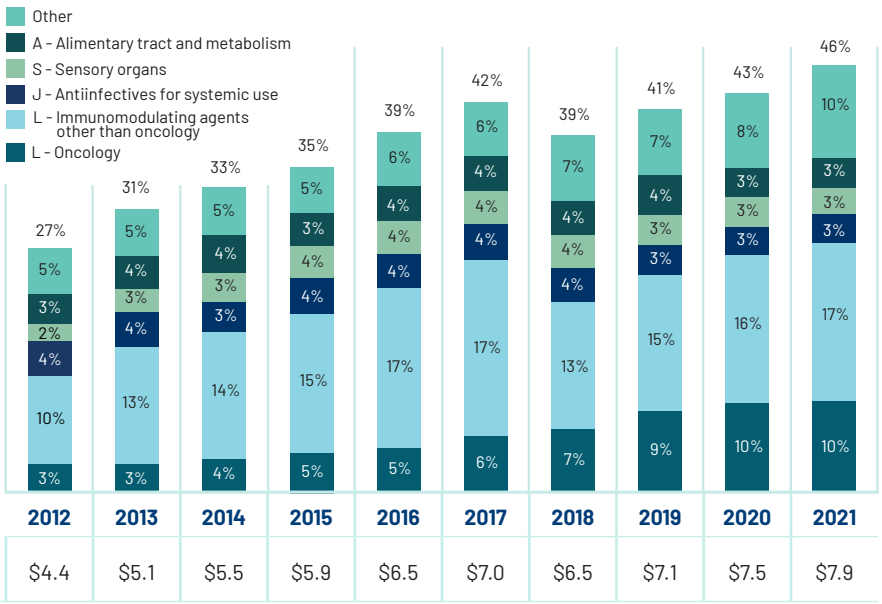
Data source: PMPRB

BIOLOGIC MEDICINES

Biologic medicines, many of which are in the high-cost category, capture a substantial share of the Canadian market. These medicines accounted for 46% of patented medicine sales in 2021, with the top three biologics alone representing more than 10% of sales. Figure 15 breaks down the annual share of sales for biologic patented medicines by major therapeutic class and lists the 10 top-selling biologics for 2021.

Although the share of biologic medicine sales has increased in many therapeutic classes, "immunomodulating agents other than oncology" had the highest uptake over the study period, rising from 10% of total patented medicine sales in 2012 to 17% in 2021. Oncology medicines also represent a steadily growing share of the biologics market, increasing from 3% of patented medicine sales in 2012 to 10% in 2021.

FIGURE 15. Biologic Medicine Share of Patented Medicine Sales by Therapeutic Class*, 2012 to 2021



Top-selling biologic medicines	Share of 2021 sales
Humira	5.1%
Eylea	3.9%
Keytruda	3.0%
Stelara	2.4%
Opdivo	1.4%
Entyvio	1.4%
Darzalex	1.4%
Simponi	1.1%
Soliris	1.0%
Ocrevus	1.0%
Total top 10	**21.7%**

Note: Values may not add to totals due to rounding.

* Level 1 of Anatomical Therapeutic Chemical (ATC) classification system maintained by the World Health Organization.

Data source: PMPRB

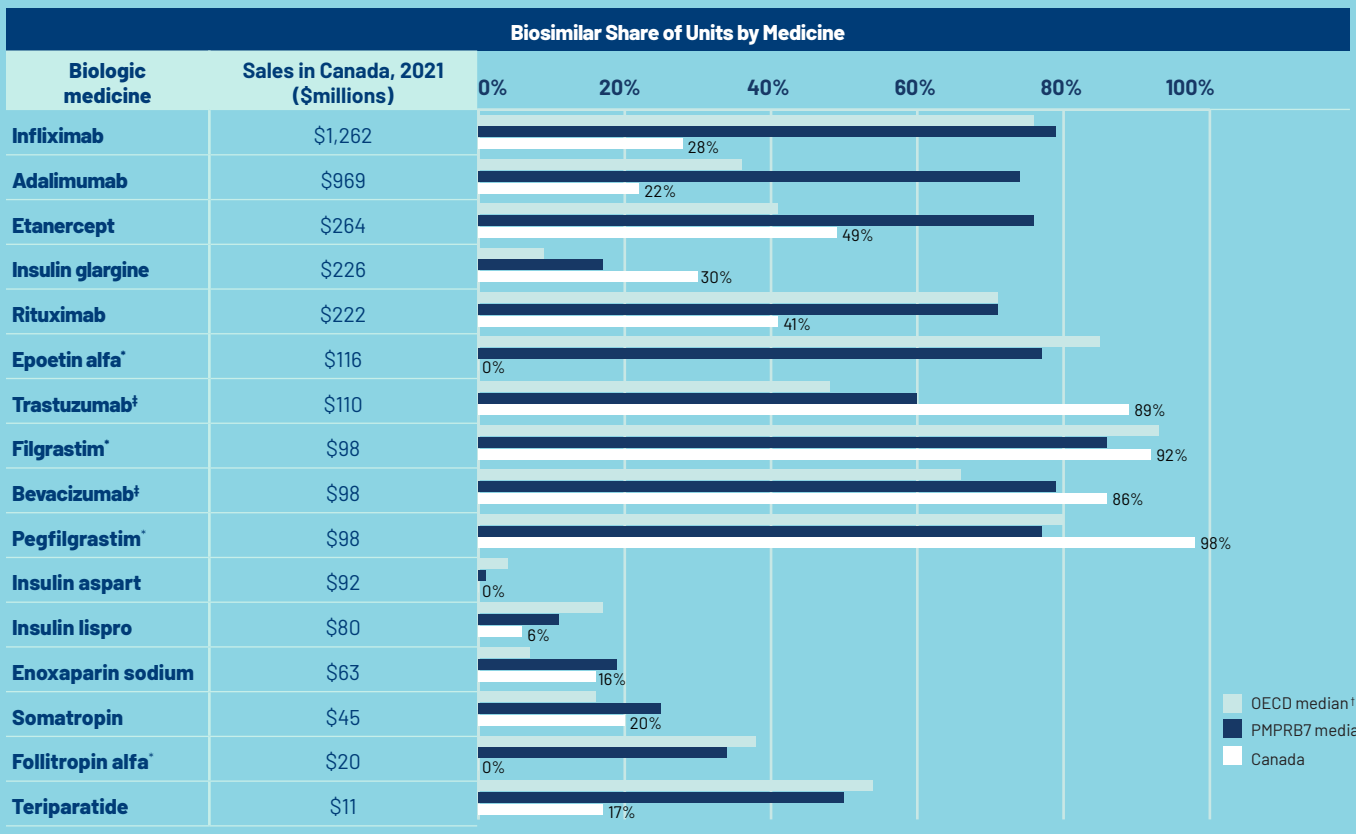
BRIEF INSIGHTS: BIOSIMILAR UPTAKE

Given the high use and cost of biologics in Canada, biosimilars offer an opportunity for significant cost savings. However, biosimilar substitution has more complexities than traditional generics as they are not considered identical to their originator medicines, but rather highly similar versions, and Health Canada's authorization of a biosimilar is not a declaration of equivalence to the originator biologic.

Recently, several Canadian payers have undertaken initiatives to encourage switching from biologics to biosimilars with an aim of increasing biosimilar uptake. Results for the biosimilars targeted by these initiatives in 2021 show positive signs in terms of increased utilization. In British Columbia, the first Canadian province to implement a biosimilar switching initiative, biosimilars now account for 94% of the infliximab market, contributing to the increase in uptake observed nationally in recent years. Biosimilars accounted for 28% of the total Canadian infliximab market in Q4-2021, compared to only 8% in Q4-2018, while shares in the etanercept and insulin glargine markets have increased to 49% and 30%, respectively (Figure 16). The recent market entry of biosimilars for adalimumab and rituximab have achieved sizable uptake for these two markets, reaching 22% and 41% of units sold by the last quarter of 2021, respectively.

While these results demonstrate growing use of biosimilars, Canada continues to lag behind international markets. Canada's 28% biosimilar share of infliximab in 2021 was lower than all but one OECD country and well below the OECD median of 76% (Figure 17).

FIGURE 16. Biosimilar Share of Units by Medicine, Canada, the OECD, and the PMPRB7, Q4-2021



* Generally used to treat acute conditions.

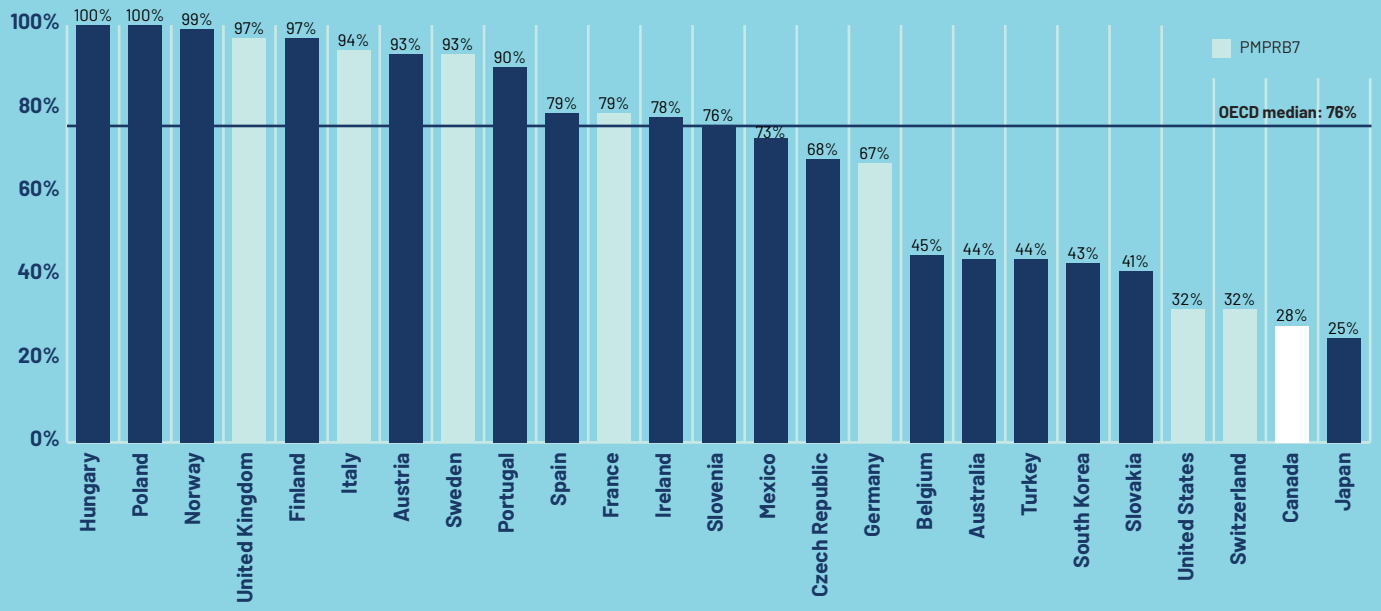
† Canada is excluded from the median OECD value.

‡ Mainly used for treatment of oncology indications and administrated in hospitals in Canada.

Data source: MIDAS® database, prescription retail and hospital markets, 2021, IQVIA (all rights reserved)

[NPDUIS Chartbook: *Biologics in Canada, Part 1: Market Trends, 2018* – graph updated for 2021]

FIGURE 17. Uptake of Infliximab Biosimilars by Share of Units, OECD, Q4-2021



Note: Countries with limited data were excluded from the analysis.

Data source: MIDAS® database, prescription retail and hospital markets, Q4-2021, IQVIA (all rights reserved)

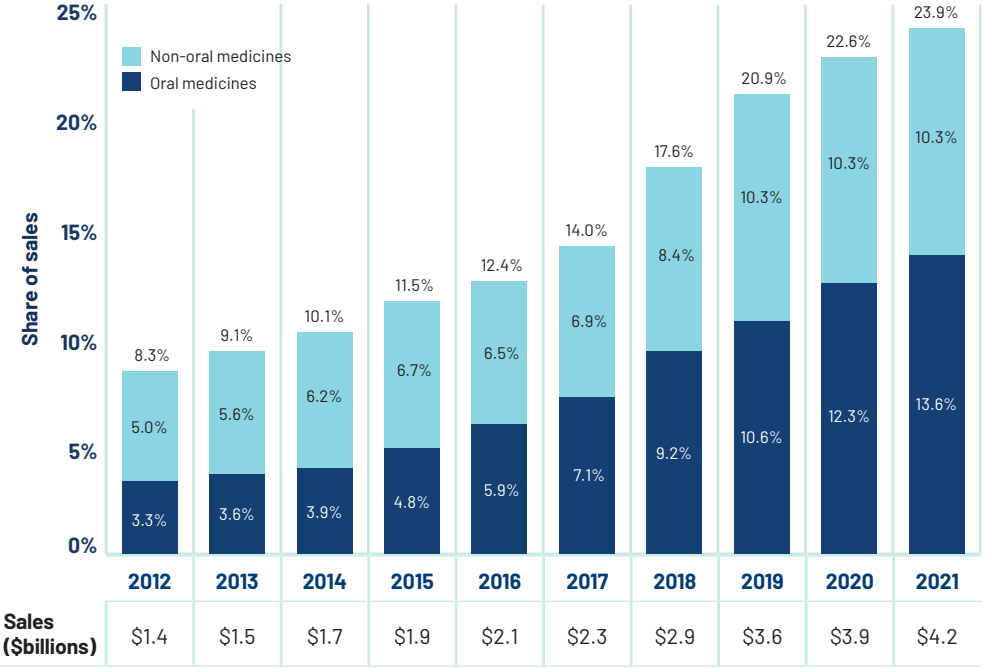
[NPDUIS Chartbook: *Biologics in Canada. Part 1: Market Trends, 2018* – graph updated for 2021]

ONCOLOGY MEDICINES

Figure 18 illustrates the growth in the sales of patented oncology medicines since 2012. In 2021, oncology medicines accounted for 23.9% of total patented medicine sales, close to triple the 2012 share of 8.3%. The shift toward high-cost treatments in the oncology market has contributed to the steeper rate of sales growth observed since 2016.

Oral forms of cancer treatment are a noteworthy emerging segment, representing more than half of all oncology medicine sales and 13.6% of the patented medicine market in 2021, compared to just 3.3% in 2012. The oral therapy Revlimid was the top-selling oncology medicine in 2021, accounting for 3.1% of all patented medicine sales.[12]

FIGURE 18. Oncology Medicine Share of Patented Medicine Sales by Formulation, 2012 to 2021



Top-selling oncology medicines	Share of 2021 sales
Revlimid	3.1%
Keytruda	3.0%
Imbruvica	2.0%
Ibrance	1.5%
Opdivo	1.4%
Darzalex	1.4%
Tagrisso	1.0%
Perjeta-Herceptin	0.8%
Xtandi	0.7%
Jakavi	0.6%
Total top 10	**15.5%**

Note: These results reflect the total sales for patented medicines used in the treatment of cancer. While some of these medicines may also be used to treat other conditions, the data used for this analysis does not distinguish between indications, and thus, the reported sales may reflect some non-oncology use.

Values may not add to totals due to rounding.

Data source: PMPRB

ENDNOTES

[6] Sales and price information do not take into account indirect discounts provided to third party payers, such as product listing agreements.

[7] All statistical results for patented medicines reported in this section are based on data submitted by patentees as of March 2022. On occasion, patentees may revise previously submitted data or provide data not previously submitted. This can appreciably affect the statistics in this section. To account for this possibility, the PMPRB reports recalculated sales figures (see "Trends in the Sales of Patented Medicines"), price and quantity indices (see "Price Trends and Utilization of Patented Medicines"), and foreign-to-Canadian price ratios (see "Comparison of Canadian Prices to Foreign Prices") for the five years preceding the current Annual Report year. All recalculated values reflect currently available data. If the data has been revised, the values reported here may differ from those presented in earlier Annual Reports.

[8] The cost driver analysis used here follows the approach detailed in the PMPRB report *The Drivers of Prescription Drug Expenditures: A Methodological Report, 2013*. As this model uses various measures to isolate the factors contributing to growth, the net change reported here may differ slightly from the reported overall growth in the patented medicines market.

[9] The annual treatment cost was calculated based on the average annual cost per active beneficiary in selected private drug plans. Given the limitations of administrative data, this approximated treatment cost may be underestimated.

[10] There is some overlap in the medicines reported in Figures 10 and 12, as the oncology medicines that exceeded $10,000 in annual treatment costs are considered in both graphs.

[11] In this report, medicines are classified according to the World Health Organization's (WHO) Anatomical Therapeutic Chemical (ATC) classification system. This is a scientific, hierarchical system based on the principal therapeutic use and chemical composition of a medicine. The first level classifies medicines according to the element of human anatomy with which they are primarily associated.

[12] The results reported for the high-cost, biologic, and oncology market segments are not mutually exclusive, as many oncology medicines are biologics and many biologics are high-cost medicines.

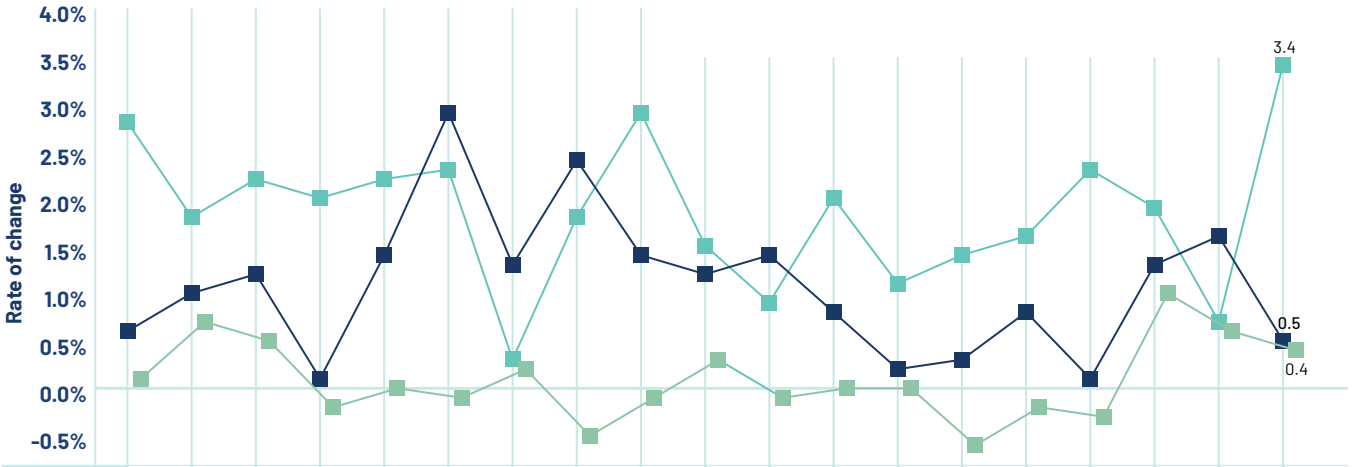
PRICE TRENDS

The PMPRB uses the Patented Medicines Price Index (PMPI) to monitor trends in the prices of patented medicines. The PMPI measures the average year-over-year change in the ex-factory prices of patented medicines sold in Canada using a sales-weighted average of price changes at the level of individual medicines.[13] This is similar to the approach Statistics Canada uses to construct the Consumer Price Index (CPI). The PMPI is based on an average transaction price and sales information submitted by patentees for a six-month period.

