

The Real Story Behind Big Pharma's R&D Spending in Canada

Canadian Generic Pharmaceutical Association

GENERIC DRUGS.



SAME QUALITY. LOWER PRICE.

Canadian Generic Pharmaceutical Association 4120 Yonge Street, Suite 409, Toronto ON M2P 2B8
Tel: (416) 223-2333 Fax: (416) 223-2425 Website: www.canadiangenerics.ca

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The mantra of the brand-name pharmaceutical industry is that without higher prices and extraordinary rules like the *Patented Medicines (Notice of Compliance) Regulations* and increased data protection provisions there will not be enough profit to recoup investments in research and development.

“Sales and marketing spend is running at roughly twice that of R&D spend. This ratio is making it quite difficult to use the R&D argument successfully.”

AstraZeneca CEO Tom McKillop, *The Pink Sheet*, November 22, 2004

In fact, the lobby group for the brand-name industry in Canada claims that the average cost to develop a new medicine is \$1.3 billion. This figure is a conversion to Canadian dollars from the US\$800 million figure used by the brands in the United States.

One of the most commonly cited sources for this figure is a November 2001 report from the Tufts Center for the Study of Drug Development, which receives 65% of its funding from drug companies. (*Comparing Facts. Innovative Medicines vs. Generic Copy*, Rx&D website www.canadapharma.org). However, most industry observers who have not been paid by the brand-name pharmaceutical industry say these figures are grossly exaggerated.

Dr. Marcia Angell on Big Pharma's \$800-million per drug figure

It was not until a year and a half later that the Tufts group actually published their analysis and it became possible to see how it was done. What they did was look at sixty-eight drugs developed at ten drug companies over about a decade. But the names of the companies and the names of the drugs were never revealed. Furthermore, all of the data on the costs of those drugs were supplied by the companies to the Tufts group confidentially, and as far as I can tell, the authors were not able to verify the information. They were supposed to take the companies' word, and we were supposed to take theirs. That situation is extremely unusual in scientific publishing, where it is understood that the salient data will be made available to readers so they can evaluate the analysis for themselves.

But one thing *is* clear from the paper. The \$802 million figure has nothing to do with the “average cost of developing a new drug,” in the words of *The New York Times*. It refers only to the cost of developing a tiny handful of the very most expensive drugs.

The Tufts analysis was restricted to new molecular entities (NMEs) developed entirely within the drug companies – what the authors called “self-originated NDEs” (the old term for NMEs). But these constitute only a tiny percentage of all new drugs.

There is a second problem with the Tufts estimate. It is not the actual out-of-pocket cost at all, even for the special group of drugs considered. That cost was \$403 million per drug. The \$802 million is what the authors call the “capitalized” cost – that is, it includes the estimated revenue that might have been generated if the money spent on R&D had instead been invested in the equity market.

And there is a third problem with the estimate. It is in pre-tax dollars. But R&D costs are fully tax deductible.

The Truth About The Drug Companies: How They Deceive Us And What to Do About It, Marcia Angell, M.D. Pages 42, 43, 44 & 45.

Big Pharma breaking its R&D commitment to Canadians

The 2005 Annual Report of the Patented Medicine Prices Review Board (PMPRB) shows that for the fifth consecutive year Big Pharma's R&D-to-sales ratio has fallen below the level the industry promised when the Mulroney government passed Bill C-22.

Pharmaceutical patentees spent only 8.7% of their revenues on research and development, below the 10% threshold the industry committed to in 1987.¹

