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The Misguided War Against Medicines 2008

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Executive summary

Research suggests that government health spending in Canada is growing at an unsustainable pace [Skinner and Rovere, 2006; 2007a]. At the same time, government spending on prescription drugs (both patented and non-patented) has grown faster than other components of health spending [CIHI, 2007a]. In addition, new patented prescription medicines are often more expensive than existing drugs. These observations have led some to assume that prescription drugs—and patented medicines, in particular—are the primary cause of the unsustainable growth in government health spending observed in Canada [Evans et al., 1989; Morgan and Hurley, 2002; Bueckert, 2006, May 11; Lee, 2006; Munro, 2006, May 11; Picard, 2006, May 11; Sanger, 2006].

In order to evaluate the validity of this claim, this study examines all of the ways in which spending on drugs may contribute to the overall growth in total government health spending. The evidence suggests that neither patented medicines in particular, nor prescription drugs in general can be blamed for the unsustainable growth rates of government health spending.

Prescription drugs are a small percentage of total government health spending; patented drugs are an even smaller percentage

Prescription drugs in general and patented drugs in particular account for a small percentage of government health spending, and, therefore, cannot be the primary cause of Medicare's lack of financial sustainability.

Overall, total spending on all types of drugs, whether patented, non-patented, prescription, or non-prescription, accounted for 16.7% of total government and private health spending in Canada in 2006. However, prescription drugs accounted for only 9.3% of total government spending on health care in 2006 [CIHI, 2007a]. More specifically, patented prescription drugs accounted for only 6.3% of total annual government spending on health care in Canada in 2006, and for much less in previous years [CIHI, 2007a; PMPRB, 2007; calculation by authors]. Therefore, even fast rates of growth in spending on prescription drugs in general, or patented drugs in particular, could not have large statistical effects on the overall growth rate of government health expenditure over time.

Non-drug spending on health growing at unsustainable pace

If it were true that prescription drugs are the primary cause of unsustainable growth in government expenditure on health, then it stands to reason that, if we spent nothing

at all on drugs, then all other components of government health spending would be growing at sustainable rates. However, the evidence shows that when health spending is analyzed according to the use of funds spent, spending on the non-drug components of health care has consistently grown at unsustainable rates.

From 2002 to 2006, annual spending on health professionals grew at a rate of 6.5% on average; annual spending on hospitals and institutions grew by 6.9% on average; and annual spending on government health, administration, research, and other areas together grew by 7.2% on average [CIHI, 2007a]. These average annual growth rates are between 1.2 and 1.3 times higher than the average annual growth in national gross domestic product (GDP) of 5.4% [Statistics Canada, 2007a]; 2.9 and 3.2 times higher than the average annual growth in general inflation (CPI) of 2.2% [Statistics Canada, 2007b]; and between 1.2 and 1.4 times higher than the average annual growth in consolidated provincial revenues from all sources of 5.3% over the same time period [Statistics Canada 2007c].

This means that even if governments spent nothing on drugs, government spending on all other medical goods and services would still be rising at an unsustainable rate. Moreover, after spending on drugs is subtracted, spending on all other medical goods and services accounted for 91.4% to 90.7% of total government spending on health care between 2002 and 2006, respectively. The fact that government spending on all other medical goods and services is growing at unsustainable rates, while accounting for over 90% of total government spending on health care, strongly suggests that efforts to contain health care costs by targeting prescription drugs are misguided.

No statistical link between the rising share of the health budget spent on drugs and overall growth rates in total health spending

We tested the claim that spending on drugs is a primary cause of the unsustainable rate of growth in government health spending using another analysis. If such a claim were true, then as prescription drugs have increased as a percentage of government health budgets over time, we should expect to observe accelerating inflation-adjusted rates of growth in government health spending over the same period. But this is not observed.

Data from 1975 to 2006 show that on a national basis, the annual inflation-adjusted growth rate for overall government health expenditures varies and is not in a linear relationship with the constantly increasing percentage of government spending on health going to drugs. The proportion of government spending on drugs relative to total spending on health has increased consistently over the period studied, suggesting that spending on drugs has taken the place of spending on other non-drug health care areas.