The PMPI only measures the sales growth attributable to changes in the prices of patented medicines. It does not measure changes in the use of patented medicines; this is measured by the quantity index or PMQI (see "Utilization of Patented Medicines"). Nor does it measure the cost impact of changes in prescribing patterns or the introduction of new medicines.

The *Patent Act* requires the PMPRB to consider changes in the CPI, among other factors, in determining whether the price of a patented medicine is excessive. Figure 19 compares year-over-year changes in the PMPI to corresponding changes in the CPI from 2003 to 2021. The PMPI is reported based on two measures: the national average transaction price, which is a net price; and the national list price, which is a gross price.[14] Both measures are reported to the PMPRB by patentees. General price inflation, as measured by the CPI, has exceeded the average increase in the prices of patented medicines almost every year since 2003. In 2021, the CPI rose by 3.4%, while the national average transaction price and the national list price PMPIs increased by 0.4% and 0.5%, respectively.

FIGURE 19. Annual Rate of Change, Patented Medicines Price Index (PMPI) and Consumer Price Index (CPI), 2003 to 2021



Rate of change (%)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CPI	2.8	1.8	2.2	2.0	2.2	2.3	0.3	1.8	2.9	1.5	0.9	2.0	1.1	1.4	1.6	2.3	1.9	0.7	3.4
PMPI change – National Average Transaction Price	0.1	0.7	0.5	-0.2	0.0	-0.1	0.2	-0.5	-0.1	0.3	-0.1	0.0	0.0	-0.6	-0.2	-0.3	1.0	0.6	0.4
PMPI change – National List Price	0.6	1.0	1.2	0.1	1.4	2.9	1.3	2.4	1.4	1.2	1.4	0.8	0.2	0.3	0.8	0.1	1.3	1.6	0.5

Note: To account for revised submissions from patentees, price and quantity indices are recalculated for the five years preceding the current Annual Report year. If the data has been revised, the values reported here may differ from those presented in earlier Annual Reports.

Data source: PMPRB; Statistics Canada

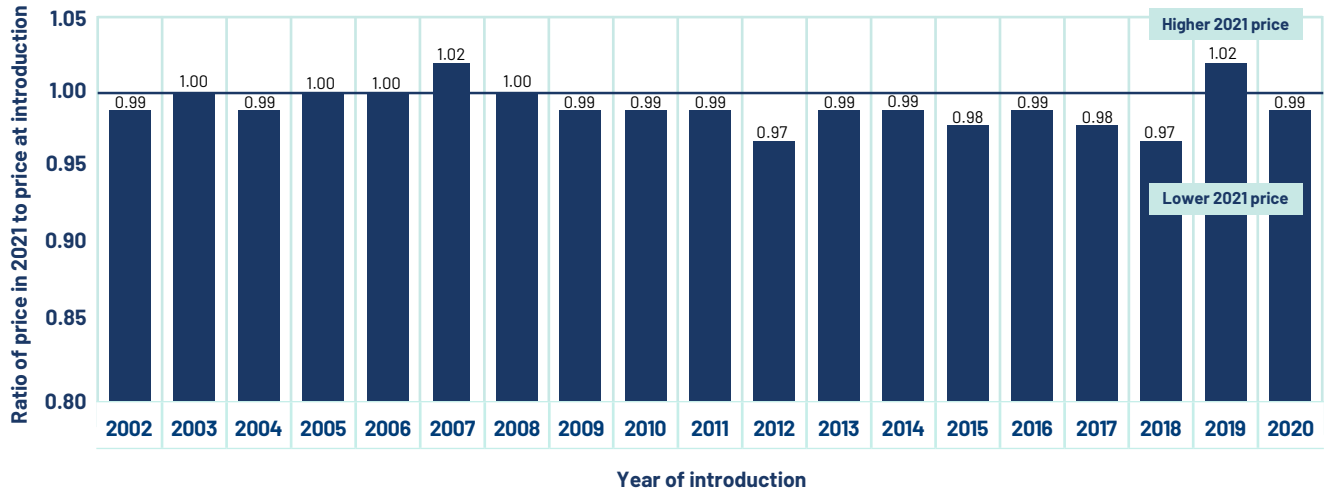
The PMPRB's Guidelines envisage that the price of a patented medicine should not rise by more than the CPI over any three-year period.[15] The Guidelines also contemplate a cap on year-over-year price increases equal to one and one-half times the current year rate of CPI inflation. This effectively establishes CPI inflation as an upper bound on the amount by which individual prices could rise over any three-year period. Increases in the PMPI normally do not reach this upper bound because many patentees do not raise their prices by the full amount envisaged under the Guidelines.

PRICE BEHAVIOUR AFTER INTRODUCTION

Does the price of a typical patented medicine change much in the years after it enters the Canadian market? To answer this question, Figure 20 provides the average ratio of the 2021 price to introductory price (the price at which the medicine was sold in its first year on the Canadian market).

The results in Figure 20 suggest that over the last two decades, prices of patented medicines have remained relatively stable, with 2021 prices being within 3% of the introductory price.[16] For example, the average prices of medicines introduced in 2002 are still at approximately the same level in 2021.

FIGURE 20. Average Ratio of 2021 Price to Introductory Price, by Year of Introduction



Data source: PMPRB

PRICE CHANGE BY COUNTRY

In 2021, in accordance with the Act and the Regulations, patentees reported publicly available prices of patented medicines for seven comparator countries (PMPRB7): France, Germany, Italy, Sweden, Switzerland, the United Kingdom (UK), and the United States (US).

The PMPRB uses this information to

- conduct international price comparison tests; and
- compare the Canadian prices of patented medicines to those prevailing in other countries.

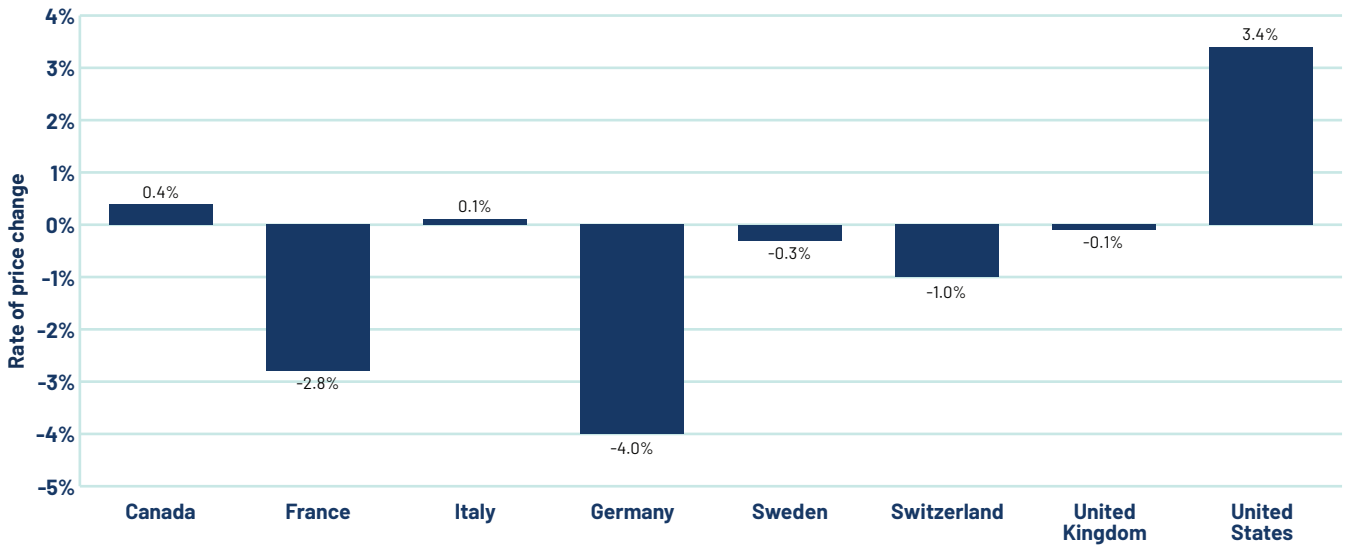
Figure 21 gives the average annual rates of price change for Canada and each of the PMPRB7 countries. These results were obtained by applying the PMPI methodology (with weights based on Canadian sales patterns) to the international price data that patentees submitted to the PMPRB. Note that prices from the US Federal Supply Schedule (FSS)[17] are incorporated into the US results.

In 2021, Canadian prices saw a slight increase of 0.4%, while prices in the US rose by an average of 3.4% and those in Italy, Sweden, and the UK remained relatively steady. Prices in the remaining countries declined.

These results are consistent with a long-term tendency for patented medicine prices to slowly fall over time in most comparator countries, with the exception of the US.

The foreign market results are based on publicly available gross prices, namely ex-factory price information (generally for the retail customer class) submitted by patentees to the PMPRB. The Canadian rate of change, however, is based on net prices, namely actual average transaction prices net of rebates and discounts provided by manufacturers to their direct customers.

FIGURE 21. Annual Average Rates of Price Change, Canada and the PMPRB7, 2021



Data source: PMPRB

ENDNOTES

[13] These calculations are performed at the level defined by Health Canada's Drug Identification Number (DIN). Each DIN represents a unique combination of active ingredient(s), dosage form, strength(s), brand, and manufacturer.

[14] The national average transaction price is the Canadian "average price per package" or "net revenue from sales of each dosage form" referred to in s. 4(1)(f)(i) and 4(4) of the *Patented Medicines Regulations*; it does not include indirect rebates and discounts offered by patentees such as certain rebates to provinces or insurers. The national list price is the gross Canadian "publicly available ex-factory price" referred to in s. 4(1)(f)(ii) of the *Patented Medicines Regulations*.

[15] Individual prices (or, for that matter, the PMPI) may rise by more than the CPI in a given year if patentees have banked price adjustments in the preceding years. This can also occur when the lagged rate of CPI inflation exceeds the actual rate.

[16] This refers to the behaviour of prices on average. There may be instances where individual prices have risen or fallen substantially since introduction.

[17] Effective January 2000, and following public consultation, the PMPRB began including prices listed in the US Federal Supply Schedule (FSS) in calculating the average US price of patented medicines. This change was made in response to concerns expressed by pharmaceutical industry representatives that publicly available prices in the US do not reflect actual prices because of confidential discounts and rebates. FSS prices are negotiated between manufacturers and the US Department of Veterans' Affairs and are typically lower than other publicly available US prices reported to the PMPRB by patentees.

COMPARISON OF CANADIAN PRICES TO FOREIGN PRICES

Tables 9 and 10 provide detailed statistics comparing the foreign prices of patented medicines to their Canadian prices. Each table provides two sets of average price ratios. These are differentiated according to the method by which foreign prices were converted to their Canadian dollar equivalents. The tables also give the numbers of strengths and dosage forms of medicines (DINs) and the volume of sales encompassed by each reported price ratio.[18]

The average price ratios given in Tables 9 and 10 are sales-weighted arithmetic means of price ratios obtained for individual DINs, with weights based on Canadian sales patterns. Average price ratios constructed in this way provide answers to questions such as:

How much more/less would Canadians have paid for the patented medicines they purchased in 2021 had they paid Country X prices rather than Canadian prices?

For example, Table 9 states that the 2021 average France-to-Canada price ratio for medicines available in both countries was 0.74. This means Canadians would have paid 26% less for the patented medicines they purchased in 2021 if they had paid French prices.

For many years, the PMPRB has reported average foreign-to-Canadian price ratios with foreign prices converted to their Canadian dollar equivalents by means of market exchange rates (more exactly, the 36-month moving averages of market rates the PMPRB normally uses in applying its Guidelines). Tables 9 and 10 also report foreign-to-Canadian price ratios with currency conversion at purchasing power parity (PPP). The PPP between any two countries measures their relative costs of living expressed in units of their own currencies. In practice, cost of living is determined by pricing out a standard basket of goods and services at the prices prevailing in each country.

Because PPPs are designed to represent relative costs of living, they offer a simple way to account for differences in overall national price levels when comparing individual prices, incomes, and other monetary values across countries. When applied to the calculation of average foreign-to-Canadian price ratios, they produce statistics answering questions such as:

How much more/less consumption of other goods and services would Canadians have sacrificed for the patented medicines they purchased in 2021 had they lived in Country X?

Questions such as this cannot be answered by simply comparing the prices of medicines. Rather, one must first calculate what each price represents in terms of goods and services foregone. PPPs are designed for such purposes.

BILATERAL PRICE COMPARISONS

Table 9 provides bilateral comparisons of list prices in each of the PMPRB7 countries to average transaction prices in Canada. Focusing on the results with currency conversion at market exchange rates, it appears that, as in previous years, Canadian prices were typically within the range of prices observed in comparator countries. Prices reported for France, Sweden, and Italy were lower than Canadian prices, while prices in Germany and the UK were on par with Canada. Two countries, Switzerland and the US, continued to report prices that were higher than Canada. Prices reported for the US remain much higher than prices in Canada or any other comparator country. Year-to-year changes in these ratios may be influenced by variations in international exchange rates.

It is important to note that it is not always possible to find a matching foreign price for every strength and dosage form of a patented medicine sold in Canada. Table 9 indicates how often an international price comparison was available for each of the comparator countries. For example, of the 1,141 DINs that reported a patent to the PMPRB in 2021, 47% had a publicly available ex-factory price for France while 79% had a price for the US. Given the integrated nature of the Canadian and US supply chain, it is not uncommon for the US to be the only comparator country with an available price for a strength and dosage form of a medicine sold in Canada. In this case, it is considered to constitute the international median price, as per the PMPRB's methodology.

When international differences in the cost of living are considered (using PPP), the average price ratios indicate that Canadians incurred a larger consumption cost for the patented medicines they purchased in 2021 than residents of France, Sweden, and Switzerland.

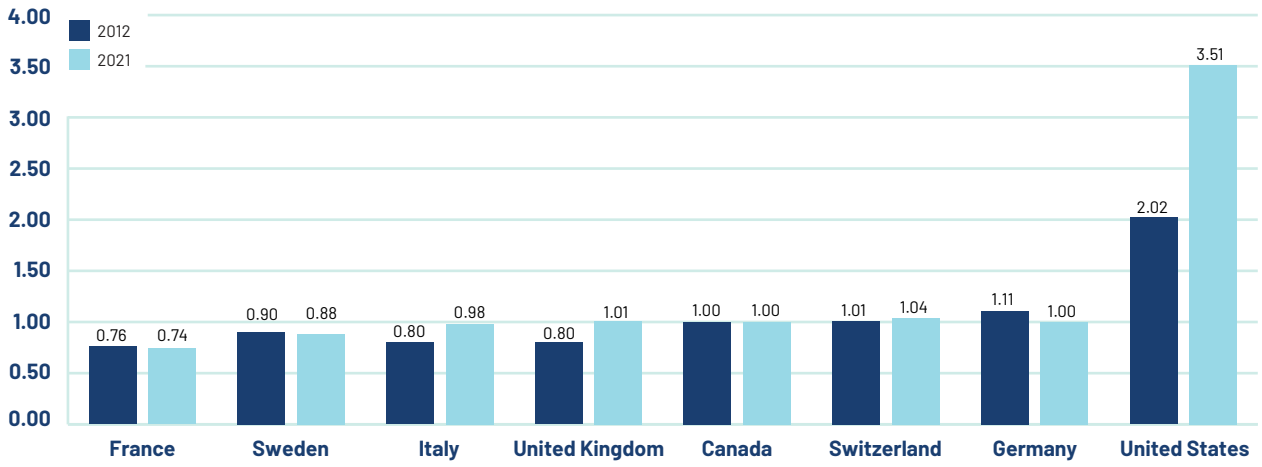
TABLE 9. Average Foreign-to-Canadian Price Ratios, Bilateral Comparisons, Canada and the PMPRB7, 2021

	Canada	France	Germany	Italy	Sweden	Switzerland	United Kingdom	United States
At market exchange rates								
Average price ratio 2021	1.00	0.74	1.00	0.98	0.88	1.04	1.00	3.51
Average price ratio 2020	1.00	0.77	1.09	1.00	0.87	1.08	0.98	3.82
At purchasing power parities								
Average price ratio 2021	1.00	0.90	1.19	1.33	0.90	0.87	1.14	3.61
Average price ratio 2020	1.00	0.80	1.14	1.17	0.78	0.79	0.96	3.53
Number of patented medicines compared 2021 (DINs)	1,141	531	858	691	674	716	821	896
Sales ($millions)	$17,445.5	$11,543.9	$15,285.1	$14,356.4	$12,293.7	$14,748.0	$15,250.0	$16,363.14

Data source: PMPRB

Figure 22 compares the 2021 foreign-to-Canadian price ratios (at market exchange rates) to those a decade earlier, in 2012. The ratios for France and Sweden remained relatively unchanged between 2012 and 2021 with prices consistently below Canada, while Switzerland hovered just above Canadian prices in both years. Whereas prices in Italy and the UK were similar to those in France in 2012, their ratios are now at parity with Canada. The German ratio is also on par with Canada, having dropped from 1.11 in 2012. The most significant change is observed for prices in the US, where the gap with Canadian prices has widened from 2.02 in 2012 to 3.51 in 2021.