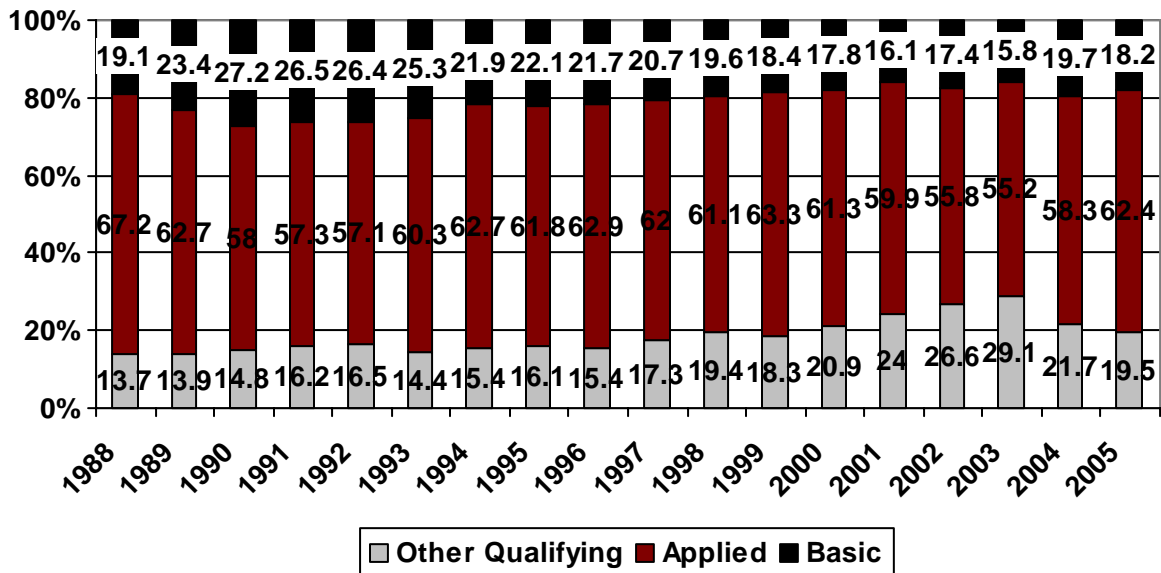
Expenditure by type of research

Even more telling figures provided by the PMPRB are for allocation of research and development spending by type of research.

Spending on basic research accounts for only 18.2% of total R&D

"Patentees reported spending \$215.17 million on basic research, representing 18.2% of current R&D expenditure. Basic Research decreased by 3% in 2005 relative to the previous year."²

R&D Expenditure by Type of Research, 1988-2005³



¹ Patented Medicine Prices Board – Annual Report 2005, page 38

² Patented Medicine Prices Board – Annual Report 2005, page 40

³ Patented Medicine Prices Board – Annual Report 2005, page 41

Clinical trials account for nearly 80% of applied research

“Applied research is directed toward a specific practical application, comprising research intended to improve manufacturing processes, pre-clinical trials and clinical trials. Patentees reported spending \$737.5 million on applied research, representing 62.4% of current R&D expenditure. Clinical trials accounted for 76.9% of applied research expenditure.

Other qualifying research (includes drug regulation submissions, bioavailability studies and Phase IV clinical trials) accounted for the remaining 19.5% of current expenditure in 2005.”⁴

Increased patent protection has not resulted in increased R&D spending

This data proves that the nearly 20 years of concessions to the brand-name pharmaceutical industry by the Government of Canada, including Bill C-22, Bill C-91 (which brought in the *Patented Medicines (Notice of Compliance) Regulations*) and Bill S-17, have had limited impact on research and development in Canada.

The vast majority of brand-name drug company R&D spending in Canada is to obtain regulatory approval so that their products can be marketed in Canada.

In terms of investment by brand-name companies in research and development, Canadians have received virtually nothing in return for these patent rules that they would not have already received solely due to the regulatory approval process for pharmaceutical products.

Generic Pharmaceutical R&D Spending in Canada Outpaces Brands’

The generic industry spends approximately \$425-million annually on research and development in Ontario. In fact, one of CGPA’s member companies, Toronto-based Apotex, is the largest R&D spender among all pharmaceutical companies in Canada – brand or generic. According to Research Infosource’s 2005 annual list of the top 100 corporate R&D spenders in Canada, Apotex spent \$173-million on R&D, which equals 20% of the company’s sales. Number two on the list was brand-name giant Pfizer, which spent \$160-million on R&D, or 9% of its sales \$2.4-billion in Canadian sales.

What is also significant about these figures is that generic pharmaceutical companies make these investments on sales of less than \$3-billion in Canada. The remainder, or \$14-billion of the \$16.8-billion spent annually on prescription drugs in Canada, is spent on brand-name drugs. Even setting aside the significant savings that generic pharmaceuticals bring to Canada’s health-care system, from a purely jobs and investment perspective, it is an indisputable fact that a dollar spent on a generic drug results in more jobs, more investment in R&D and more investment in pharmaceutical manufacturing capacity in Canada than a dollar spent on a brand-name drug.