Inflation adjusted post-market prices for patented drugs declining

Price inflation for existing patented drugs is also not to blame for unsustainable growth rates in government spending on health. Nominal after-market prices for patented drugs have been stable for the last 19 years [PMPRB, 2007]. In fact, the evidence shows that once patented medicines are introduced to the market, nominal prices for these drugs have, on average, remained relatively flat and have sometimes declined [PMPRB, 2007].

In addition, Canadian government data shows that average prices for existing patented prescription drugs in Canada have grown at a slower annual pace than the general rate of inflation for 17 of the last 19 years, and have declined in six of those years [PMPRB, 2007]. By implication, this means that prices for existing patented drugs are increasing at an even slower rate than they are allowed to grow under federal price controls that permit annual price increases matching the general rate of inflation [PMPRB, 2007]. It also means that after adjusting for inflation, prices for existing patented medicines have *declined* in real terms in 17 of the last 19 years.

Introductory prices for patented drugs are at or below international prices

Evidence also shows that introductory prices for patented medicines in Canada are lower than those in many of the countries that the federal government uses for international comparisons, and are far below American prices for identical drugs. This indicates that Canadian Medicare is not uniquely affected by high prices for new drugs, and that this cannot be used as an excuse for the unsustainable growth of government health spending [PMPRB, 2007; Skinner 2005a].

New drugs, small markets, and high research and development costs means a high price per patient but a small impact on budgets

While it is true that on a global level the introductory prices of many new medicines are now much higher than the introductory prices of many drug products in the past, this is because the cost of drug development remains high [Adams and Brantner, 2006; DiMasi et al., 2002] and many new drugs treat very small patient populations. The small market for these drugs requires that a higher price per unit be charged to recover the total risk-adjusted costs of research and development, which remain similar on average to the costs of developing drugs for much larger markets. However, while the price per patient is sometimes very high, the small patient populations being treated mean that the overall impact on government health budgets is not large.

Increasing use explains rising proportion spent on drugs

There are two well-documented, yet not widely understood, reasons that drugs are accounting for a rising share of total health expenditures. One is the introduction of new drugs as treatments that did not previously exist. Another is the increasing use of drugs to replace or complement other forms of medical treatment [CIHI, 2005]. The available evidence suggests that the introduction of new drug treatments that did not previously exist, the substitution of drugs for other medical therapies, and the complementary use of drugs in conjunction with other treatments are positive developments that lead to improvements in human health, and can produce net cost savings when all health spending is accounted for [Han and Wang, 2005; Cremieux et al., 2005; Lichtenberg and Virabhak, 2002; Kleinke, 2001; Lichtenberg, 2001; Frech and Miller, 1999].

To analyze the cost-efficiency of drugs as a medical treatment for this study, we compared changes in the rate of hospitalization against changes in the percentage of government health budgets allocated to drugs between 1995 and 2005 (the only period for which data were available). The data show that hospitalization rates declined as spending on drugs increased as a percentage of government health budgets in Canada [CIHI, 2007b; 2007c]. While not necessarily causal, this correlation is at least broadly consistent with other research that shows that drugs are a cost-efficient substitute for other treatment alternatives requiring hospitalization.

Some new drugs represent net new costs, but they also represent net new health benefits

Of course some medicines are new treatments that did not previously exist and, therefore, represent net additional expenditures to existing health care budgets. Nevertheless, new treatments can also produce additional medical benefits that did not previously exist, and, thus, represent a net gain for patients in terms of health improvements. New health benefits can be quantified in broader economic terms. For instance, a new medicine might lead to fewer in-patient admissions to hospitals or to faster overall recovery times for the treatment populations. Economic evidence shows that such health gains can result in reduced productivity losses associated with illness [Han and Wang, 2005; Lichtenberg, 2001].

The real cause of unsustainable growth in government health spending—flawed design of government health and drug insurance

Acknowledging the cost-efficiency of prescription medicines for treating disease does not in any way suggest that governments should spend more public money on drugs. In fact, government interference in health care markets through public insurance programs actually distorts the efficient allocation of medical resources, including prescription drugs. Government health and drug insurance programs are not able to gain the efficiency benefits of new medical technologies like patented drugs because such programs lack appropriate incentives for patients and providers to make optimal use of medical goods and services. Central planning is unable to compensate for this deficiency. There are a number of insurmountable structural obstacles faced by government health insurance and drug programs, including:

- The absence of consumer price signals to influence the demand for, and determine the allocation of resources;
- The politicization of centrally planned allocation; and,
- The impossibly large information requirements needed to plan for patients' individual health care needs and preferences.