FIGURE 22. Average Foreign-to-Canadian Price Ratios, Canada and the PMPRB7, 2012 and 2021

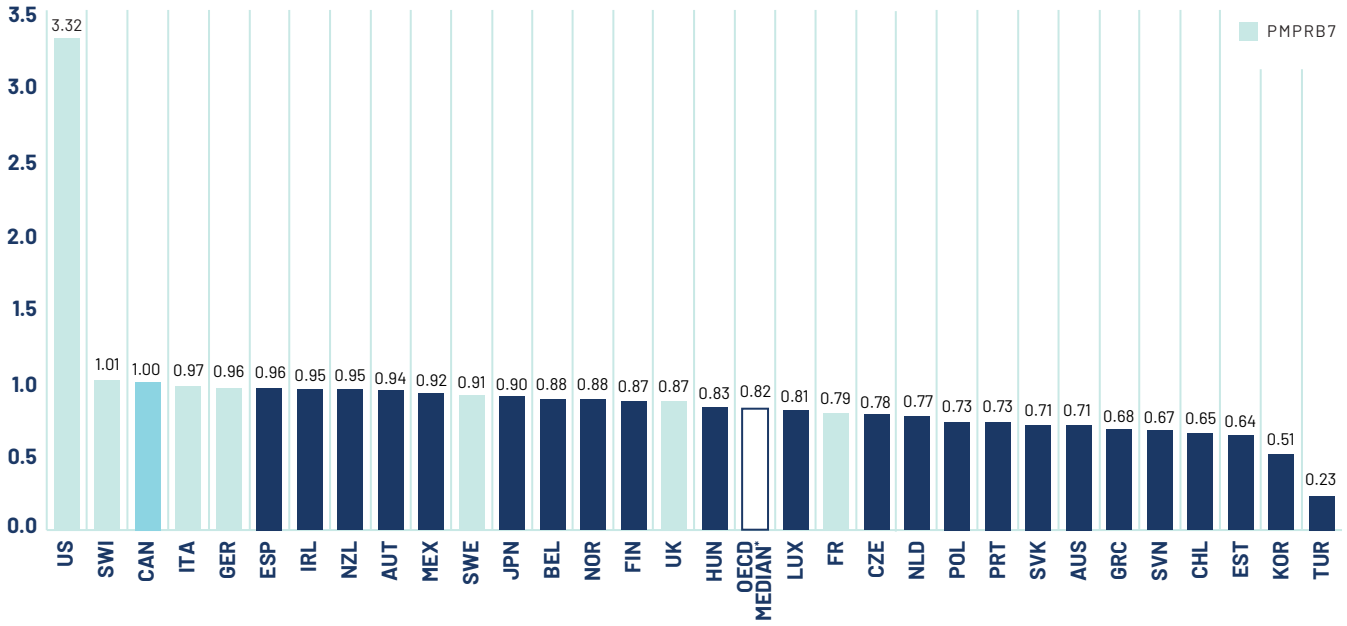


Data source: PMPRB

If a patented medicine is being sold in one or more of the PMPRB7 countries, the patentee must report the publicly available ex-factory prices to the PMPRB for each class of customer.[19] Using this data, Figure 22 provides sales-weighted bilateral ratios comparing Canadian average transaction prices against foreign list prices. In order to assess how Canada compares to a basket of countries beyond the PMPRB7, Figure 23 uses Canadian and international prices reported in the IQVIA MIDAS® database at the ex-factory manufacturer level, reflecting all sales to the pharmacy and hospital sectors.[20] Note that the results presented in Figures 22 and 23 will differ somewhat due to the use of different data sources.

The international price comparisons reported in Figure 23 provide a bilateral price comparison for all countries in the Organisation for Economic Co-operation and Development (OECD) with available MIDAS® data. The average foreign-to-Canadian price ratios are calculated using the same approach employed to produce the ratios presented in Figure 22. These are Canadian sales-weighted arithmetic averages of the corresponding foreign-to-Canadian price ratios for individual medicines. As shown in Figure 23, median OECD prices are, on average, approximately 18% lower than price levels in Canada, which are the third highest among the 31 countries. Notably, the top two highest-priced countries are the US and Switzerland.

FIGURE 23. Average Foreign-to-Canadian Price Ratios, Patented Medicines, OECD, 2021



* Calculated at the medicine level for medicines with prices available in at least three foreign markets.

Data source: PMPRB; MIDAS® database, 2021, IQVIA (all rights reserved)

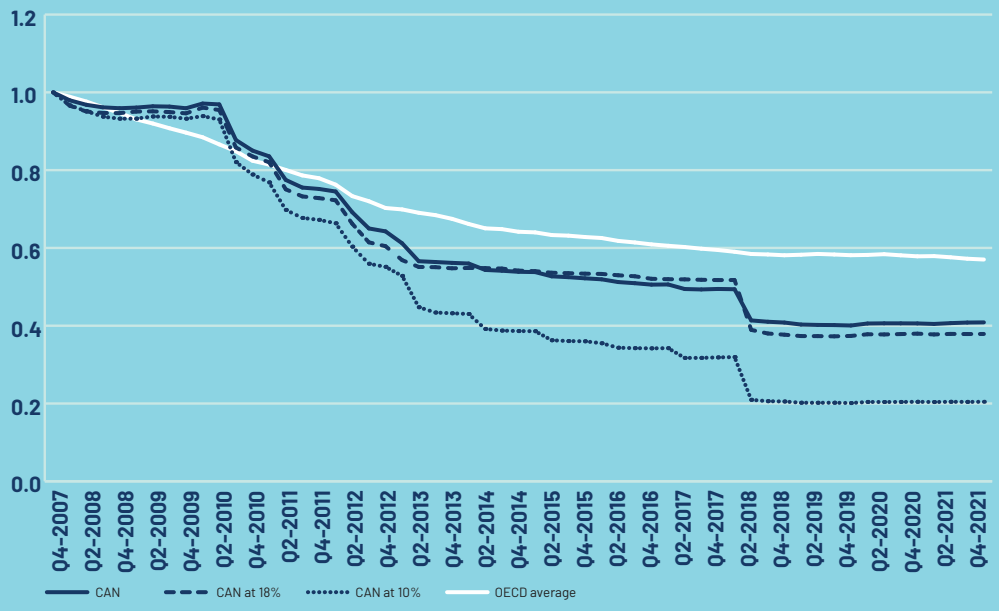
BRIEF INSIGHTS: TRENDS IN THE PRICE OF GENERIC MEDICINES

The average price of generic medicines in Canada has dropped substantially, by 59% relative to price levels in 2007 (Figure 24). This was the second highest rate of price reduction compared to the PMPRB7 markets, following the US, as generic price decreases continued to reduce the historic gap between Canadian and foreign generic price levels.

The most recent Canadian generic pricing policy, implemented in 2018, had brought Canadian generic prices in line with average prices in the PMPRB7.

However, since 2018, the gap between Canadian and PMPRB7 countries has widened, largely due to decreases in foreign prices and fluctuating exchange rates. While Canadian prices were half the level of those in Switzerland in 2021, they were above those in the remaining PMPRB7 countries (Figure 25). Prices were marginally higher than Italy, about 20% above France, Germany, the US, and the UK, and twice those of Sweden. Median prices for these medicines across all OECD countries were 25% lower than prices in Canada in the last quarter of 2021.

FIGURE 24. Price Indices and Generic Price Reductions, Canada and the PMPRB7, Q4-2007 to Q4-2021



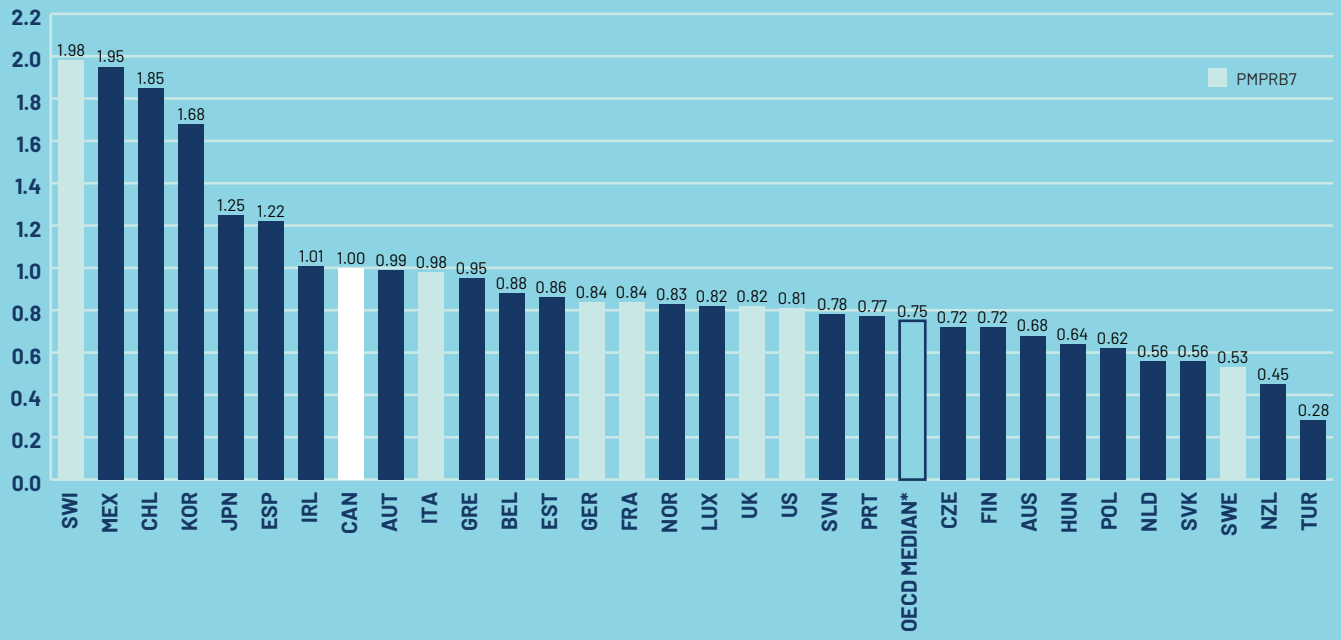
Generic price reduction Q4-2007 to Q4-2021	
Sweden	-32%
Italy	-28%
United Kingdom	-53%
Switzerland	-34%
France	-44%
Germany	-58%
United States	-68%
OECD average	-43%
CAN	-59%
CAN at 18%	-62%
CAN at 10%	-80%

Note: The term "generic" used in this analysis includes both patented and non-patented generic medicines. Results are based on manufacturer ex-factory list prices in the national retail markets. The analysis was restricted to oral solid generic medicines that had been on the market for at least one year. CAN at 18% and 10% refer to the 67 generic medicines reduced to 18% and 10% of their brand reference prices through the generic pricing policy introduced in April 2018.

Data source: MIDAS® database, October–December 2007 to October–December 2021, IQVIA (all rights reserved)

[NPDUIS Report: *Generics360, 2018* – graph updated for 2019 to 2021]

FIGURE 25. Foreign-to-Canadian Price Ratios for Generic Medicines, OECD, Q4-2021



* The OECD median does not necessarily represent the median result for the individual countries reported in this graph, as it is calculated at the medicine level for generics with prices available in at least three foreign markets.

Data source: MIDAS® database, October–December 2021, IQVIA (all rights reserved)

[NPDUIS Report: *Generics360, 2018* – graph updated to 2021]

MULTILATERAL PRICE COMPARISONS

Table 10 provides average foreign-to-Canadian price ratios using several multilateral measures of foreign prices. The median international price (MIP) is the median of list prices observed among the PMPRB7. Other multilateral price ratios compare the minimum, maximum, and simple mean of foreign prices to the Canadian average transaction price.

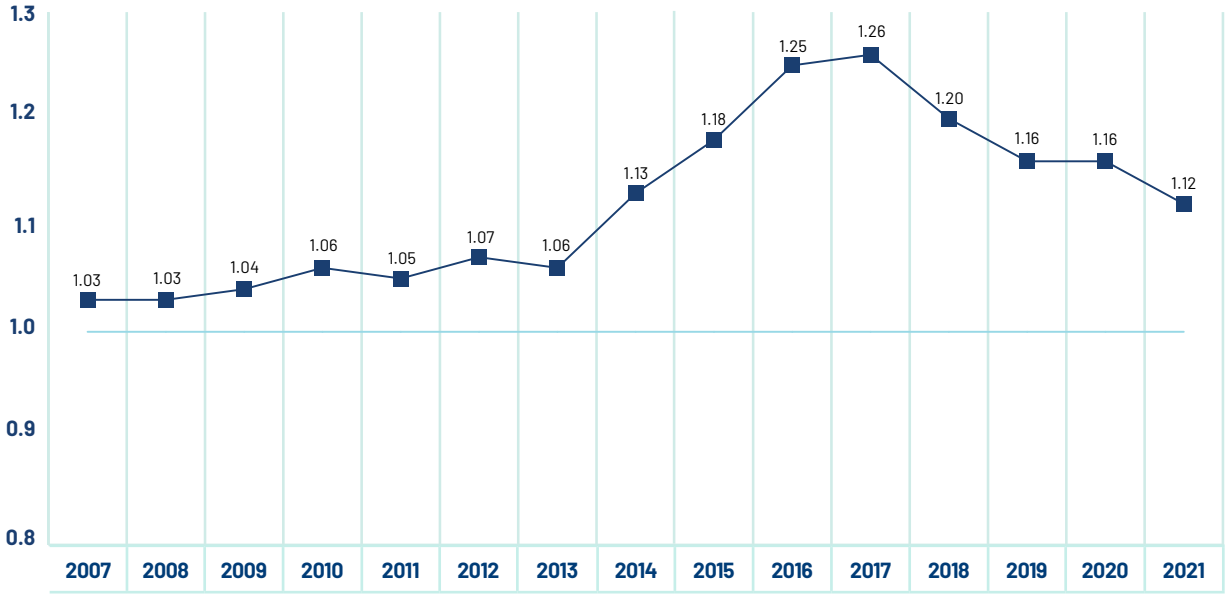
Focusing again on the results based on market exchange rates, the average MIP-to-Canadian price ratio was 1.12 in 2021, lower than the 1.16 ratio in 2020 (Figure 26). Note that mean foreign prices produce higher foreign-to-Canadian price ratios than MIPs do. This is due to the influence of US prices, which are typically much higher than prices elsewhere and nearly always figure importantly in determining the mean foreign price. While the US has less of an impact on median international prices, it does exercise a significant influence over the average ratio of median international prices relative to Canadian prices, as the US is sometimes the only country with an available ex-factory price for a patented medicine sold in Canada.

TABLE 10. Average Foreign-to-Canadian Price Ratios, Multilateral Comparisons, 2021

	Median	Minimum	Maximum	Mean
Average price ratio at market exchange rates	1.12	0.86	3.45	1.46
Average price ratio at purchasing power parities	1.24	0.93	3.59	1.58
Number of patented medicines	1,064	1,064	1,064	1,064
Sales ($millions)	$17,105.14	$17,105.14	$17,105.14	$17,105.14

Data source: PMPRB

FIGURE 26. Average Ratio of Median International Price (MIP) to Canadian Price, at Market Exchange Rates, 2007 to 2021



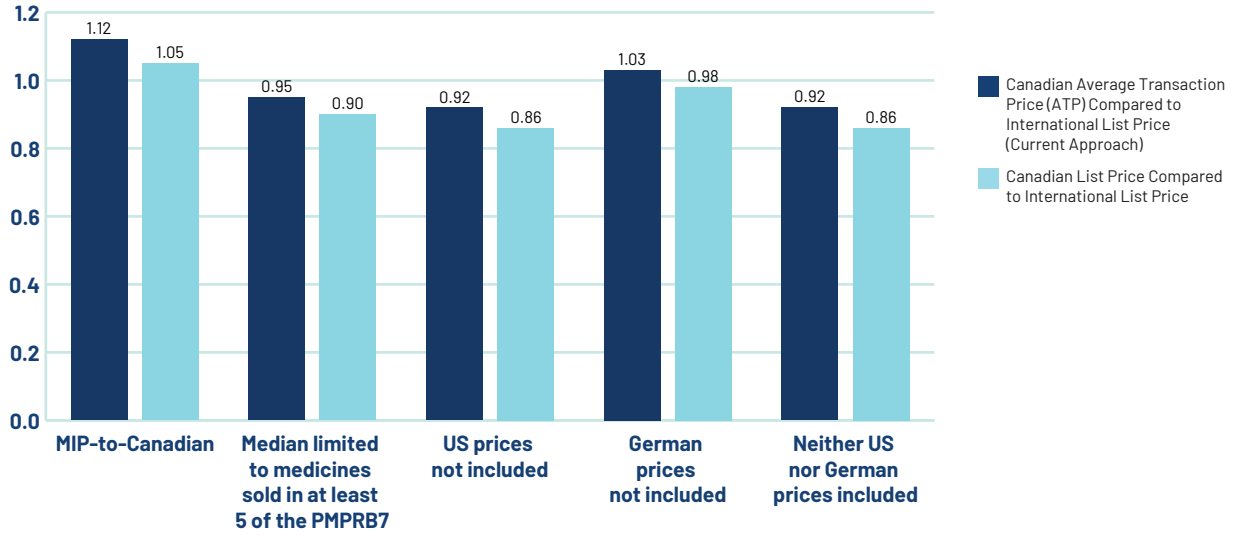
Data source: PMPRB

Figure 27 provides alternative results for the average MIP-to-Canadian price ratio at market exchange rates in 2021. To address the point that Canadian prices are national average transaction prices whereas foreign prices are list prices, a list-to-list price ratio is calculated. Using this method, the average ratio decreases from 1.12 to 1.05. It is important to keep in mind that confidential rebates provided to payers are not captured in this data.

To account for the large impact of US prices in determining the median foreign price, a ratio excluding the US and a ratio including at least five countries in the calculation of the median are also provided as additional context in Figure 27. With these restrictions, the average MIP-to-Canadian price ratios drop to 0.86 and 0.90, respectively, suggesting that median foreign list prices are, on average, 14% to 10% lower than Canadian list prices.

In many of the comparator countries, discounts off list prices are available to all payers, both public and private. By contrast, a large portion of the Canadian market pays list prices, or close to list prices. Furthermore, it should be noted that these are average ratios—some patentees charge Canadian consumers less than median international prices, while others charge more. For MIP-to-Canadian price ratios at the patentee level, please refer to Table 22 in Appendix 4 of this report.

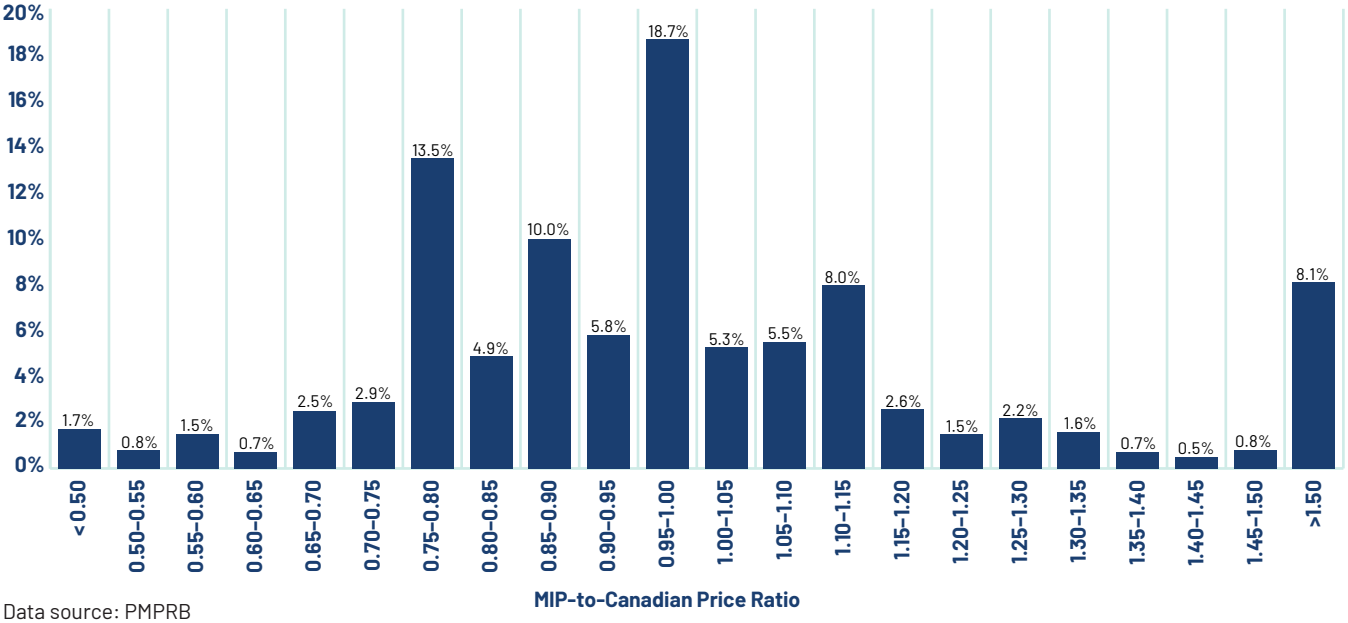
FIGURE 27. Average Ratio of Median International Price (MIP) to Canadian Price, at Market Exchange Rates, 2021



Data source: PMPRB

Figure 28 offers more detail on the medicine-level MIP-to-Canadian ratios underlying the averages reported in Table 10. This figure distributes the 2021 sales of each patented medicine according to the value of its MIP-to-Canadian price ratio (more exactly, according to the range into which the ratio fell).[21] These results show a substantial dispersion in medicine-level price ratios: while patented medicines with MIP-to-Canadian price ratios between 0.90 and 1.10 accounted for 35.3% of sales, those with ratios less than 0.90 accounted for 38.5% of sales and medicines with ratios exceeding 1.10 accounted for the remaining 26.1%. Approximately one quarter of the medicines assessed had an MIP-to-Canadian ratio greater than 1.50, including many for which the US price was the only available international comparator.