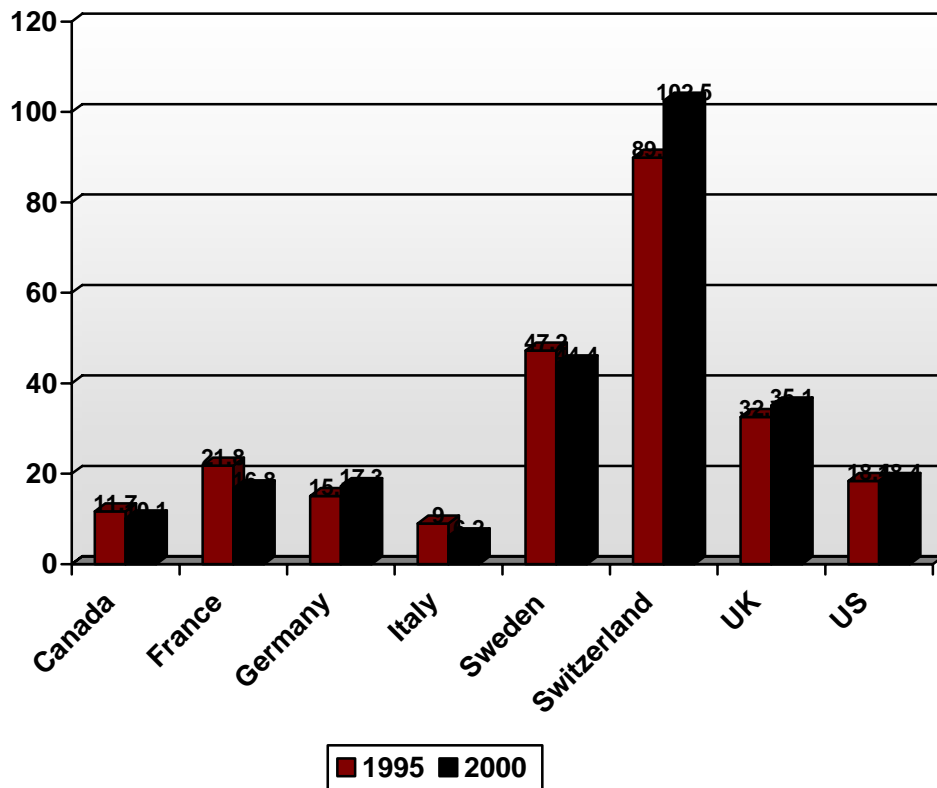
⁴Patented Medicine Prices Board – Annual Report 2005, page 41

Canada's pharmaceutical R&D spending well behind other countries

The PMPRB's December 2002 report *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, reported the following:

- Despite growth in R&D spending, Canada ranked behind other major industrialized countries in R&D spending by several measures.
- The ratio of R&D to domestic sales in Canada remains well below values in the United States and Europe. In 2000, the Canadian ratio was 10.1% while the aggregate ratio for the seven countries used for the PMPRB's comparison was nearly double that at 19%. Only Italy had a lower ratio than Canada.
- Among major industrialized countries, Canada accounts for a share total R&D that is roughly one-half of its share of total pharmaceutical sales.⁵