Economic evidence suggests that properly designed, private-payment, health systems (insurance and out-of-pocket spending) are better structured to encourage the rational allocation of health technology and to optimize overall efficiency gains [Danzon, 1993; Newhouse and the Insurance Experiment Group, 1993].

Government drug insurance programs are notorious for restricting access to new medicines in a misguided attempt to control costs. When government health insurance attempts to provide equal access and 100 % insurance coverage for any medical need on a universal basis, the system becomes financially unsustainable. Therefore, when governments are committed to enforcing egalitarian access, they inevitably deny everyone access to the more expensive medical goods and services, which are usually the latest and most advanced technologies—including patented medicines. This means that, under a government health insurance monopoly like the one that exists in Canada, patients go without the most advanced treatments if they do not have the option to buy private insurance or pay cash for the latest developments in health technology. Relying instead on compulsory private insurance and low income subsidies to achieve universal coverage, in a properly regulated competitive market, would be more efficient and would provide a better range of benefits for patients than Canada's provincial government health insurance monopolies and various government drug programs.

Conclusion

At various times throughout the history of Canadian Medicare, the unsustainable growth in government health care spending has been blamed on the cost of paying for physicians, hospitals, and medicines. This misguided focus on the components of health spending has led governments to rely on central planning to cap the supply of physicians [Esmail, 2005] and suppress their wages below market rates [Mullins, 2004]; to constrain hospital operating and capital resources [OHA, 2003]; and to restrict access to new technologies and treatments, leaving Canadian patients to go without the most advanced medical care available [Esmail and Walker, 2006; Skinner, 2005b; Skinner et al., 2007].

It is a mistake for policy makers to engage in top-down cost containment strategies targeting the individual components of health care spending. Unsustainable growth in government spending on health is a function of the flawed design of government health and drug insurance programs, not of the price of medical treatment or the introduction of new medical technologies like patented drugs.

Introduction

Since the year 2000, at least five studies by provincial governments, in addition to a federal Senate report, have concluded that growth trends in government spending on health are unsustainable [Clair, 2000; Fyke, 2001; Mazankowski, 2001; Kirby, 2002; Menard, 2005; Taylor, 2006]. The most recent edition of an annual Fraser Institute study that uses Statistics Canada data shows that, in 9 of the 10 provinces, government spending on health continues to grow faster, on average, than total available revenues from all sources—including federal transfers [Skinner and Rovere, 2007a]. Health care is taking up an increasing share of provincial revenue over time, leaving proportionally less money for other government responsibilities. Projecting the most recent ten-year trend into the future, the data suggests that government health spending in 6 of 10 provinces is on pace to consume more than half of total revenue from all sources by the year 2035 [Skinner and Rovere, 2007a].

During the last ten years, government spending on all types of prescription drugs (both patented and non-patented) grew by 8.2% [CIHI, 2007a]. This is primarily due to an increase in utilization. Yet, because new or patented medicines can be more expensive than older drugs and other health treatments, some have mistakenly concluded that patented medicines must be the primary cause of unsustainable health care costs in Canada [Evans et al., 1989; Morgan and Hurley, 2002; Bueckert, 2006, May 11; Lee, 2006; Munro, 2006, May 11; Picard, 2006, May 11; Sanger, 2006]. Such a conclusion is based on either incorrect assumptions about the prices of patented drugs in Canada; a failure to make a distinction between total drug spending and government spending on patented prescription medicines in particular; a failure to appreciate the cost-efficiency of medicines as a type of innovative health technology; or, a failure to understand the general economic benefits resulting from improved health related to the use of new drugs. This analytical error results in a misguided focus on the cost of the goods and services that make up modern medical care instead of on the fundamental flaws in Canada's government health and drug insurance programs.