FIGURE 28. Range Distribution, Share of Sales by MIP-to-Canadian Price Ratio, 2021



Data source: PMPRB

In 2021, approximately 44% of Canadian patented medicines were priced above the median international level.[22] Table 11 examines the impact of this difference by therapeutic class. Medicines that share the fourth level ATC classification ("ATC4")[23] are grouped to identify distinct chemical/pharmacological/therapeutic subgroups, allowing for a calculation of the average MIP-to-Canadian price ratios among medicines that may be used to treat the same conditions. Table 11 identifies the top 10 ATC4s in 2021 in which the difference between Canadian and median prices had the largest effect on Canadian patented medicine spending.[24] For example, had Canadian prices been in line with the international median for these classes of medicines in 2021, sales in Canada would have been reduced by approximately $1,021 million (an average reduction of 14% for these ATC4s). Of the 244 DINs classified into these 10 ATC4s, 53% were priced above the median international price.

TABLE 11. Top 10 ATC4s* by Total Sales Greater than Median International Prices, 2021

Description	ATC4*	No. of companies	No. of chemicals in ATC4 (No. currently under patent)	Total patented DINs	Patented DINs greater than median price	2021 net revenues for patented DINs ($millions)	Patented DINs ATC4 share of 2021 revenues	MIP-to-Canadian ratio (min. 5) of patented DINs†	Impact of difference on patented medicines in 2021 ($millions)
Selective immunosuppressants	L04AA	13	18 (18)	37	30	$2,023.25	11.60%	0.88	$271.28
Protein kinase inhibitors	L01XE	17	40 (40)	87	37	$1,386.70	7.95%	0.95	$156.77
Other blood glucose lowering drugs, excl. insulins	A10BX	4	5 (5)	11	9	$639.25	3.66%	0.79	$133.18
DPP-4 inhibitors	A10BH	4	4 (4)	9	7	$308.38	1.77%	0.69	$96.38
Combinations of oral blood glucose lowering medicines	A10BD	5	10 (10)	29	15	$405.26	2.32%	0.64	$95.92
Antineovascularisation agents	S01LA	2	2 (2)	2	2	$534.0	3.06%	0.86	$70.88
Antiinfectives for systemic use	J05AX	3	11 (9)	18	9	$295.42	1.69%	0.82	$68.83
Other antineoplastic agents	L01XC	15	25 (25)	39	10	$1,576.47	9.04%	0.96	$50.92
Adrenergics in combination with corticosteroids or other medicines excluding anticholinergics	R03AK	2	4 (2)	5	5	$69.59	0.41%	0.43	$39.90
Adrenergics in combination with anticholinergics incl. triple combinations with corticosteroids	R03AL	5	6 (6)	7	5	$106.29	0.61%	0.64	$35.91

* Level 4 of the Anatomical Therapeutic Chemical (ATC) classification system maintained by the World Health Organization.

† For cases where the Canadian average transactional price was below the median international price, the MIP-to-Canadian ratio was set to 1.00.

Data source: PMPRB

ENDNOTES

[18] The number of medicines and sales these ratios encompass vary because it is not always possible to find a matching foreign price for each strength and dosage form of a patented medicine sold in Canada. All bilateral average price ratios reported in Table 9 combined represent at least 66% of 2021 Canadian sales, while the multilateral ratios in Table 10 cover over 98%.

[19] The publicly available ex-factory price includes any price of a patented medicine that is agreed on by the patentee and the appropriate regulatory authority of the country.

[20] IQVIA's MIDAS® database is the source of sales data used in this analysis. MIDAS® summarizes data obtained from IQVIA's detailed audits of pharmaceutical purchases. MIDAS® contains information on sales of individual medicines, measured in both currency and physical units. It also includes information on medicine manufacturer, active ingredient, brand, form, strength, pack-size, patent status, and therapeutic class. Sales estimates are based directly on the purchase information obtained in its pharmacy audits. To obtain the value of a company's ex-factory sales of a particular medicine, IQVIA removes an estimate of wholesalers' mark-ups from the acquisition costs reported. It should be noted that the acquisition costs used by IQVIA are based on invoiced prices. Off-invoice discounts, free goods, and other forms of price reduction such as rebates are therefore not represented in the MIDAS® data.

[21] To produce the results represented in this figure, foreign prices were converted to their Canadian-dollar equivalents at market exchange rates.

[22] This outcome is not inconsistent with the current Guidelines, which contemplate, post introduction, annual price increases in line with general inflation, as long as prices remain below the highest international price.

[23] ATCs used in this analysis are those maintained under the World Health Organization's Collaborating Centre for Drug Statistics Methodology. The first level of an ATC code describes the anatomical main group and has one letter. The second level divides the main groups into pharmacological/therapeutic groups and has two digits. The third and fourth levels divide these into distinct chemical/therapeutic/pharmacological subgroups and each has one letter. The fifth level defines an individual chemical substance and has two digits. For example, in the case S01LA (as found in Table 11), "S" indicates that these medicines treat the sensory organs; "01" that they specifically treat ophthalmological indications; "L" that they consist of ocular vascular disorder agents; and "A" that they are specifically antineovascularisation agents. An individual medicine belonging to this group is aflibercept (Eylea), represented by the fifth level ATC S01LA05. For further information, please refer to http://www.whocc.no/atc_ddd_index/

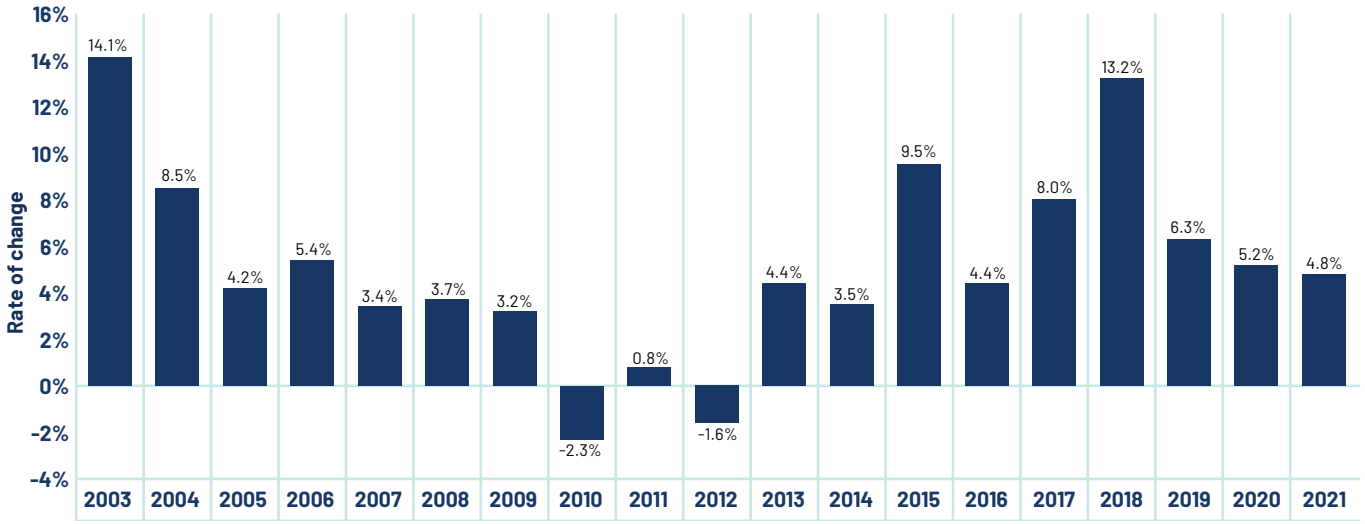
[24] The medicines in Table 11 reported under the jurisdiction of the PMPRB are as follows:

- **A10BD:** alogliptin benzoate/metformin hydrochloride, canagliflozin/metformin hydrochloride, dapagliflozin/metformin hydrochloride, empagliflozin/linagliptin, empagliflozin/metformin hydrochloride, linagliptin/metformin, saxagliptin/metformin, sitagliptin phosphate, monohydrate/metformin hydrochloride
- **A10BH:** alogliptin benzoate, linagliptin, saxagliptin, sitagliptin phosphate monohydrate
- **A10BX:** canagliflozin, dapagliflozin propanediol monohydrate, dulaglutide, empagliflozin, exenatide
- **J05AX:** dolutegravir, elbasvir/grazoprevir, ledipasvir/sofosbuvir, letermovir, maraviroc, raltegravir potassium, sofosbuvir, sofosbuvir/velpatasvir, sofosbuvir/velpatasvir/voxilaprevir
- **L01XC:** atezolizumab, avelumab, bevacizumab, blinatumomab, brentuximab vedotin, daratumumab, durvalumab, inotuzumab ozogamicin, ipilimumab, nivolumab, obinutuzumab, olaratumab, panitumumab, pembrolizumab, pertuzumab, polatuzumab vedotin, ramucirumab, rituximab, trastuzumab, trastuzumab emtansine
- **L01XE:** abemaciclib, acalabrutinib, afatinib, alectinib, axitinib, bosutinib, brigatinib, cabozantinib, ceritinib, cobimetinib fumarate, crizotinib, dabrafenib, dacomitinib, dasatinib, entrectinib, erdafitinib, gilteritinib, ibrutinib, lapatinib ditosylate monohydrate, larotrectinib, lenvatinib mesylate, lorlatinib, midostaurin, neratinib, nilotinib hydrochloride monohydrate, nintedanib, osimertinib, palbociclib, pazopanib hydrochloride, ponatinib hydrochloride, regorafenib, ribociclib, ruxolitinib, sofarenib tosylate, sunitinib malate, temsirolimus, trametinib, vandetanib, vemurafenib
- **L04AA:** abatacept, adalimumab, anakinra, baricitinib, belimumab, eculizumab, etanercept, everolimus, fingolimod hydrochloride, mycophenolate sodium, natalizumab, ocrelizumab, ozanimod, siponimod, sirolimus, tofacitinib, upadacitinib, vedolizumab
- **R03AK:** budesonide/formoterol fumarate dihydrate, fluticasone furoate/vilanterol, indacaterol acetate/mometasone furoate
- **R03AL:** indacaterol maleate/glycopyrronium bromide, umeclidinium bromide/vailanterol trifenatate, ipratropium bromide monohydrate/salbutamol sulfate, aclidinium bromide/formoterol fumarate dihydrate, fluticasone furoate/umeclidinium/vilanterol, indacaterol acetate/glycopyrronium bromide/mometasone furoate
- **S01LA:** aflibercept, brolucizumab

UTILIZATION OF PATENTED MEDICINES

The price and sales data used to calculate the PMPI also allow the PMPRB to examine trends in the quantities of patented medicines sold in Canada. The PMPRB maintains the Patented Medicines Quantity Index (PMQI) for this purpose. Figure 29 provides average rates of utilization growth, as measured by the PMQI, from 1988 through 2021.

FIGURE 29. Annual Rate of Change, Patented Medicines Quantity Index (PMQI), 2003 to 2021



Data source: PMPRB

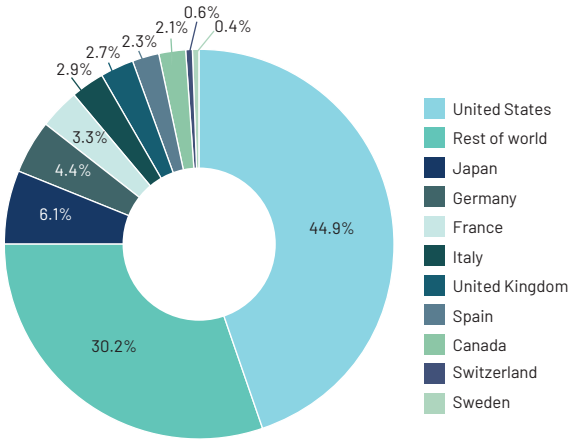
CANADIAN MEDICINE EXPENDITURES IN THE GLOBAL CONTEXT

IQVIA[25] regularly reports on medicine sales across a large number of countries. Based on sales data from this source, Figure 30 provides shares of global sales for Canada and other major national markets including the PMPRB7 countries.[26] The Canadian market accounted for 2.1% of the global market in 2021.

Figure 31 provides Canada's share of global sales for 2012 to 2021. The Canadian share has remained between 1.9% and 2.6% throughout this period. Although Canada's share of 2.1% has been relatively stable in recent years, the US share grew from 40.4% in 2014 to 44.9% in 2021.

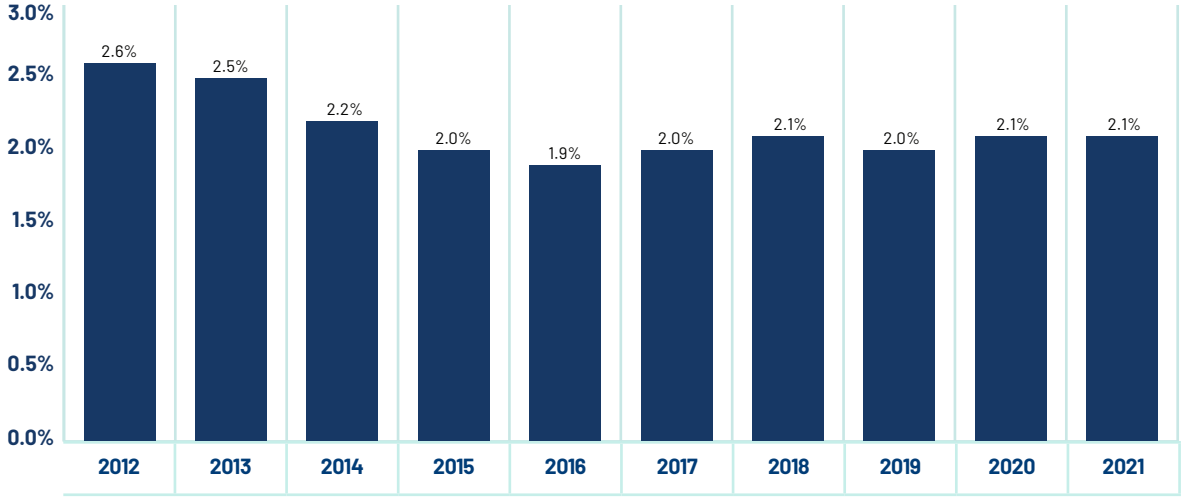
Figure 32 gives the average annual rate of growth in total medicine sales for Canada and the PMPRB7, individually and collectively. From 2012 to 2021, sales of medicines in Canada rose at an average annual rate of 4.8%. This is on par with the average rate of growth in medicine sales among the PMPRB7 countries over the same period, though this average is heavily skewed by the influence of US sales.

FIGURE 30. Distribution of Medicine Sales Among Major National Markets, 2021



Data source: MIDAS® database, 2021, IQVIA (all rights reserved)

FIGURE 31. Canada's Share of Global Medicine Sales, 2012 to 2021



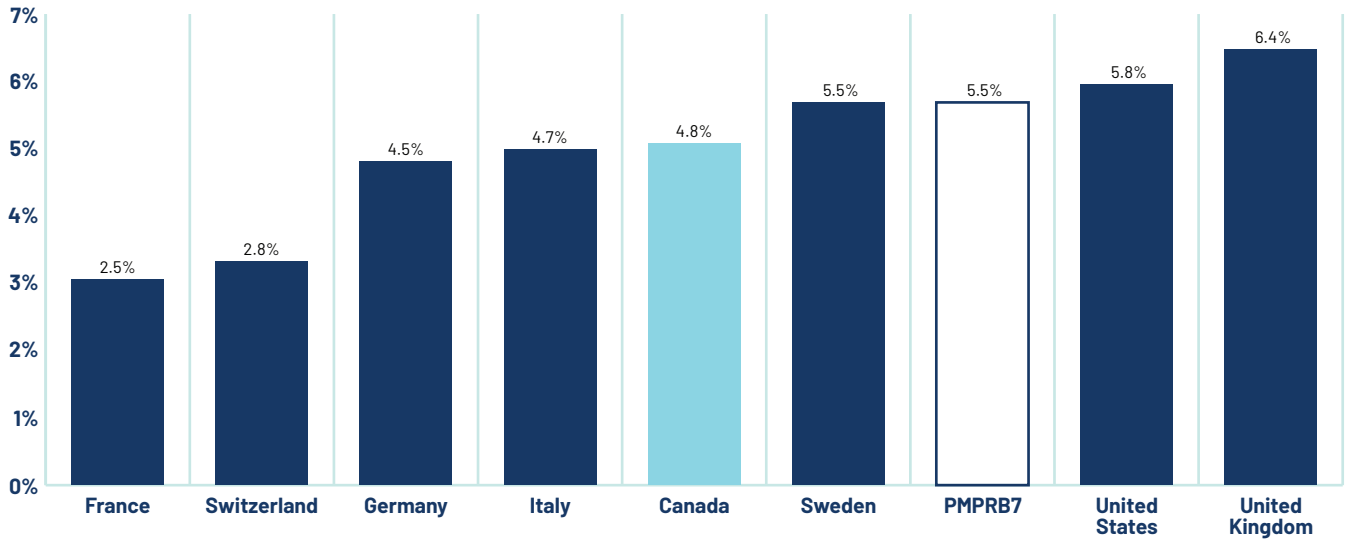
Data source: MIDAS® database, 2012-2021, IQVIA (all rights reserved)

CANADA IS A TOP 10 GLOBAL MARKET

Canada is an important market for pharmaceuticals representing 2.1% of worldwide sales.

Canada spends nearly the same amount as the UK on pharmaceuticals despite having only half the population.