R&D-to-domestic-sales ratios, Canada and selected countries, 1995-2000⁶

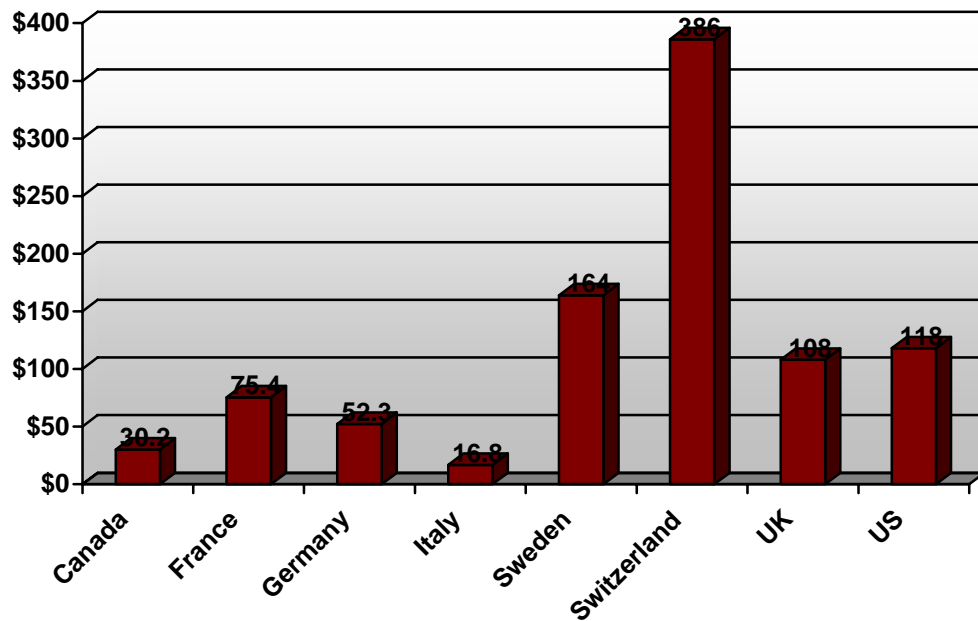


⁵ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 4

⁶ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 13

The PMPRB report also shows that, in 2000, R&D spending in Canada was \$30.2 per person, well below the aggregate value of \$90 for the other countries. Once again, Canada surpassed only Italy in R&D spending per capita.⁷

Pharmaceutical R&D spending per capita, Canada and C7 countries, 2000⁸



Shares of world pharmaceutical sales and R&D spending

As another way of assessing Canada's R&D performance, the PMPRB report also compared world shares of R&D spending and sales.

As the report stated: "To the extent sales revenue earned in a particular country governs the pharmaceutical industry's ability to conduct research in that country, one might expect a rough equality between the world shares of research investment and sales."⁹

This is not what the PMPRB found in Canada. In 2000, sales in Canada accounted for 3.4% of the total sales (\$275 billion) of the eight countries, while research and development spending accounted for only 1.8% of total R&D. Sweden, Switzerland and the UK all had R&D shares substantially higher than their sales shares. In France, Germany and the US, R&D and sales shares were about equal.¹⁰

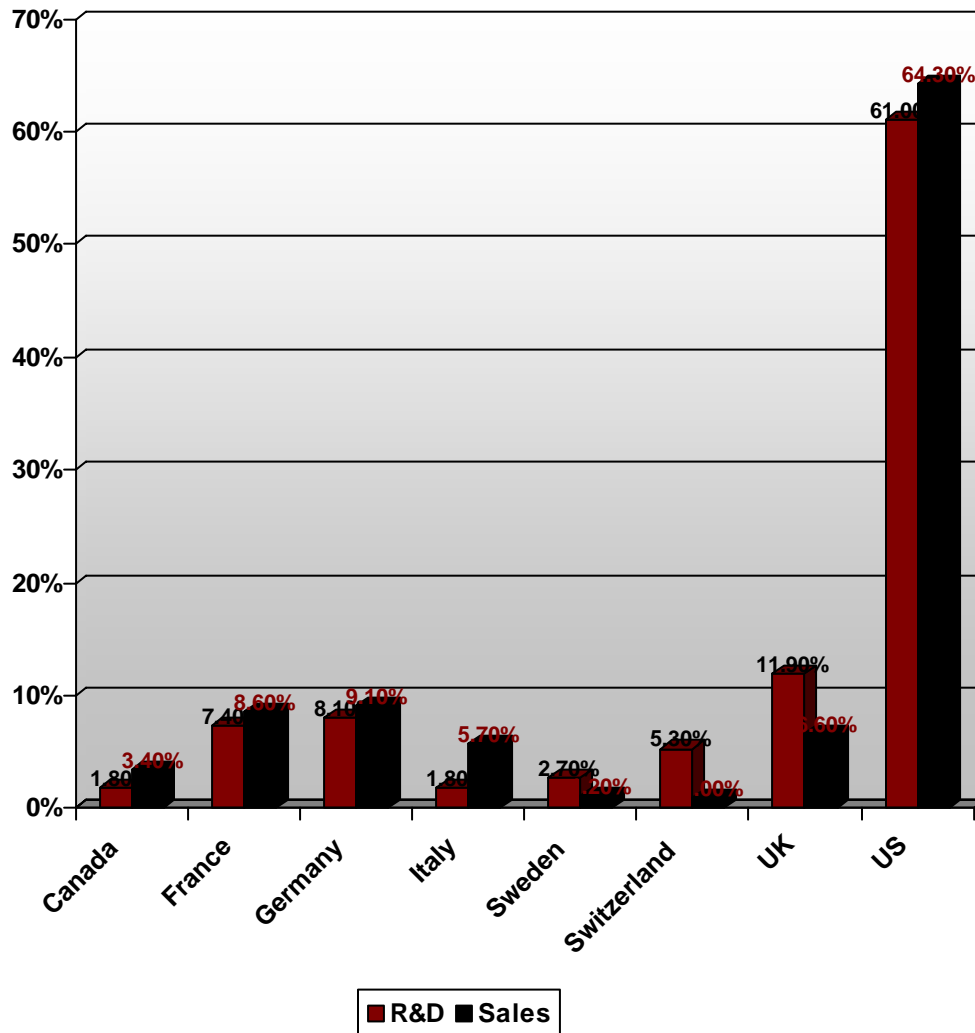
⁷ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 16