The particular impact of new or "patented" drugs on government health care costs

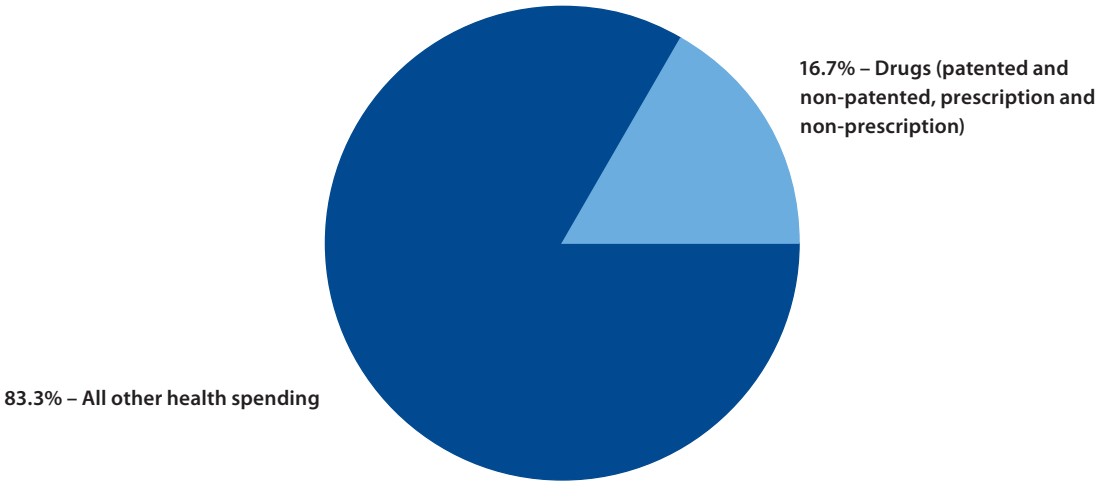
Patented drugs are a small percentage of government health spending

Patented prescription drugs do not account for a large enough percentage of total health care costs to have a major impact on overall growth rates in government spending on health. It is important to analyze government spending on health care separate from private health care expenditures. Spending on all types of drugs (patented and non-patented, prescription and non-prescription) together accounted for 16.7% of total government plus private health spending in Canada in 2006 [figure 1a].[1] But, while all types of drugs (patented and non-patented, prescription and nonprescription) accounted for a significant percentage of total government and private health expenditure, prescription drugs (patented and non-patented) accounted for only 9.3% of government spending on health care [figure 1b]. And, this share has been much smaller in the past [figure 1c].

Furthermore, patented prescription drugs account for an even smaller share of government expenditure on health. The Canadian Institute for Health Information (CIHI) publishes data separating total private from total government spending on prescription drug products, but does not publish data that would allow a precise calculation of the percentage of government expenditures on drugs that are patented, separate from non-patented drugs. However, the Patented Medicine Prices Review Board (PMPRB), Canada's federal drug price regulator, publishes data [table 1] showing that patented drugs accounted for 68.1% of total national drug sales in Canada in 2006, up from 43% in 1990 [PMPRB, 2007]. Assuming that patented drugs account for the same percentage of government drug spending as for total drug spending means that patented prescription drugs accounted for only 6.3% [calculation 1] of total annual government spending on health care in Canada in 2006 [figure 1b], and smaller percentages in past years [table 1]. Therefore, even high growth rates for spending on patented drugs would not have had a large statistical effect on the overall growth rate for total government health expenditure between 1975 and 2006.

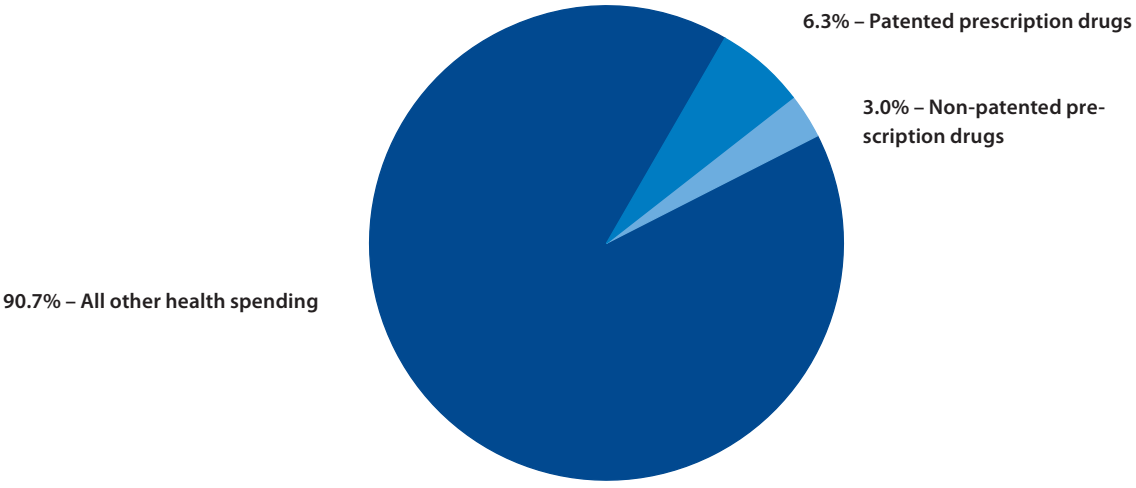
[1] CIHI data for drug expenditures accounts only for outpatient drugs. Drugs administered in hospitals are counted under hospital expenditures, and are not shown separately. However, most drugs administered in hospitals are likely to be for anesthesia or to control pain and infection, which are almost always generic drugs.