FIGURE 32. Average Rate of Growth of Medicine Sales, at Constant 2021 Market Exchange Rates, by Country, Canada and the PMPRB7, 2012 to 2021



Data source: MIDAS® database, 2012-2021, IQVIA (all rights reserved)

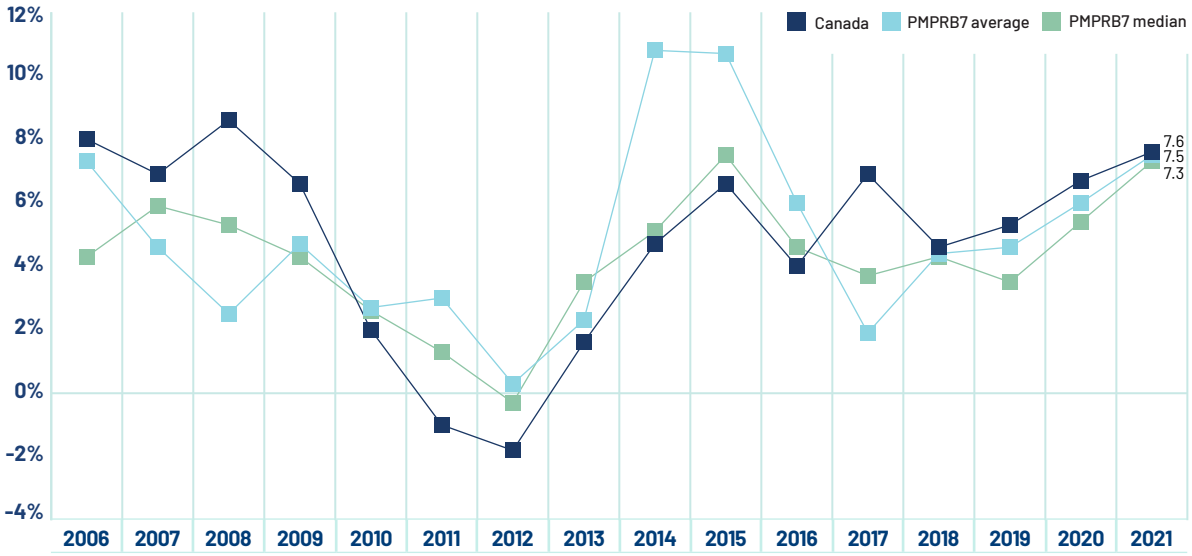
Figure 33 compares rates of year-over-year growth in medicine sales for the entire pharmaceutical market in Canada and the PMPRB7 countries combined. In 2021, sales grew at a slightly faster rate in Canada than in the PMPRB7.

The proportion of national income allocated to the purchase of medicines provides another way to compare medicine costs across countries.[27] Figure 34 gives medicine expenditures as a share of gross domestic product (GDP) for Canada and the PMPRB7 countries based on data for 2019. Medicine expenditures absorbed between 1.1% and 2.1% of the GDP in the PMPRB7. The Canadian value of 1.7% was second only to the US but on par with Germany and just slightly above Italy (1.6%).

1.7% MEDICINE EXPENDITURES IN CANADA

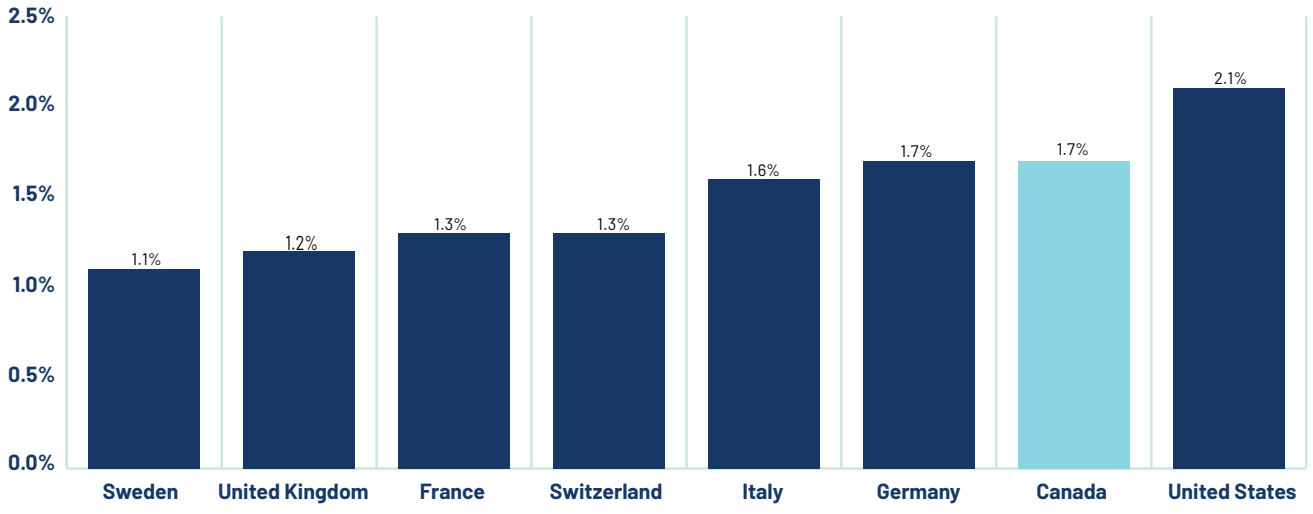
In 2019, Canadians spent 1.7% of gross domestic product on medicines. This was the second highest share in the PMPRB7, behind only the US.

FIGURE 33. Average Annual Rate of Change in Medicine Sales, at Constant 2021 Market Exchange Rates, Canada and the PMPRB7, 2006 to 2021



Data source: MIDAS® database, 2006–2021, IQVIA (all rights reserved)

FIGURE 34. Medicine Expenditures as a Share of GDP, Canada and the PMPRB7, 2019



Data source: OECD

Table 12 provides a historical perspective on the expenditures-to-GDP ratio and per capita spending.[28] Between 2010 and 2019, Canada's ratio declined, along with the ratios of four other PMPRB7 countries (France, Germany, Italy, and Sweden). In 2019, Canada had the third highest spending per capita on medicines compared to the PMPRB7, behind the US and Germany.

Table 13 gives the composition of patentees' sales by therapeutic class for Canada and the PMPRB7, individually by country and as an aggregate.[29] The results suggest considerable similarity across countries.

TABLE 12. Medicine Expenditures as a Share of GDP and Per Capita, Canada and the PMPRB7, 2010 and 2019

	Share: Medicine Expenditures/GDP 2010	Share: Medicine Expenditures/GDP 2019	Growth: GDP 2010-2019	Medicine spending per capita 2010 ($US PPP)	Medicine spending per capita 2019 ($US PPP)
Canada	1.90%	1.74%	35.9%	$756	$864
France	1.86%	1.32%	41.3%	$622	$627
Germany	1.72%	1.67%	45.2%	$663	$935
Italy	1.60%	1.57%	27.2%	$582	$659
Sweden	1.21%	1.06%	41.7%	$466	$540
Switzerland	1.11%	1.34%	44.1%	$627	$850
United Kingdom	1.13%	1.17%	42.8%	N/A	$516
United States	2.09%	2.12%	42.1%	$987	$1,376

Data source: OECD

TABLE 13. Distribution of Medicine Sales by Major Therapeutic Class, Canada and the PMPRB7, 2021

Therapeutic class	Canada	PMPRB7	France	Germany	Italy	Sweden	Switzerland	United Kingdom	United States
A: Alimentary tract and metabolism	14.3%	16.6%	9.1%	10.4%	10.5%	10.8%	10.7%	10.6%	18.6%
B: Blood and blood-forming organs	4.8%	7.3%	8.7%	9.3%	8.8%	9.8%	6.7%	7.5%	6.8%
C: Cardiovascular system	6.1%	4.6%	6.1%	8.0%	6.6%	4.0%	8.9%	5.6%	4.0%
D: Dermatologicals	2.7%	2.1%	1.8%	1.8%	3.0%	2.0%	3.0%	1.8%	2.1%
G: Genito-urinary system and sex hormones	3.5%	2.4%	2.3%	2.5%	2.1%	2.8%	3.3%	2.3%	2.5%
H: Systemic hormonal preparations	1.2%	2.1%	1.8%	1.6%	1.7%	2.1%	1.2%	1.5%	2.2%
J: General anti-infective for systemic use	8.0%	9.8%	9.1%	11.4%	8.3%	10.4%	8.1%	9.6%	10.0%
L: Antineoplastics and immunomodulating agents	26.6%	27.3%	31.2%	28.2%	26.7%	27.7%	28.6%	28.0%	27.0%
M: Musculo-skeletal system	2.9%	2.9%	2.4%	2.9%	3.4%	3.5%	4.6%	2.4%	2.9%
N: Nervous system	15.5%	13.0%	13.1%	12.3%	14.1%	14.2%	15.1%	13.3%	12.9%
P: Antiparasitic products	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%
R: Respiratory system	6.1%	6.8%	5.7%	5.0%	6.5%	6.1%	4.7%	10.2%	6.8%
S: Sensory organs	4.4%	2.2%	3.4%	1.9%	2.9%	3.8%	4.5%	4.3%	2.0%
V: Various	3.9%	2.7%	5.1%	4.6%	5.3%	2.9%	0.7%	2.9%	2.2%
All therapeutic classes*	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

* Values may not add to 100% due to rounding.

Data source: MIDAS® database, 2021, IQVIA (all rights reserved)

ENDNOTES

[25] Most of the statistical results presented in this section are based on sales data from the MIDAS® database, 2005–2021, IQVIA (all rights reserved). MIDAS® data covers the pharmacy and hospital sectors.

[26] The results given in Figures 31 through 34 and Table 13 are based on estimates of ex-factory sales revenues encompassing all prescription medicines, including patented and non-patented branded medicines, and patented and non-patented generic medicines. These estimates have been converted to Canadian dollar equivalents at annual average market exchange rates. Fluctuations in these rates can substantially influence these shares.

[27] Comparisons made on this basis will reflect international differences in prices, overall utilization, and patterns of therapeutic choice, as well as differences in national income.

[28] To make use of the best and most up-to-date data on OECD medicine expenditures, the GDP in Table 12 was calculated using the purchasing power parity (PPP). PPPs are corrected for the relative cost of living based on a standard basket of goods, therefore, the GDP growth rates reported in Table 12 will be different than those generated using other methodologies. Details on purchasing power parity are provided in the text associated with Table 9.

[29] Note that the data used to produce Table 13 encompasses patented and non-patented brand-name medicines and patented and non-patented generic medicines. Hence, the results reported for Canada are not directly comparable to the results reported in Figure 15, which include only patented medicines.

NATIONAL PRESCRIPTION DRUG UTILIZATION INFORMATION SYSTEM:

SUPPORTING HEALTH CARE DECISION MAKING IN CANADA

How medications are used—where, by whom, and for what—has an impact on the amount that we spend on medicines. The PMPRB contributes to Canada's understanding of medicine usage through the National Prescription Drug Utilization Information System (NPDUIS) initiative, generating comprehensive, accurate information to help guide decision making and support the sustainability of our pharmaceutical system.

BACKGROUND

NPDUIS is a research initiative established by federal, provincial, and territorial Ministers of Health in September 2001. It is a partnership between the PMPRB and the Canadian Institute for Health Information (CIHI).

At the request of the Minister of Health pursuant to section 90 of the *Patent Act*, the PMPRB has the mandate to conduct analysis that provides decision makers with critical information and intelligence on price, utilization, and cost trends so that Canada's healthcare system has more comprehensive and accurate information on how medicines are being used and on sources of cost pressures.

The specific research priorities and methodologies for NPDUIS are established with the guidance of the NPDUIS Advisory Committee and reflect the priorities of the participating jurisdictions. The Advisory Committee is composed of representatives from public drug plans in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon, the Non-Insured Health Benefits (NIHB) Program, and Health Canada. It also includes observers from the CIHI, the Canadian Agency for Drugs and Technologies in Health (CADTH), the Ministère de la Santé et des Services sociaux du Québec (MSSS), and the pan-Canadian Pharmaceutical Alliance (pCPA) Office.

NPDUIS operates independently of the regulatory activities of the PMPRB. NPDUIS reports do not contain information that is confidential or privileged under sections 87 and 88 of the *Patent Act*.

HIGHLIGHTS

Since the start of 2021, the PMPRB has published five analytical reports, one chartbook, three posters, and one slide presentation under the NPDUIS banner.

ANNUAL PUBLICATIONS AND REPORT SERIES:

CompassRx: Annual Public Drug Plan Expenditure Report, 7th Edition, 2019/20 (November 2021)

Formularies in Canada – Part 2: Oncology Medicines (May 2021)

Formularies in Canada – Part 3: Medicines Assessed by the Common Drug Review (February 2022)

Meds Pipeline Monitor, 2021 (April 2022)

Meds Entry Watch, 6th Edition (April 2022)

CHARTBOOK:

Expensive Drugs for Rare Diseases: Canadian Trends and International Comparisons, 2011-2020 (January 2022)

POSTER PRESENTATIONS:

Playing catch-up: where Canada stands three years into the pCPA-CGPA generics pricing initiative

A pan-Canadian comparison of coverage for hospital and take-home oncology medicines

Changes in Canadian Guidelines for Conducting Budget Impact Analysis

SLIDE PRESENTATIONS:

Biosimilars in Canada: building momentum in the wake of recent switching policies

The PMPRB continues to support and strengthen its NPDUIS engagement activities by regularly consulting with the NPDUIS Advisory Committee, participating in conferences and stakeholder committees, and organizing bilingual information sessions with interested stakeholders to share the results of the analytical studies.

RESEARCH AGENDA

The NPDUIS research agenda for the 2022/23 fiscal year includes plans to publish the following analytical studies:

ANNUAL PUBLICATIONS AND REPORT SERIES

- *CompassRx: 8th Edition, 2020/21*
- *Meds Pipeline Monitor, 2022*
- *Meds Entry Watch, 7th Edition*
- *Market Intelligence Report: New Oral Anti-Diabetic Drugs*
- *Private Drug Plans in Canada*

FOCUSED REPORTS

- *Drug Shortages in Canada*

Additional research topics may be pursued based on consultation with the NPDUIS Advisory Committee.

ANALYSIS OF RESEARCH AND DEVELOPMENT EXPENDITURES:

AT A HISTORICAL LOW

Innovation is vital to advancing health care. However, the ratio of R&D expenditures to sales revenues for pharmaceutical patentees in Canada has been falling since the late 1990s and has been below the agreed-upon target of 10% since 2003. In 2021, it was at 3.4% for all patentees and 3.5% for members of Innovative Medicines Canada.

ANALYSIS OF RESEARCH AND DEVELOPMENT EXPENDITURES

The Act mandates the PMPRB to monitor and report on pharmaceutical R&D spending. This chapter provides key statistics on the current state of pharmaceutical R&D investment in Canada.

DATA SOURCES

The statistical results in this section were entirely derived from data submitted to the PMPRB by patentees.

The Act requires each patentee to report its total gross revenues from sales of all medicines for human or veterinary use (including revenues from sales of non-patented medicines and from licensing agreements) and R&D expenditures in Canada related to medicines (both patented and non-patented for human or veterinary use). Patentees transmit this information to the PMPRB by means of its Form 3 (Revenues and Research and Development Expenditures Provided Pursuant to subsection 88(1) of the *Patent Act*).

The *Patented Medicines Regulations* (Regulations) require that each submitted Form 3 be accompanied by a certificate stating the information it contains is "true and correct". The Board does not audit Form 3 submissions, but it does review submitted data for anomalies and inconsistencies, seeking corrections or clarifications from patentees where necessary. To confirm that PMPRB staff has correctly interpreted the data submitted, each patentee is given the opportunity to review and confirm the accuracy of its own R&D-to-sales ratio before that ratio is published.

FAILURE TO FILE (FORM 3)

It is a patentee's responsibility to ensure a complete and accurate Form 3 is filed within the time frame set out in the Regulations. If a patentee fails to meet these filing requirements, the Board may issue an Order demanding compliance. No such Board Orders were issued for the 2021 reporting period.

COVERAGE

Note that companies without sales of patented medicines do not need to report their R&D expenditures to the PMPRB. This has two implications:

First, the statistical results reported herein should not be understood as representative of all pharmaceutical research conducted in Canada. For example, a company may sell only non-patented medicines but still perform considerable research. Similarly, a company may conduct research and have no medicine sales at all.[30] The results presented below will not reflect the R&D expenditures of firms in either scenario.

Second, as new patented medicines enter the Canadian market and existing relevant patents expire, the number and identity of companies required to file R&D data may change from year to year. In 2021, 100 companies reported on their R&D activity. Of these, 37 were members of Innovative Medicines Canada.

DEFINITION OF SALES REVENUES

For reporting purposes, sales revenues are defined as total gross revenues from sales in Canada of all medicines and from licensing agreements (e.g., royalties and fees accruing to the patentee related to sales in Canada by licensees).

DEFINITION OF R&D EXPENDITURES

Pursuant to section 6 of the Regulations, patentees are required to report R&D expenditures that would have qualified for a Scientific Research and Experimental Development (SR&ED) investment tax credit under the provisions of the *Income Tax Act* that came into effect on December 1, 1987.[31] By this definition, R&D expenditures may include current expenditures, capital equipment costs, and allowable depreciation expenses. Market research; sales promotions; quality control or routine testing of materials, devices, or products; and routine data collection are not eligible for an investment tax credit, and, therefore, are not to be included in the R&D expenditures reported by patentees.

3.4% R&D-TO-SALES RATIO

The R&D-to-sales ratio for all patentees was 3.4% in 2021.

This represents

A 71% DECREASE

from a peak of 11.7% in 1995.

TOTAL SALES REVENUES AND R&D EXPENDITURES

Table 14 provides an overview of reported sales revenues and R&D expenditures from 1988 to 2021.

Patentees reported total 2021 sales revenues of $27.5 billion, an increase of 13.2% from 2020. Sales revenues reported by Innovative Medicines Canada members were $21.2 billion, accounting for 77% of the total. Less than 1% of reported sales revenues were generated by licensing agreements. Patentees reported R&D expenditures of $922.9 million in 2021, an increase of 12.2% from 2020. Innovative Medicines Canada members reported R&D expenditures of $735.9 million in 2021, an increase of 11.0% over the previous year. Innovative Medicines Canada members accounted for 80% of all reported R&D expenditures in 2021.

R&D-TO-SALES RATIOS

Table 14 and Figure 35 also provide ratios of R&D expenditures to sales revenues. It should be noted that with the adoption of the 1987 amendments to the Act, Innovative Medicines Canada made a public commitment to increase its members' annual R&D expenditures to 10% of sales revenues by 1996.[32] This level of R&D expenditure was reached by 1993, with the ratio exceeding 10% in some years.

The ratio of R&D expenditures to sales revenues among all patentees was 3.4% in 2021, which remains unchanged from 2020. The overall R&D-to-sales ratio has been less than 10% for the past 21 years.

The corresponding R&D-to-sales ratio for members of Innovative Medicines Canada was 3.5% in 2021, also unchanged from 2020.[33] The Innovative Medicines Canada ratio has been less than 10% for the past 19 years. Table 21 in Appendix 4 provides details on the range of 2021 R&D-to-sales ratios. Of the 100 companies reporting in 2021, 87.0% had R&D-to-sales ratios below 10%.