⁸ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 17

⁹ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 19

¹⁰ *A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries*, Patented Medicine Prices Review Board, page 19

**Distribution of pharmaceutical R&D spending and sales,
Canada and C7 countries, 2000¹¹**



Clearly, the multinational brand-name pharmaceutical companies are developing their new drugs in their home countries, not here in Canada. The vast majority of spending on R&D they do in Canada is for things like clinical trials in order to obtain regulatory approval to market their products in Canada.

¹¹ A Comparison of Pharmaceutical Research and Development Spending in Canada and Selected Countries, Patented Medicine Prices Review Board, page 19

Taxol: A Case Study on Big Pharma's "Innovation"

Take the case of Taxol (the brand name for paclitaxel), the bestselling cancer drug in history. Now used to treat cancers of the ovary, breast and lung, it was derived from the bark of the Pacific yew tree in the 1960s. All of the research on the drug was conducted at, or supported by, the National Cancer Institute over nearly thirty years, at a cost to taxpayers of \$183 million. In 1991, Bristol-Myers Squibb signed a cooperative research and development agreement with the NCI – a deal made possible by the Stevenson-Wydler Act and a 1986 amendment called the Federal Technology Transfer Act. The company's part of the bargain was mainly to supply the NCI with seventeen kilograms of paclitaxel (which it obtained from a chemical company). No ingenuity there. In 1992, after Taxol was approved by the FDA for treatment of cancer of the ovary, entirely on the basis of NIH-supported research, Bristol-Myers Squibb was given five years of exclusive marketing rights.

The only remaining problem for Bristol-Myers Squibb was the fact the Pacific yew tree was in short supply. That problem was solved in 1994 by NIH-funded scientists at Florida State University. They devised a method to synthesize Taxol, which they promptly licensed to Bristol-Myers Squibb in return for royalties. No company ingenuity there, either.

The worldwide use of Taxol (for cancers of the ovary, breast, and lung) generated between \$1 and \$2 billion a year for Bristol-Myers Squibb and tens of millions in annual royalties for Florida State University. The company spent very little on R&D in getting initial FDA approval to treat cancer of the ovary, although it has undoubtedly spent substantial sums since then for testing the drug for other cancers. But that takes no ingenuity, either. The story of Taxol is a prime example of a taxpayer-supported research discovering a valuable and lucrative drug that was virtually given as a gift to a large drug company for marketing, commercial exploitation, and further development. The public pays again when it buys Taxol at the exorbitant price Bristol-Myers Squibb charges for a drug it neither discovered nor developed.

When it came on the market, Taxol sold for \$10,000 to \$20,000 for a year's treatment – reportedly a twentyfold markup over manufacturing costs. Bristol-Myers Squibb, you will recall, put next to nothing into the initial R&D, although it has since sponsored clinical trials aimed at expanding the uses of the drug. In a blazing act of hubris, the company fought tooth and nail to extend its exclusive rights on Taxol beyond the original five-year term, and managed to win another three years by suing the generic manufacturers who wanted to enter the market. As of 2003, the company had paid royalties to the NIH of only \$35 million on its \$9 billion in sales of Taxol (the agreement was 0.5 percent in royalties). Going in the other direction, the government paid Bristol-Myers Squibb hundreds of millions of dollars for Taxol through the Medicare program.