Figure 1a: Percentage of total government and private health spending in Canada, 2006, by use of funds



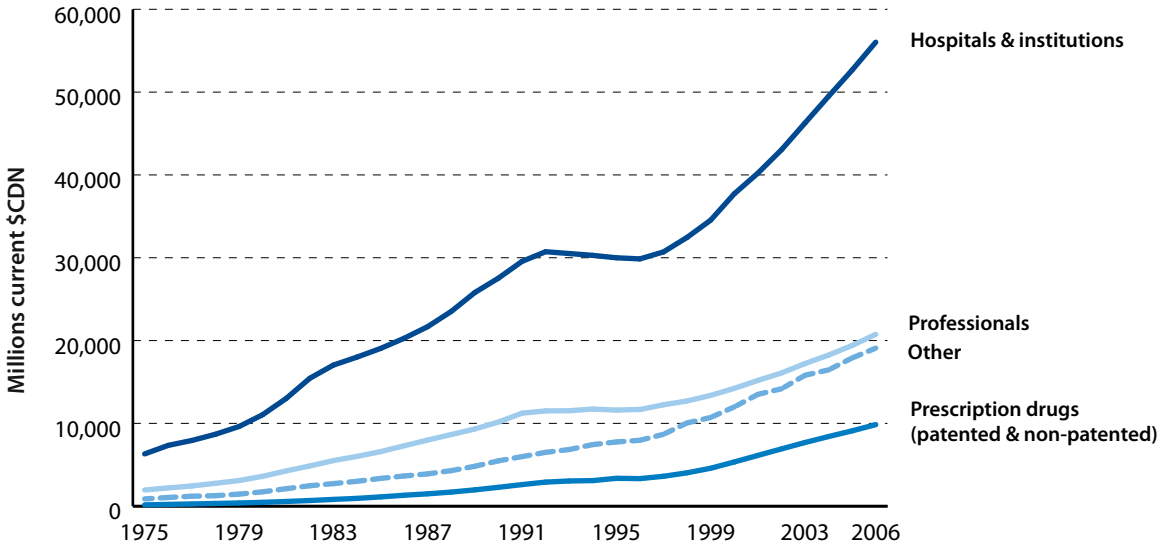
Source: Canadian Institute for Health Information (2007a).

Figure 1b: Percentage of government health expenditure (GHEX) in Canada, 2006, by use of funds



Sources: Canadian Institute for Health Information (2007a); Patented Medicine Prices Review Board (2007); calculations by authors.

Figure 1c: Government health expenditure (GHEX) in Canada, by use of funds, 1975-2006



Source: Canadian Institute for Health Information (2007a).

Table 1: Patented drugs' share of total drug sales in Canada, 1990 to 2006

	Patented drug sales ($ billions)	Patented drug sales, percentage of total
1990	$1.7	43.2%
1991	$2.0	43.2%
1992	$2.2	43.8%
1993	$2.4	44.4%
1994	$2.4	40.7%
1995	$2.6	43.9%
1996	$3.0	45.0%
1997	$3.7	52.3%
1998	$4.3	55.0%
1999	$5.4	61.0%
2000	$6.3	63.0%
2001	$7.6	65.0%
2002	$8.9	67.4%
2003	$10.1	66.9%
2004	$11.0	68.6%
2005	$11.6	71.4%
2006	$12.0	68.1%

Source: Patented Medicine Prices Review Board (2007).