TABLE 14. Total R&D Expenditures and R&D-to-Sales Ratios of Reporting Companies, 1988 to 2021

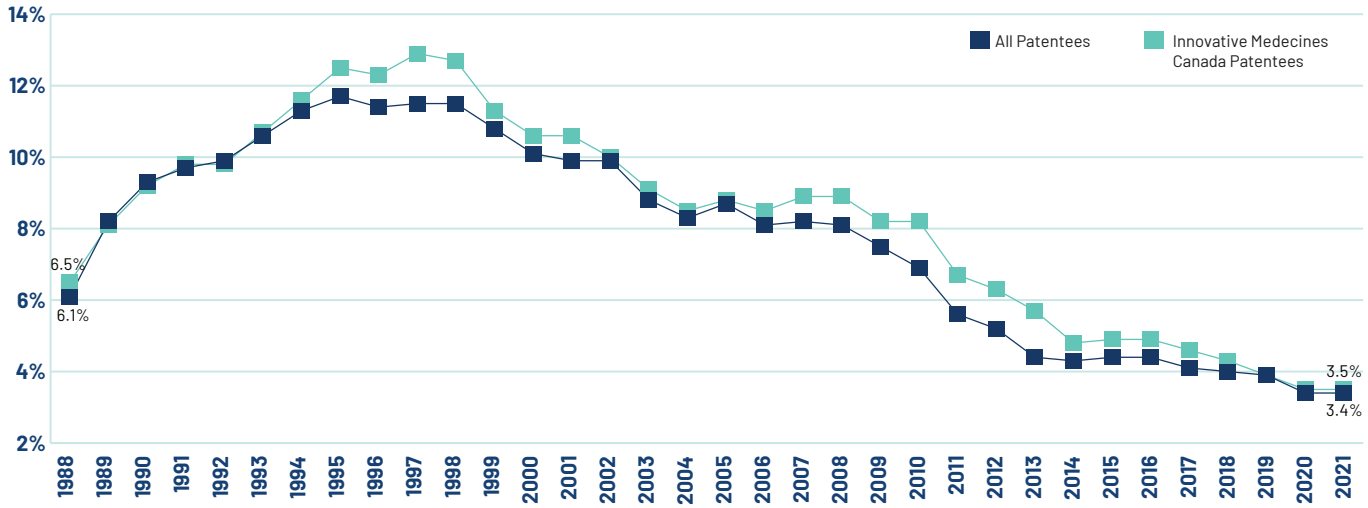
Year	All patentees					Innovative Medicines Canada patentees				R&D-to-sales ratio: all patentees	R&D-to-sales ratio: Innovative Medicines Canada patentees
	Number of companies reporting	R&D expenditures by all patentees ($millions)	Change from previous year	Sales revenues ($millions)	Change from previous year	R&D expenditures by Innovative Medicines Canada patentees ($millions)	Change from previous year	Sales revenues ($millions)	Change from previous year		
2021	100	$922.9	12.2%	$27,478.5	13.2%	$735.9	11.0%	$21,243.9	12.4%	3.4%	3.5%
2020	99	$822.9	-7.9%	$24,278.2	5.1%	$662.8	1.6%	$18,902.9	12.1%	3.4%	3.5%
2019	101	$893.2	0.1%	$23,101.0	1.9%	$652.6	-9.7%	$16,858.8	0.4%	3.9%	3.9%
2018	93	$892.6	2.4%	$22,663.4	7.2%	$723.0	-4.3%	$16,789.7	2.7%	4.0%	4.3%
2017	85	$871.4	-5.1%	$21,147.2	1.4%	$755.8	-1.8%	$16,349.8	4.8%	4.1%	4.6%
2016	78	$918.2	5.7%	$20,855.7	5.9%	$769.9	0.3%	$15,599.9	0.2%	4.4%	4.9%
2015	77	$869.1	9.7%	$19,693.3	6.7%	$767.4	7.8%	$15,565.1	4.7%	4.4%	4.9%
2014	75	$792.2	-0.8%	$18,455.1	1.0%	$711.7	2.0%	$14,861.1	9.2%	4.3%	4.8%
2013	81	$798.3	-14.7%	$18,268.1	1.4%	$697.5	-15.4%	$13,614.8	3.4%	4.4%	5.1%
2012	85	$936.1	-5.6%	$18,021.1	1.3%	$824.1	-8.6%	$13,162.8	-2.1%	5.2%	6.3%
2011	79	$991.7	-15.8%	$17,798.8	4.7%	$901.2	-9.9%	$13,446.1	10.7%	5.6%	6.7%

...Continued

Year	All patentees					Innovative Medicines Canada patentees				R&D-to-sales ratio: all patentees	R&D-to-sales ratio: Innovative Medicines Canada patentees
	Number of companies reporting	R&D expenditures by all patentees ($millions)	Change from previous year	Sales revenues ($millions)	Change from previous year	R&D expenditures by Innovative Medicines Canada patentees ($millions)	Change from previous year	Sales revenues ($millions)	Change from previous year		
2010	82	$1,178.2	-7.4%	$17,000.0	-0.3%	$1,000.2	-11.7%	$12,149.0	-11.8%	6.9%	8.2%
2009	81	$1,272.0	-2.9%	$17,051.9	4.5%	$1,132.9	-3.4%	$13,780.0	4.6%	7.5%	8.2%
2008	82	$1,310.7	-1.1%	$16,316.7	2.0%	$1,172.2	-1.0%	$13,178.2	-1.4%	8.1%	8.9%
2007	82	$1,325.0	9.5%	$15,991.0	7.3%	$1,184.4	24.8%	$13,359.8	20.0%	8.3%	8.9%
2006	72	$1,210.0	-1.9%	$14,902.0	4.7%	$949.0	-8.8%	$11,131.2	-5.8%	8.1%	8.5%
2005	80	$1,234.3	5.5%	$14,231.3	0.5%	$1,040.1	3.9%	$11,821.4	0.0%	8.7%	8.8%
2004	84	$1,170.0	-2.0%	$14,168.3	4.0%	$1,000.8	0.8%	$11,819.0	8.8%	8.3%	8.5%
2003	83	$1,194.3	-0.4%	$13,631.1	12.8%	$992.9	-3.6%	$10,865.7	5.2%	8.8%	9.1%
2002	79	$1,198.7	13.0%	$12,081.2	12.5%	$1,029.6	10.1%	$10,323.8	16.8%	9.9%	10.0%
2001	74	$1,060.1	12.6%	$10,732.1	15.3%	$935.2	14.7%	$8,835.4	14.3%	9.9%	10.6%
2000	79	$941.8	5.3%	$9,309.6	12.0%	$815.5	4.0%	$7,728.8	11.6%	10.1%	10.6%
1999	78	$894.6	12.0%	$8,315.5	19.2%	$784.3	9.9%	$6,923.4	22.8%	10.8%	11.3%
1998	74	$798.9	10.2%	$6,975.2	10.9%	$713.7	8.6%	$5,640.2	10.6%	11.5%	12.7%
1997	75	$725.1	9.0%	$6,288.4	7.4%	$657.4	10.3%	$5,098.2	4.9%	11.5%	12.9%
1996	72	$665.3	6.4%	$5,857.4	9.9%	$595.8	6.5%	$4,859.5	8.7%	11.4%	12.3%
1995	71	$625.5	11.5%	$5,330.2	7.5%	$559.5	9.8%	$4,468.8	1.4%	11.7%	12.5%
1994	73	$561.1	11.4%	$4,957.4	4.4%	$509.5	10.4%	$4,407.2	2.0%	11.3%	11.6%
1993	70	$503.5	22.1%	$4,747.6	14.0%	$461.4	24.0%	$4,321.4	14.4%	10.6%	10.7%
1992	71	$412.4	9.6%	$4,164.4	6.9%	$372.1	9.0%	$3,778.4	6.5%	9.9%	9.8%
1991	65	$376.4	23.2%	$3,894.8	18.1%	$341.4	24.7%	$3,546.9	19.5%	9.7%	9.6%
1990	65	$305.5	24.8%	$3,298.8	11.0%	$273.8	25.8%	$2,967.9	10.5%	9.3%	9.2%
1989	66	$244.8	47.4%	$2,973.0	9.4%	$217.6	34.7%	$2,685.5	7.3%	8.2%	8.1%
1988	66	$165.7	–	$2,718.0	–	$161.5	–	$2,502.3	–	6.1%	6.5%

Data source: PMPRB

FIGURE 35. R&D-to-Sales Ratio, Pharmaceutical Patentees, 1988 to 2021



Data source: PMPRB

CURRENT R&D EXPENDITURES BY TYPE OF RESEARCH

Table 15 and Figure 36 (as well as Figure 38 in Appendix 4) provide information on the allocation of 2021 R&D expenditures[34] in basic and applied research as well as other qualifying R&D.[35] Patentees reported spending $112.7 million on basic research in 2021, representing 12.6% of current R&D expenditures, a decrease of 1.1% over the previous year. A reported $507.7 million was spent on applied research, representing 56.9% of current R&D expenditures. Clinical trials (Phase I to III) accounted for 81.0% of applied research expenditures.

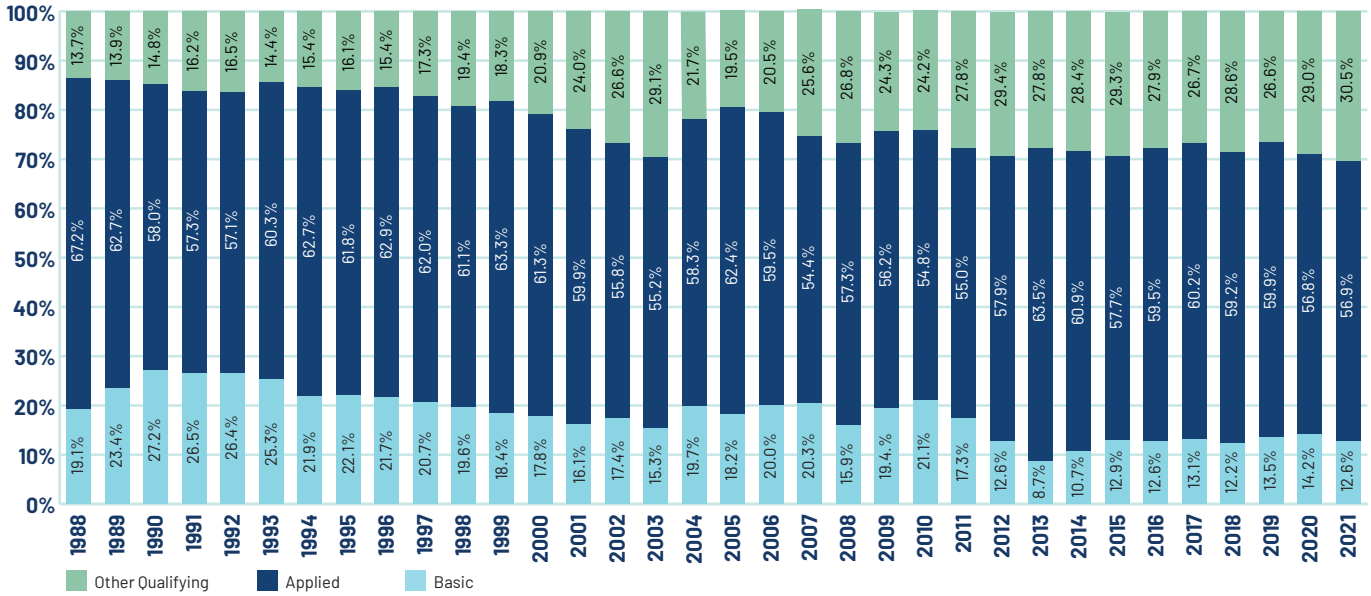
TABLE 15. Current R&D Expenditures by Type of Research, 2021 and 2020

Type of research	Expenditures: 2021 ($millions)	Share: 2021	Expenditures: 2020 ($millions)	Share: 2020	Annual change in expenditures
Basic	$112.7	12.6%	$113.9	14.2%	-1.1%
Chemical	$70.6	7.9%	$71.5	8.9%	-1.3%
Biological	$42.1	4.7%	$42.4	5.3%	-0.7%
Applied	$507.7	56.9%	$455.5	56.8%	11.5%
Manufacturing process	$44.3	5.0%	$42.5	5.3%	4.2%
Pre-clinical trial I	$31.6	3.5%	$26.6	3.3%	18.8%
Pre-clinical trial II	$19.7	2.2%	$17.5	2.2%	12.6%
Clinical trial Phase I	$53.1	5.9%	$57.3	7.2%	-7.3%
Clinical trial Phase II	$78.3	8.8%	$69.1	8.6%	13.3%
Clinical trial Phase III	$280.7	31.5%	$242.4	30.2%	15.8%
Other qualifying R&D	$272.1	30.5%	$232.4	29.0%	17.1%
Total*	**$892.5**	**100%**	**$801.7**	**100%**	**11.3%**

* Values may not add to totals due to rounding.

Data source: PMPRB

FIGURE 36. Current R&D Expenditures by Type of Research, 1988 to 2021



Data source: PMPRB

CURRENT R&D EXPENDITURES BY PERFORMER

Patentees report expenditures on research they conduct themselves (intramural) and research performed by other establishments, such as universities, hospitals, and other manufacturers (extramural).

Table 16 shows that 46.8% of 2021 current research expenditures were intramural. Research performed by other companies on behalf of patentees made up 25.3% of current expenditures, while research conducted in universities and hospitals accounted for 16.6%.

TABLE 16. Current R&D Expenditures by R&D Performer, 2021 and 2020

R&D performer	Expenditures: 2021 ($millions)	Share: 2021	Expenditures: 2020 ($millions)	Share: 2020	Annual change in expenditures
	Intramural				
Patentees	$417.3	46.8%	$368.1	45.9%	13.4%
	Extramural				
Universities and hospitals	$147.9	16.6%	$152.5	19.0%	-3.0%
Other companies	$225.9	25.3%	$211.9	26.4%	6.6%
Others	$101.4	11.4%	$69.2	8.6%	46.5%
Total*	**$892.5**	**100%**	**$801.7**	**100%**	**11.3%**

* Values may not add to totals due to rounding.

Data source: PMPRB

CURRENT R&D EXPENDITURES BY REGION

Table 17 (as well as Tables 23 and 24 in Appendix 4) show current R&D expenditures by region. As in previous years, current expenditures were heavily concentrated in Ontario and Quebec in 2021, with these provinces accounting for 78.6% of total expenditures. Between 2020 and 2021, R&D expenditures decreased at a year-over-year rate of 27.0% in the Atlantic provinces and increased at a rate of 3.3% in Quebec, 14.1% in Ontario, and 20.6% in Western Canada.

TABLE 17. Current R&D Expenditures by Region, 2021 and 2020

Region	Expenditures: 2021 ($millions)	Share: 2021	Expenditures: 2020 ($millions)	Share: 2020	Annual change in expenditures
Atlantic provinces	$13.0	1.5%	$17.8	2.2%	-27.0%
Quebec	$235.0	26.3%	$227.5	28.4%	3.3%
Ontario	$466.4	52.3%	$408.7	51.0%	14.1%
Western provinces	$178.0	19.9%	$147.6	18.4%	20.6%
Territories	$0.1	0.0%	$0.0	0.0%	199.8%
Total*	**$892.5**	**100%**	**$801.7**	**100%**	**11.3%**

* Values may not add to totals due to rounding.

Data source: PMPRB

TOTAL R&D EXPENDITURES BY SOURCE OF FUNDS

Table 18 provides information on the sources of funds used by patentees to finance their R&D activity. Internal company funds remained by far the single largest source of funding in 2021, accounting for 90.2% of total expenditures. Funds received from government amounted to 0.5% of total expenditures.

TABLE 18. Total R&D Expenditures by Source of Funds, 2021 and 2020

Source of funds	Expenditures: 2021 ($millions)	Share: 2021	Expenditures: 2020 ($millions)	Share: 2020	Annual change in expenditures
Company funds	$832.3	90.2%	$745.9	90.6%	11.6%
Federal/provincial governments	$5.0	0.5%	$5.2	0.6%	-3.9%
Others	$85.7	9.3%	$71.8	8.7%	19.4%
Total*	**$922.9**	**100%**	**$822.9**	**100%**	**12.2%**

* Values may not add to totals due to rounding.

Data source: PMPRB

THE GLOBAL CONTEXT

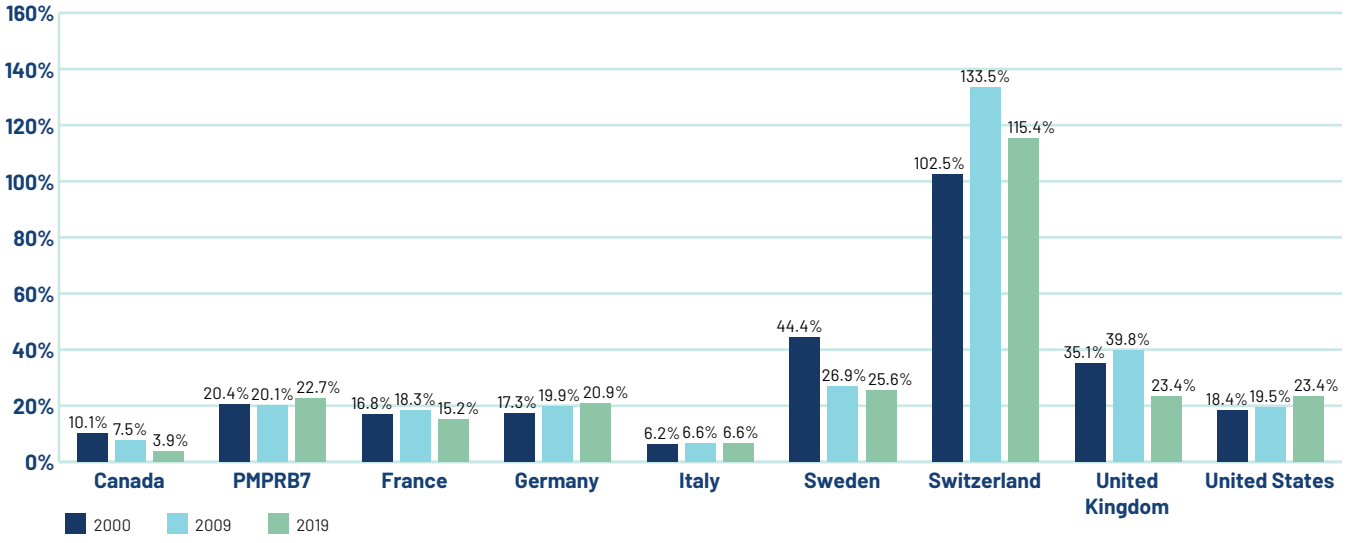
Figure 37 compares Canadian pharmaceutical R&D-to-sales ratios to those of the PMPRB7 in 2000, 2009, and 2019. These three years of data provide a snapshot of observed market trends over the past 20 years.

Starting in 2000, Canada had an R&D-to-sales ratio of 10.1%, lower than all PMPRB7 countries except for Italy at 6.2%. Canada's R&D-to-sales ratio moved down to 7.5% in 2009, likewise remaining below all PMPRB7 countries except for Italy at 6.6%. In 2019, Canada's R&D-to-sales ratio dropped below that in Italy, becoming the lowest among all comparator countries at 3.9%. Across all three years, Switzerland's ratios were much higher than the other comparator countries, rising from 102.5% in 2000 to 133.5% in 2009 and decreasing slightly to 115.4% in 2019.