The Truth About The Drug Companies, Dr. Marcia Angell, pages 58, 66

Pharmaceutical Industry Investment in Canada: Generic vs. Brand

Canadian Sales

Total annual spending on prescription drugs: \$16.8 billion
 Brand name: \$13.9 billion (82.6%)
 Generic: \$2.9 billion (17.4%)

Total number of prescriptions filled: 389 million
 Brand name: 220 million (56.5%)
 Generic: 169 million (43.5%)

Source: IMS HEALTH - 12-months ending March 2006

Employment in Canada

Brand name: 22,000 (Source: Rx&D)
 Generic: 10,500

Research and Development Spending in Canada

Brand name: \$1.23 billion/8.7% of sales
 (Source: Patented Medicine Prices Review Board)
 Generic: \$425 million/15% of sales

Canadian Trade Balances: Pharmaceutical and Medicine Manufacturing

Source: Statistics Canada, July 17, 2006

Value in Millions of Canadian Dollars

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Exports	516	684	816	940	1,327	1,562	1,681	1,853	2,307	2,552	3,401	4,011	4,335
Total Imports	2,072	2,360	2,643	2,927	3,298	4,196	5,086	5,962	7,044	8,055	8,993	9,507	9,986
Trade Balance	(1,556)	(1,666)	(1,827)	(1,987)	(1,971)	(2,634)	(3,405)	(4,109)	(4,737)	(5,504)	(5,592)	(5,496)	(5,651)

Canada's Trade Deficit in Pharmaceutical and Medicine Manufacturing

As the chart above illustrates, data from Statistics Canada shows that Canada's trade deficit in pharmaceutical and medicine manufacturing has grown from \$1.6-billion in 1993 to \$5.7-billion in 2005.

Not only is Canada not getting its fair share of R&D spending from the brand-name pharmaceutical industry, this industry has restricted its manufacturing capacity in Canada thus leading to a flood of imports and only limited exports.

The Vice-Chair (Mr. Dan McTeague): Yes, sir.

Let me ask you a question then on that. I realize that the capsule form expired earlier but you have the tablets today. These tablets are obviously a very lucrative business. They are the second-largest sales in Canada.

Of those tablets, sir, how many of them are manufactured here in Canada, and I'm not talking about packaging. How many tablets of Losec are produced in Canada and sold in Canada?

Mr. Gerry McDole (President and Chief Executive Officer of AstraZeneca Canada Inc.): The tablets are not manufactured here. They are only packaged here.

The Vice-Chair (Mr. Dan McTeague): Not one tablet is made in Canada?

Mr. Gerry McDole: No.

Hansard transcript of the House of Commons Standing Committee on Industry, Science and Technology, Wednesday, June 4, 2003

Conclusion

From a public policy perspective, the most important and relevant question regarding the pharmaceutical patent regime is whether or not it is serving the interests of Canadians.

Nearly 20 years after the introduction of Bill C-22, which gave brand-name drug companies longer periods of market monopoly, and more than 10 years after the introduction of the *Patented Medicines (Notice of Compliance) Regulations* of Canada's *Patent Act*, it is evident that the shift in Canada's pharmaceutical policy in favour of brand-name drug companies has been a failure in virtually every measurable outcome.

It is clear that nearly 20-years of concessions to the multi-national brand-name pharmaceutical industry by the Government of Canada has not served the interests of Canadians:

- Relative to other countries, increased pharmaceutical patent protection has not resulted in more research and development in Canada nor has it had any relation to the number of pharmaceutical products introduced in this country
- Historical data from the Patented Medicine Prices Review Board (PMPRB) shows the vast majority of brand-name drug company R&D spending in Canada is to obtain regulatory approval so that their products can be marketed in Canada. It is clear that increasing pharmaceutical patent protection in Canada has had limited impact on levels of research and development spending
- Pharmaceutical patentees are now failing to meet the minimum commitments for R&D spending in Canada that they made to the Canadian government when their state-sanctioned and enforced market monopolies were increased in 1987
- Given its enormous annual sales in Canada, brand industry job creation is quite low (22,000 jobs on \$14-billion in sales)
- Canada's trade deficit in pharmaceutical and medicine manufacturing has increased from \$1.6-billion in 1995 to \$5.7-billion in 2005, which highlights the fact that the vast majority of brand-name drugs are not produced in Canada but shipped in from foreign countries
- Drug costs are the fastest rising cost in Canadian health care. Provincial governments are demanding changes as their drug benefit plan costs increase at annual rates of 10-15%.
- Drug benefits are increasingly becoming a major point of contention in labour negotiations as employers attempt to shift costs to employees