Calculation 1: Patented (IP) prescription (R_x) drugs as a percentage of government (G) health expenditures (HEX) in 2006

2006 GHEX = 105,713.6 ($millions)

2006 GRx = 9,847.1 ($millions)

2006 IP % of total drug sales = 68.1%

2006 IPRx % of GHEX = 9,847.1 ($millions) X 68.1% = 6,705.9 / 105,713.6 = 6.3%

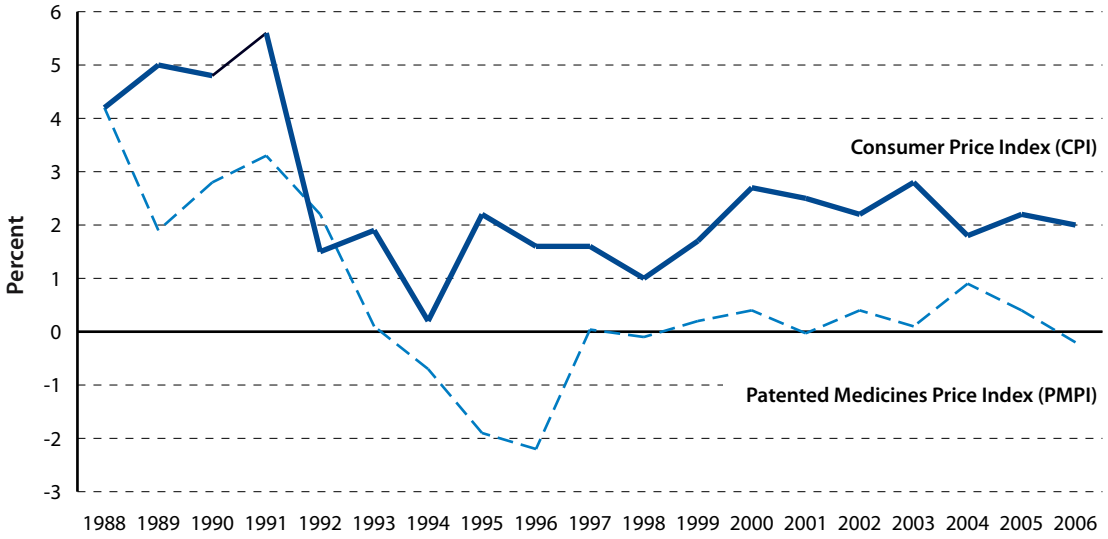
Sources: Canadian Institute for Health Information (2007a); Patented Medicine Prices Review Board (2007); calculations by authors.

Inflation adjusted post-market prices for patented drugs declining

Price inflation for existing patented drugs is also not to blame for unsustainable growth rates in government spending on health. The Patented Medicine Prices Review Board (PMPRB), Canada's federal drug price regulator, confirms that, on average, post-market prices for patented drugs are not growing over time. The PMPRB uses the Patented Medicine Price Index (PMPI) to monitor the price trends of patented drugs in Canada. Since 1988, the PMPI has been used to measure the average annual change in the prices of patented drugs, using a basket of products already on the market [PMPRB, 2007]. The most recent data available from the PMPI is current to the year 2006. PMPRB data show that post-market prices for patented drugs in Canada have been stable or declining over the last 19 years [figure 2]. The largest annual increase in average prices between 1988 and 2006 occurred in the first five years (1988-1992) after the PMPRB began measuring patented drug prices in Canada. Yet, even during this five-year period, patented drug prices only increased by 2.9% annually, on average. After the first five years, prices grew at a much slower rate and even declined in some years. In fact, the data show that the prices of patented drugs in Canada have actually decreased, in nominal terms, in six of the last 19 years. Overall, the average annual growth in prices for the entire 19-year period was only 0.6%. Thus, the evidence collected by the PMPRB indicates that the average post-market price of Canadian patented drugs has *not* been persistently increasing over time.

The PMPRB also compares the PMPI to the Consumer Price Index (CPI) in order determine the year-to-year changes in existing patented drug prices in comparison to changes in general inflation for other goods and services [PMPRB, 2007]. Figure 2 shows the year-to-year changes in the PMPI compared to the CPI between 1988 and 2006. In 1988, growth in the price of patented drugs matched the rate of general inflation. The only year in which the average annual price growth of patented drugs exceeded general price inflation was 1992. This means that the general inflation rate exceeded the aver-

Figure 2: Annual percentage change in the Patented Medicines Price Index (PMPI) and the Consumer Price Index (CPI), Canada, 1988-2006



Source: Patented Medicine Prices Review Board (2007).