The ratio obtained by aggregating R&D spending and sales across all PMPRB7 countries was 22.7%, more than five times that in Canada. The R&D-to-sales ratios represented in Figure 37 may be compared to the average bilateral price ratios reported in Table 9 (see "Comparison of Canadian Prices to Foreign Prices"). A number of comparator countries with patented medicine prices that are, on average, lower than prices in Canada, have achieved much higher R&D-to-sales ratios.

There are a multitude of factors that drive the location of pharmaceutical R&D, including where companies can find the best science base at a reasonable cost and have ready access to a quality clinical trials infrastructure. Although price levels and intellectual property protection are often cited as an important policy lever for attracting R&D, the data has not supported this link domestically or internationally.

FIGURE 37. R&D-to-Sales Ratios, Canada and the PMPRB7, 2000, 2009, and 2019



Data source: PMPRB; European Federation of Pharmaceutical Industries and Associations (EFPIA): *The Pharmaceutical Industry in Figures 2021*; PhRMA 2021 profile

ENDNOTES

[30] This is likely the situation for much of Canada's biotechnology sector. Note, however, that if a patentee commissions research from another company specializing in biotechnology research, the patentee should normally include this among the research expenditures that it reports to the PMPRB.

[31] Changes have been made to the Scientific Research and Experimental Development (SR&ED) tax credit since its implementation, including new restrictions on deductions, while other measures have been introduced at the federal level to support innovation and R&D. As per the Regulations, the PMPRB defines R&D based on the 1987 SR&ED definition.

[32] As published in the Regulatory Impact Assessment Statement (RIAS) of the *Patented Medicines Regulations*, 1988, published in the Canada Gazette, Part II, Vol. 122, No. 20 – SOR/DORS/88-474.

[33] The R&D-to-sales ratios presented in Table 14 include research expenditures funded by government grants. When the government-funded component is excluded, the ratios for all patentees and for the members of Innovative Medicines Canada in 2020 remain at 3.3% and 3.4%, respectively.

[34] Current R&D expenditures consist of non-capital expenses directly related to research, including (a) wages and salaries; (b) direct material; (c) contractors and sub-contractors; (d) other direct costs such as factory overhead; (e) payments to designated institutions; (f) payments to granting councils; and (g) payments to other organizations. These elements are described in more detail in Form 3 (Revenues and Research and Development Expenditures) available on the PMPRB website. Current R&D expenditures accounted for 96.7% of total R&D expenditure in 2021, while capital equipment costs and allowable depreciation expenses made up 1.1% and 2.1%, respectively.

[35] "Basic research" is defined as work that advances scientific knowledge without a specific application in mind. "Applied research" is directed toward a specific practical application, comprising research intended to improve manufacturing processes, pre-clinical trials, and clinical trials. "Other qualifying research" includes regulatory submissions, bioavailability studies, and Phase IV clinical trials.

THE PMPRB7 AVERAGE R&D RATIO IS MORE THAN 5X GREATER THAN IN CANADA.

The R&D-to-sales ratio obtained by aggregating R&D spending and sales across all seven comparator countries in 2019 was 22.7%, compared to just 3.9% in Canada.

APPENDIX 1: GLOSSARY

These definitions are provided for general assistance only; they have no legal force and should be read in conjunction with the applicable legislation.

Active Ingredient or Medicinal Ingredient: Chemical or biological substance responsible for the claimed pharmacologic effect of a medicine.

ATC: Anatomical Therapeutic Chemical (ATC) classification system, developed and maintained by the World Health Organization (WHO) Collaborating Centre for Drug Statistics Methodology, which divides medicines into different groups according to their site of action and therapeutic and chemical characteristics. This system is used by the PMPRB as a guide for selecting comparable medicines for purposes of price review under the Guidelines.

Drug Identification Number (DIN): A registration number (drug identification number) that the Health Products and Food Branch of Health Canada assigns to each prescription and non-prescription drug product marketed under the *Food and Drug Regulations*. A DIN uniquely identifies the following product characteristics: manufacturer; product name; active ingredient(s); strength of active ingredient(s); pharmaceutical dosage form; route of administration. Different strengths and dosage forms of a medicine may be assigned different DINs.

Drug Product: A particular presentation of a medicine characterized by its pharmaceutical dosage form and the strength of the active ingredient(s) (see "Medicine" below).

Failure to File: The complete or partial failure of a patentee to comply with regulatory filing requirements pursuant to the *Patent Act* and the *Patented Medicines Regulations*.

Failure to Report: The complete failure of a patentee to have reported a patented medicine being sold in accordance with regulatory filing requirements pursuant to the *Patent Act* and the *Patented Medicines Regulations*.

License, Voluntary: A contractual agreement between a patent holder and a licensee under which the licensee is entitled to enjoy the benefit of the patent or to exercise any rights in relation to the patent for some consideration (e.g., royalties in the form of a share of the licensee's sales).

Medicine: A medicinal ingredient and/or a substance or a mixture of substances manufactured, sold or represented for use in the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or its symptoms, in human beings or animals; or restoring, correcting or modifying organic functions in human beings or animals.

Notice of Compliance (NOC): A notice issued under section C.08.004 or C.08.004.01 of the *Food and Drug Regulations*. The issuance of an NOC indicates that a drug product meets the required Health Canada standards for use in humans or animals and that the manufacturer of the product is authorized to market the product in Canada.

Patent: An instrument issued by the Commissioner of Patents in the form of letters patent for an invention.

Patented Medicine Price Index (PMPI): The PMPI was developed by the PMPRB as a measure of average year-over-year change in the transaction prices of patented medicines sold in Canada, based on the price and sales information reported by patentees.

Patentee: As defined by subsection 79(1) of the *Patent Act*, "the person for the time being entitled to the benefit of the patent for that invention and includes, where any other person is entitled to exercise any rights in relation to that patent other than under a license continued by subsection 11(1) of the *Patent Act Amendment Act,* 1992, that other person in respect of those rights".

PMPRB7: France, Germany, Italy, Sweden, Switzerland, the United Kingdom, and the United States.

Research and Development (R&D): Basic or applied research for the purpose of creating new, or improving existing, materials, devices, products, or processes (e.g., manufacturing processes).

Research and Development—Applied Research: R&D directed toward a specific practical application, comprising research intended to improve manufacturing processes, pre-clinical trials, and clinical trials.

Research and Development—Basic Research: R&D defined as work that advances scientific knowledge without a specific application in mind.

Research and Development—Other Qualifying: Eligible research and development expenditures that cannot be classified into any of the preceding categories of "type of research and development". It includes regulatory submissions, bioavailability studies, and Phase IV clinical trials.

Research and Development Expenditures: For the purposes of the *Patented Medicines Regulations*, in particular Sections 5 and 6, research and development includes activities for which expenditures would have qualified for the investment tax credit for scientific research and experimental development under the *Income Tax Act* as it read on December 1, 1987.

Research and Development Expenditures–Current: Consist of the following non-capital expenses directly related to research work: (a) wages and salaries, (b) direct material, (c) contractors and subcontractors, (d) other direct costs such as factory overhead, (e) payments to designated institutions, (f) payments to granting councils, and (g) payments to other organizations. These elements are described in greater detail in the *Patentees' Guide to Reporting*—Form 3, available on the PMPRB website under Regulatory Filings.

Special Access Programme (SAP): A program operated by Health Canada to give practitioners access to medicines that are not approved or otherwise available in Canada.

Voluntary Compliance Undertaking (VCU): A written undertaking by a patentee to adjust its price to conform to the Board's Guidelines. A VCU represents a promise by a patentee geared towards a satisfactory resolution of an investigation initiated by Staff as per the Guidelines. A VCU takes into account the specific facts and underlying context of a particular case. As such, VCUs are not intended to have precedential value.

APPENDIX 2:
PATENTED MEDICINES/ NEW DOSAGE FORMS AND STRENGTHS FIRST REPORTED TO THE PMPRB IN 2021

TABLE 19. PATENTED MEDICINES FIRST REPORTED TO THE PMPRB IN 2021

Brand Name – Dosage Form and Strength	Company	DIN	Status - Full Year 2021	Level of Therapeutic Improvement
AJOVY - 225 MG/AUTO-INJECTOR	Teva Canada Innovation G.P.-S.E.N.C.	2509474	VCU	SN
AMGEVITA - 40 MG/SYRINGE	Amgen Canada Inc.	2459299	Within Guidelines	SN
AMGEVITA - 40 MG/AUTO-INJECTOR	Amgen Canada Inc.	2459302	Within Guidelines	SN
AMGEVITA - 20 MG/SYRINGE	Amgen Canada Inc.	2459310	Within Guidelines	SN
BRUKINSA - 80 MG/CAPSULE	BeiGene Ltd	2512963	Within Guidelines	SN
CREON MINIMICROSPHERES 35 - 35000 UNIT/CAPSULE	BGP Pharma ULC	2494639	Does Not Trigger	SN
DOJOLVI - 1000 MG/ML	Ultragenyx Pharmaceuticals Inc.	2512556	Does Not Trigger	SN
DUPIXENT - 300 MG/AUTO-INJECTOR	Sanofi-Aventis Canada Inc.	2510049	Subject to Investigation	SN
EMGALITY - 100 MG/ML	Eli Lilly Canada Inc.	2505134	Under Review	Under Review
EVRYSDI - 0.75 MG/ML	Hoffmann-La Roche Ltd	2514931	Subject to Investigation	SN
FASENRA PEN - 30 MG/DOSE	AstraZeneca Canada Inc.	2496135	Within Guidelines	SN
HADLIMA - 40 MG/SYRINGE	Organon Canada Inc.	2473097	Within Guidelines	SN
HADLIMA PUSH TOUCH - 40 MG/AUTO-INJECTOR	Organon Canada Inc.	2473100	Within Guidelines	SN
HIZENTRA - 200 MG/ML	CSL Behring Canada Inc.	2498251	Within Guidelines	SN
JANSSEN COVID-19 VACCINE - 0.5 ML/DOSE	Janssen Inc.	2513153	Under Review	Under Review
JORVEZA - 1 MG/TABLET	Avir Pharma Inc.	2493675	Subject to Investigation	SN

...Continued

Brand Name – Dosage Form and Strength	Company	DIN	Status - Full Year 2021	Level of Therapeutic Improvement
KESIMPTA - 20 MG/PEN	Novartis Pharmaceuticals Canada Inc.	2511355	Does Not Trigger	SN
NIROGACESTAT - 100 MG/TABLET	SpringWorks Therapeutics Inc.	–	Under Review	Under Review
NIROGACESTAT - 50 MG/TABLET	SpringWorks Therapeutics Inc.	–	Under Review	Under Review
NIROGACESTAT - 10 MG/TABLET	SpringWorks Therapeutics Inc.	–	Under Review	Under Review
PHESGO 60/60 - 120 MG/ML	Hoffmann-La Roche Ltd	2512920	Subject to Investigation	SN
PHESGO 80/40 - 120 MG/ML	Hoffmann-La Roche Ltd	2512912	Subject to Investigation	SN
POTELIGEO - 4 MG/ML	Kyowa Kirin Inc.		Under Review	Under Review
QINLOCK - 50 MG/TABLET	Medison Pharma Canada Inc.	2500833	Subject to Investigation	MI-P
RIABNI - 10 MG/ML	Amgen Canada Inc.	2513447	Within Guidelines	SN
TAKHZYRO - 150 MG/ML	Takeda Canada Inc.	2505614	Within Guidelines	SN
TAVALISSE - 100 MG/TABLET	Medison Pharma Canada Inc.	2508052	Subject to Investigation	SN
TAVALISSE - 150 MG/TABLET	Medison Pharma Canada Inc.	2508060	Within Guidelines	SN
ADYNOVATE - 250 IU/VIAL	Takeda Canada Inc.	2498537	Under Review	Under Review
ADYNOVATE - 500 IU/VIAL	Takeda Canada Inc.	2498545	Under Review	Under Review
ADYNOVATE - 1000 IU/VIAL	Takeda Canada Inc.	2498588	Under Review	Under Review
ARIKAYCE - 590 MG/VIAL	Insmed Inc.	–	Under Review	Under Review
BRAFTOVI - 75 MG/CAPSULE	Pfizer Canada ULC	2513099	Under Review	Under Review
CEQUA - 0.9 MG/ML	Sun Pharmaceutical Industries Inc.	2512629	Under Review	Under Review
ENHERTU - 100 MG/VIAL	AstraZeneca Canada Inc.	2514400	Under Review	Under Review
JORVEZA - 0.5 MG/TABLET	Avir Pharma Inc.	2513854	Under Review	Under Review
KALYDECO - 25 MG/PACK	Vertex Pharmaceuticals Canada Inc.	2519364	Under Review	Under Review
KANJINTI - 150 MG/VIAL	Amgen Canada Inc.	2518244	Under Review	Under Review
MEKTOVI - 15 MG/TABLET	Pfizer Canada ULC	2513080	Under Review	Under Review
MINJUVI - 200 MG/VIAL	Incyte Biosciences Canada Corporation	2518627	Under Review	Under Review
NEXTSTELLIS 15/3 - 18 MG/TABLET	Searchlight Pharma Inc.	2513218	Under Review	Under Review
ONUREG - 200 MG/TABLET	Celgene Inc.	2510197	Under Review	Under Review
ONUREG- 300 MG/TABLET	Celgene Inc.	2510200	Under Review	Under Review

...Continued

Brand Name – Dosage Form and Strength	Company	DIN	Status - Full Year 2021	Level of Therapeutic Improvement
OPSYNVI - 50 MG/TABLET	Janssen Inc.	2521083	Under Review	Under Review
POLIVY - 30 MG/VIAL	Hoffmann-La Roche Ltd	2515431	Under Review	Under Review
PONVORY - 1/KIT	Janssen Inc.	2515474	Under Review	Under Review
PONVORY - 20 MG/TABLET	Janssen Inc.	2515482	Under Review	Under Review
RINVOQ - 30 MG/TABLET	AbbVie Corporation	2520893	Under Review	Under Review
SUBOXONE 4/1 - 5 MG/FILM	Indivior Canada Ltd	2502321	Under Review	Under Review
TISSUEBLUE - 0.25 MG/ML	Dutch Ophthalmic Research Center (International) B.V.	2510995	Under Review	Under Review
TRELEGY ELLIPTA 200/62.5/25 - 287.5 MCG/DOSE	GlaxoSmithKline Inc.	2515776	Within Guidelines	SN
TEPMETKO - 225 MG/TAB	EMD Serono Canada Inc.	2516322	Under Review	Under Review
TRODELVY - 180 MG/VIAL	Gilead Sciences Canada Inc.	2520788	Under Review	Under Review
VIMIZIM - 1 MG/ML	BioMarin Pharmaceutical Canada Inc.	2427184	Under Review	Under Review
VERQUVO - 2.5 MG/TABLET	Bayer Inc.	–	Under Review	Under Review
VERQUVO - 5 MG/TABLET	Bayer Inc.	–	Under Review	Under Review
VERQUVO - 10 MG/TABLET	Bayer Inc.	–	Under Review	Under Review
XARELTO - 1 MG/ML	Bayer Inc.	2510162	Under Review	Under Review
XARELTO - 1 MG/ML	Bayer Inc.	2510170	Under Review	Under Review

SN Slight or No Improvement
MI-S Moderate improvement - Secondary
MI-P Moderate improvement - Primary
SI Substantial improvement
B Breakthrough

APPENDIX 3:
PHARMACEUTICAL TRENDS – SALES

TABLE 20. Sales of Patented Medicines, 1990 to 2021

Year	Patented medicine		5-year compound annual growth rate	Sales of patented medicines as a share of all medicine sales*	Patented medicine sales per capita	Change in patented medicine sales per capita	Patented medicine sales per GDP
	Sales ($billions)	Change					
2021	$17.4	-1.7%	2.2%	51.0%	$456.14	-3.3%	0.758%
2020	$17.7	3.0%	3.2%	55.4%	$472.00	2.9%	0.801%
2019	$17.2	3.5%	4.5%	57.5%	$458.60	2.7%	0.748%
2018	$16.7	-0.6%	4.5%	59.0%	$446.30	-1.7%	0.751%
2017	$16.8	7.6%	5.4%	61.5%	$454.09	5.4%	0.783%
2016	$15.6	3.3%	3.9%	60.8%	$430.94	2.2%	0.770%
2015	$15.1	9.4%	4.0%	61.6%	$421.80	8.5%	0.760%
2014	$13.8	3.1%	1.2%	59.9%	$388.70	1.8%	0.696%
2013	$13.4	4.2%	1.2%	60.7%	$381.80	2.7%	0.706%
2012	$12.9	0.1%	1.3%	59.2%	$371.80	-1.2%	0.708%
2011	$12.9	3.5%	2.0%	58.3%	$376.10	3.1%	0.729%
2010	$12.4	-4.3%	2.6%	55.8%	$364.70	-5.7%	0.746%
2009	$13.0	2.9%	4.4%	59.6%	$386.90	1.9%	0.829%
2008	$12.6	4.6%	5.4%	61.7%	$379.50	2.9%	0.762%
2007	$12.1	3.2%	6.3%	63.2%	$368.90	2.5%	0.769%
2006	$11.7	7.4%	9.0%	67.8%	$360.00	6.3%	0.784%
2005	$10.9	4.2%	11.6%	70.6%	$338.50	2.8%	0.769%
2004	$10.5	7.8%	14.2%	72.2%	$329.20	7.2%	0.789%

...Continued

Year	Patented medicine		5-year compound annual growth rate	Sales of patented medicines as a share of all medicine sales*	Patented medicine sales per capita	Change in patented medicine sales per capita	Patented medicine sales per GDP
	Sales ($billions)	Change					
2003	$9.7	9.0%	17.7%	72.7%	$307.00	8.0%	0.776%
2002	$8.9	17.5%	19.2%	67.4%	$284.30	16.0%	0.748%
2001	$7.6	18.9%	20.4%	65.0%	$245.20	19.1%	0.666%
2000	$6.3	16.7%	19.4%	63.0%	$205.90	15.9%	0.571%
1999	$5.4	27.0%	17.6%	61.0%	$177.60	24.3%	0.538%
1998	$4.3	18.9%	12.4%	55.1%	$142.90	15.4%	0.459%
1997	$3.7	22.6%	11.0%	52.3%	$123.70	22.1%	0.409%
1996	$3.0	12.8%	8.4%	45.0%	$101.40	14.2%	0.350%
1995	$2.6	10.8%	8.9%	43.9%	$88.70	7.2%	0.314%
1994	$2.4	-2.1%	–	40.7%	$82.80	-1.4%	0.304%
1993	$2.4	9.4%	–	44.4%	$83.90	7.9%	0.322%
1992	$2.2	14.0%	–	43.8%	$77.70	8.8%	0.307%
1991	$2.0	13.1%	–	43.2%	$71.40	16.0%	0.286%
1990	$1.7	–	–	43.2%	$61.60	–	0.245%

* The denominator in this ratio comprises sales of patented and non-patented brand medicines and patented and non-patented generic medicines. Starting with the estimate for 2005, this value is derived from data contained in IQVIA's MIDAS® database. In previous years, IQVIA data was used to calculate sales of generic medicines only, while sales of non-patented brand products were estimated from data submitted by patentees. This approach was abandoned because of anomalies related to year-to-year changes in the set of companies reporting to the PMPRB. Ratios reported for years before 2005 likely overstate the patented share, but by only a small amount. This small bias in no way invalidates the strong upward trend evinced by the results for the years 1990 through 2003. Ratios since 2009 have also been revised slightly as a result of data updates from IQVIA—none of these adjustments resulted in a change greater than 0.4%.

Data source: PMPRB; MIDAS® database, 2005–2021, IQVIA (all rights reserved)

APPENDIX 4: RESEARCH AND DEVELOPMENT

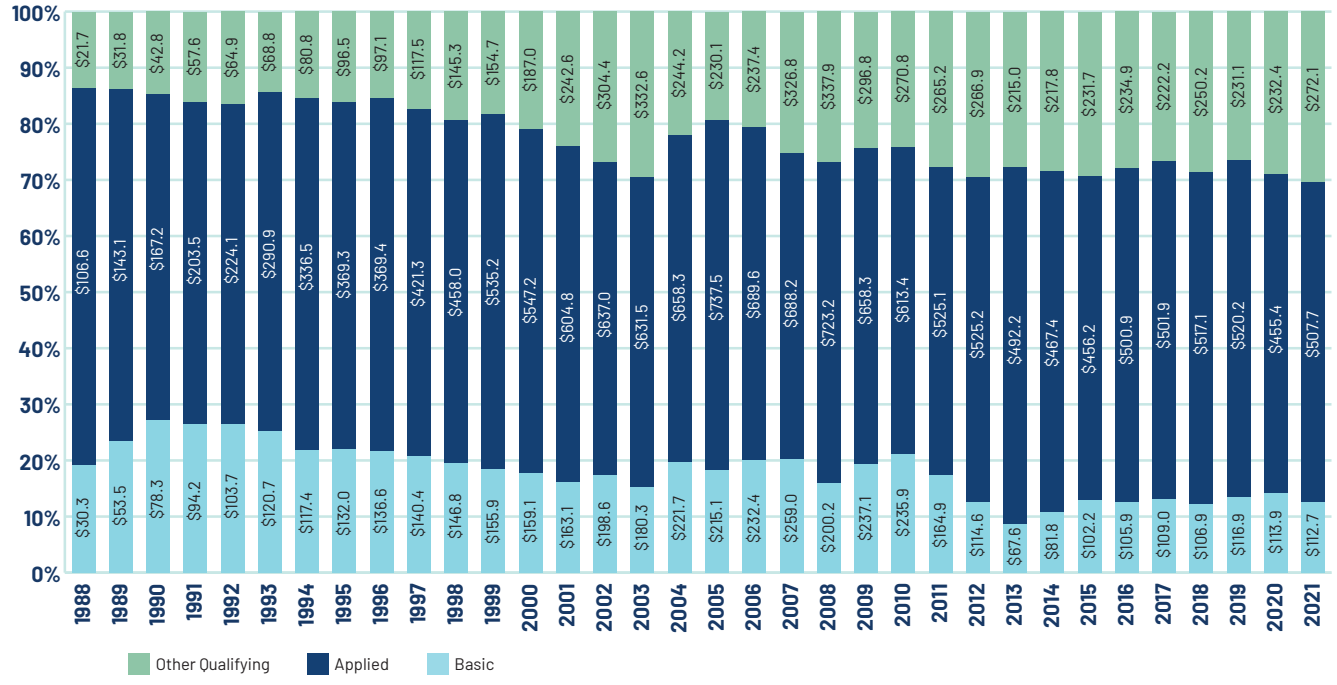
TABLE 21. Range of R&D-to-Sales Ratios by Number of Reporting Companies and Total Sales Revenue, 2021 and 2020

Range: R&D-to-sales ratio	Number of reporting companies: 2021	Sales revenues: 2021 ($millions)	Share: 2021 (%)	Number of reporting companies: 2020	Sales revenues: 2020 ($millions)	Share: 2020 (%)
0%	44	$3,017.2	11.0%	42	$2,552.2	10.5%
≤10%	43	$23,160.3	84.3%	42	$20,538.3	84.6%
>10%	13	$1,301.0	4.7%	15	$1,187.7	4.9%
Total*	**100**	**$27,478.5**	**100%**	**99**	**$24,278.2**	**100%**

* Values may not add to totals due to rounding.

Data source: PMPRB

FIGURE 38. Current R&D Expenditures ($millions) by Type of Research, 1988 to 2020



Data source: PMPRB

TABLE 22. Ratios of R&D Expenditures to Sales Revenue by Reporting Patentee[1], 2021 and 2020

Company	R&D-to-sales ratio 2021	R&D-to-sales ratio 2020	MIP-to-Cdn price ratio – 5 country limit	Canadian sales compared to PMPRB7 sales 2021	Canadian sales compared to rest of OECD sales 2021
AbbVie Corporation[2,3]	2.4%	2.8%	0.83	2.8	2.6
Advanced Accelerator Applications[3]	0.0%	0.0%	–	0.1	0.04
Aerie Pharmaceuticals Inc.	0.0%	0.0%	–	–	–
Alexion Pharmaceuticals Inc.[3]	0.0%	0.0%	0.91	–	–
ALK-Abelló A/S	7.7%	1.4%	1.08	3.6	2.8
Alkermes Inc.	0.0%	N/A	–	–	–
Allergan Inc.	2.2%	1.4%	0.72	1.6	1.5
Alnylam Pharmaceuticals Inc.[3]	0.0%	0.0%	–	–	–
Altius Healthcare Inc.	14.4%	40.9%	–	–	–
Amgen Canada Inc.[2,3]	3.2%	3.6%	0.90	1.7	1,6
Amicus Therapeutics UK Ltd[2]	0.0%	0.0%	1.19	–	–
Aralez Pharmaceuticals Inc.	0.0%	0.0%	–	–	–
Astellas Pharma Canada Inc.[2]	0.03%	0.1%	1.24	3.5	2.3
AstraZeneca Canada Inc.[2,3]	8.0%	7.3%	0.89	4.9	3.9
Avir Pharma Inc.	0.0%	0.0%	0.98	–	–
Bausch Health Canada Inc.	0.4%	0.4%	1.20	5.2	4.5
Baxter Corporation	0.1%	0.1%	1.37	0.4	0.3
Bayer Inc.[2,3]	3.8%	5.1%	0.99	14.0	6.7
BeiGene Ltd[3,4]	76.6%	N/A	–	–	–
BGP Pharma ULC	0.0%	0.0%	0.54	90.5	63.9
Biogen Idec Canada Inc.[3]	11.1%	10.4%	0.94	3.2	2.4
BioMarin Canada Inc.[3]	2.1%	5.1%	0.94	–	–
Boehringer Ingelheim (Canada) Ltd[2]	1.1%	1.8%	0.87	3.2	2.7
Bristol-Myers Squibb Canada[2,3]	9.8%	7.4%	0.99	–	–
Celgene Inc.[2]	0.3%	1.4%	0.99	0.6	0.2
Cheplapharm Arzneimittel GmbH	0.0%	0.0%	0.72	1.6	1.3
Chiesi USA Inc.	0.0%	0.0%	–	0.6	0.4
Cipher Pharmaceuticals Inc.	0.9%	1.3%	–	–	–
CSL Behring Canada Inc.[3]	0.1%	0.1%	1.62	–	–
Duchesnay Inc.	0.0%	0.1%	–	11.6	10.4
Dutch Ophthalmic Research Center (International) B.V.[4]	0.0%	N/A	–	–	–
Eisai Ltd[3]	21.6%	27.8%	0.92	1.7	0.9
Eli Lilly Canada Inc. (incl. Provel Animal Health Division)[2,3]	8.6%	5.2%	0.91	1.2	1.1
Elvium Life Sciences[2,4]	0.6%	N/A	0.84	–	–

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Company	R&D-to-sales ratio 2021	R&D-to-sales ratio 2020	MIP-to-Cdn price ratio – 5 country limit	Canadian sales compared to PMPRB7 sales 2021	Canadian sales compared to rest of OECD sales 2021
EMD Serono Canada Inc.[2]	0.0%	0.0%	1.01	3.4	3.3
Fresenius Kabi[4]	0.4%	N/A	–	0.9	0.7
Ferring Pharmaceuticals Inc.[3]	0.0%	0.0%	0.85	3.4	2.5
Galderma Canada Inc.	0.0%	0.0%	0.36	5.3	4.3
GE Healthcare Inc.	0.0%	0.0%	–	–	–
Gilead Sciences Canada Inc.[2,3]	20.7%	17.2%	0.95	2.1	1.8
GlaxoSmithKline Inc.[2]	6.3%	2.6%	0.96	59.0	14.9
Grifols Canada Ltd (Talecris Biotherapeutics Ltd)[3]	0.0%	0.0%	–	–	–
HLS Therapeutics Inc.	0.2%	0.2%	–	74.5	74.5
Hoffmann-La Roche Ltd Canada[2,3]	6.9%	6.4%	1.09	11.7	5.9
Horizon Pharma PLC[2,3]	0.0%	0.0%	–	–	–
Incyte Biosciences Canada Corporation[2,3,4]	0.0%	N/A	–	–	–
Indivior Canada Ltd	0.0%	0.0%	0.92	3.8	3.7
Insmed Inc.[4]	0.0%	N/A	–	–	–
Intercept Pharmaceuticals Inc.	8.3%	6.7%	–	1.3	1.0
Ipsen Biopharmaceuticals Inc.[2,3]	0.4%	0.3%	0.88	2.6	1.9
Janssen Inc.[2,3]	2.4%	2.3%	1.05	8.1	6.1
Jazz Pharmaceuticals[3]	41.1%	36.4%	–	0.2	0.1
Johnson & Johnson Medical Products	0.0%	0.0%	–	–	–
Knight Therapeutics Inc.[2]	4.4%	5.1%	0.52	–	–
Labtician Théa.	4.3%	10.4%	0.92	–	–
Lantheus MI Canada Inc.	0.0%	0.0%	–	–	–
LEO Pharma Inc.[2]	0.1%	0.1%	0.67	15.2	8.4
Lundbeck Canada Inc.[2]	0.6%	0.6%	0.59	12.5	7.4
Lupin Pharma Canada Ltd	0.0%	0.0%	0.97	0.7	0.7
Medexus Inc.	0.0%	0.0%	1.66	36.6	26.8
Medison Canada	44.0%	0.0%	–	–	–
Merck Canada Inc.[2,3]	5.9%	5.7%	1.00	4.1	3.2
Merz Pharma Canada Ltd	0.0%	0.0%	1.17	2.5	1.8
Noden Pharma DAC	0.0%	0.0%	–	4.1	3.6
Novartis Pharmaceuticals Canada Inc.[2,3]	1.7%	1.9%	0.91	5.1	3.5
Novo Nordisk Canada Inc.[2,3]	1.4%	1.3%	1.94	2.7	2.4
Octapharma Canada Inc.	0.0%	0.0%	–	–	–
Organon Canada Inc.[4]	0.0%	N/A	1.03	–	–
Otsuka Canada Pharmaceutical Inc. (OCPI)[2]	2.1%	1.5%	0.99	6.0	2.9
Paladin Labs Inc.[2]	0.3%	0.2%	1.07	–	–

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Company	R&D-to-sales ratio 2021	R&D-to-sales ratio 2020	MIP-to-Cdn price ratio – 5 country limit	Canadian sales compared to PMPRB7 sales 2021	Canadian sales compared to rest of OECD sales 2021
Partner Therapeutics Inc.	0.0%	0.0%	–	–	–
Pediapharm Inc.	0.0%	0.0%	–	–	–
Pfizer Canada Inc.[2,3]	0.1%	0.3%	1.17	3.9	3.2
Pierre Fabre Dermo-Cosmétique Canada Inc.	0.0%	0.0%	1.01	0.5	0.2
Purdue Pharma	0.1%	0.7%	1.22	14.7	12.8
Recordati Rare Diseases	0.0%	0.0%	0.85	–	–
Sandoz Canada Inc.	0.0%	0.0%	–	15.3	8.1
Sanofi Canada Inc.[2,3]	1.5%	2.3%	0.89	24.3	11.3
Sanofi Pasteur Ltd	43.7%	47.5%	–	–	–
Santen SAS[2]	0.0%	0.0%	–	0.3	0.02
Searchlight Pharma Inc.	0.0%	0.0%	0.96	–	–
Seagen Canada Inc. (Seattle Genetics Inc.)[3]	7.4%	11.6%	1.35	–	–
Seqirus Canada Inc.[3]	9.5%	8.0%	1.87	0.4	0.3
Servier Canada Inc.[2,3]	2.7%	3.7%	1.04	33.0	6.5
SpringWorks Therapeutics Inc.[4]	0.0%	N/A	1.48	–	–
SteriMax Inc.	1.0%	1.6%	–	99.0	97.0
Sun Pharmaceutical Industries Inc.	342.7%	20,074.4%	–	0.5	0.4
Sunovion Pharmaceuticals Canada Inc.[2]	0.0%	0.0%	0.49	1.1	1.0
Swedish Orphan Biovitrum AB (Sobi)[2,3]	0.0%	0.0%	0.83	0.05	0.02
Taiho Oncology Inc.[3]	44.0%	2.3%	1.10	3.1	0.8
Takeda Canada Inc.[2,3]	0.1%	0.1%	–	3.8	2.8
Theratechnologies Inc.[2]	665.7%	798.5%	–	–	–
Teva Canada Innovation[3]	0.1%	0.1%	0.98	5.8	4.5
UCB Canada Inc.[3]	20.0%	7.8%	0.95	1.6	1.2
Ultragenyx Pharmaceutical Inc.[3]	12.1%	21.3%	0.88	–	–
Upjohn Canada ULC	0.0%	0.0%	0.77	14.1	9.3
Valeo Pharma[2]	0.0%	0.0%	0.72	–	–
Vertex Pharma Canada Inc.[3]	0.5%	0.0%	1.06	–	–
ViiV Healthcare ULC[2]	0.0%	0.0%	1.03	3.0	2.4
Xediton Pharmaceuticals Inc.	0.0%	0.0%	0.93	–	–

[1] To avoid double counting sales revenues, revenues from royalties are included in calculating each company's ratio but not included in calculating industry-wide ratios. Federal and provincial government grants are subtracted from the R&D expenditure in calculating individual R&D-to-sales ratios but are included in calculating industry-wide ratios. Differences between the list of companies filing data on prices and those filing R&D data are due to differences in the reporting practices of patentees and their affiliates or licensees. Note as well that some veterinary patentees (i.e., those without revenue from sales of products for human use) are required to file information on R&D expenditures but not price and sales information.

[2] Member of Innovative Medicines Canada.

[3] Member of BIOTECanada.

[4] Not a patentee in 2020.

Data source: PMPRB

TABLE 23. Current R&D Expenditures by Province/Territory, 2021

Province	Expenditures: All patentees ($thousands)	Regional share	Expenditures: Innovative Medicines Canada ($thousands)	Regional share
Newfoundland and Labrador	$1,464.25	0.164%	$895.40	0.125%
Prince Edward Island	$205.92	0.023%	$5.61	0.001%
Nova Scotia	$9,742.19	1.092%	$6,856.88	0.958%
New Brunswick	$1,593.48	0.179%	$1,062.29	0.148%
Quebec	$234,974.95	26.327%	$202,379.46	28.269%
Ontario	$466,443.52	52.262%	$351,638.91	49.118%
Manitoba	$3,712.12	0.416%	$2,457.72	0.343%
Saskatchewan	$2,095.55	0.235%	$619.40	0.087%
Alberta	$101,173.12	11.336%	$96,139.53	13.429%
British Columbia	$71,035.55	7.959%	$53,852.32	7.522%
Territories	$70.60	0.008%	$0.00	0.000%
Canada*	**$892,511.25**	**100%**	**$715,907.52**	**100%**

* Provincial/territorial values may not add to totals for Canada due to rounding.

Data source: PMPRB

TABLE 24. Current R&D Expenditures by Performer and Province/Territory, 2021

Province		Patentees	Other companies	Universities	Hospitals	Others
Newfoundland and Labrador	Expenditure ($thousands)	$644.61	$536.50	$113.05	$21.95	$148.14
	Share	44.0%	36.6%	7.7%	1.5%	10.1%
Prince Edward Island	Expenditure ($thousands)	$91.39	$108.93	$0.00	$5.61	$0.00
	Share	44.4%	52.9%	0.0%	2.7%	0.0%
Nova Scotia	Expenditure ($thousands)	$1,198.57	$2,991.64	$1,112.77	$477.82	$3,961.38
	Share	12.3%	30.7%	11.4%	4.9%	40.7%
New Brunswick	Expenditure ($thousands)	$663.86	$343.86	$110.41	$73.14	$402.21
	Share	41.7%	21.6%	6.9%	4.6%	25.2%
Quebec	Expenditure ($thousands)	$58,203.70	$93,591.89	$18,745.84	$23,572.73	$40,860.79
	Share	24.8%	39.8%	8.0%	10.0%	17.4%
Ontario	Expenditure ($thousands)	$256,804.92	$82,968.76	$39,193.78	$46,616.06	$40,859.99
	Share	55.1%	17.8%	8.4%	10.0%	8.8%
Manitoba	Expenditure ($thousands)	$1,587.87	$665.01	$653.29	$509.43	$296.52
	Share	42.8%	17.9%	17.6%	13.7%	8.0%
Saskatchewan	Expenditure ($thousands)	$672.77	$475.52	$506.36	$11.04	$429.86
	Share	32.1%	22.7%	24.2%	0.5%	20.5%
Alberta	Expenditure ($thousands)	$73,532.40	$12,437.76	$4,072.90	$4,192.31	$6,937.76
	Share	72.7%	12.3%	4.0%	4.1%	6.9%
British Columbia	Expenditure ($thousands)	$23,860.60	$31,702.34	$4,763.28	$3,179.76	$7,529.57
	Share	33.6%	44.6%	6.7%	4.5%	10.6%
Territories	Expenditure ($thousands)	$70.60	$0.00	$0.00	$0.00	$0.00
	Share	100.0%	0.0%	0.0%	0.0%	0.0%
Canada*	**Expenditure ($thousands)**	**$417,331.29**	**$225,822.21**	**$69,271.68**	**$78,659.85**	**$101,426.22**
	Share	**46.8%**	**25.3%**	**7.8%**	**8.8%**	**11.4%**

Note: For each jurisdiction, the share for each category represents the percentage of total R&D expenditures for the given province or territory (or nationally for the total R&D in Canada).

* Provincial/territorial expenditures may not add to totals for Canada and shares across individual rows may not add to 100% due to rounding.

Total R&D expenditures are the sum of current expenditures and capital expenditures (equipment + depreciation).

Data source: PMPRB