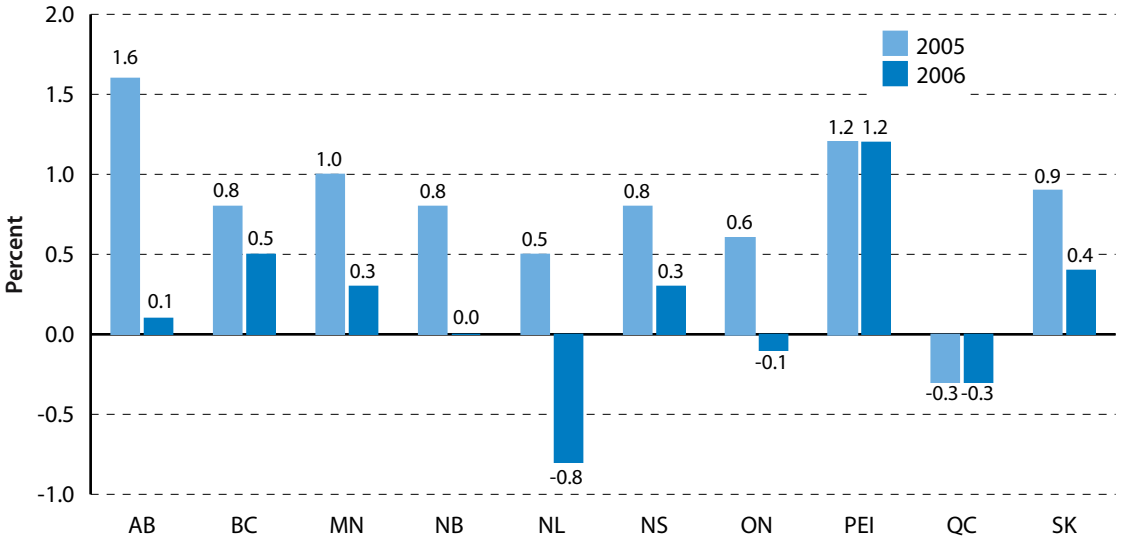
age growth in the price of patented drugs that were already on the market 94% of the time between 1988 and 2006. Over the entire period, the annual percentage growth in the CPI (2.5%) exceeded the annual percentage growth in the PMPI (0.6%) by 1.9 percentage points.

The difference between the average prices of patented medicines and the CPI—the benchmark used by the PMPRB to ensure that patented drug prices in Canada are not excessive—is further substantiated by provincial data. Figure 3 shows the annual growth rate for patented drug prices from 2005 to 2006, broken down by province.[2] Although average drug prices increased slightly in six provinces during this period, the increase was offset by the four remaining provinces in which prices either stayed the same or decreased. More importantly, the annual growth rates for patented drug prices in all jurisdictions (averaging 0.16% across all provinces) were significantly lower than the national CPI annual growth rate of 2% [PMPRB, 2007].

Canadian government data shows that average prices for existing patented prescription drugs in Canada have declined in nominal terms in six of the last 19 years. Post-market patented drug prices have also grown at a slower annual pace than the general rate of inflation for 17 of the last 19 years. By implication, this means that prices

[2] Using provincial data, the PMPRB uses the same methodology that is used to calculate the PMPI.

Figure 3: Average annual percentage change in prices for patented medicines, by province, 2005-2006



Source: Patented Medicine Prices Review Board (2007).

for existing patented drugs are increasing at an even slower rate than they are allowed to grow under federal price controls that permit annual price increases matching the general rate of inflation [PMPRB, 2007]. It also means that, after adjusting for inflation, prices for existing patented medicines have declined in real terms in 17 of the last 19 years.

Introductory prices for patented drugs are at or below international prices

The PMPI only measures average annual price changes for a basket of patented drugs already on the market and, therefore, does not capture the impact on health budgets resulting from introductory prices for new drugs [PMPRB, 2007]. In order to measure whether introductory prices for new drugs are "excessive,"[3] the PMPRB compares the average price of patented drugs in Canada to prices for the same drugs in a select group of other countries. Figure 4 shows the difference between average prices for patented

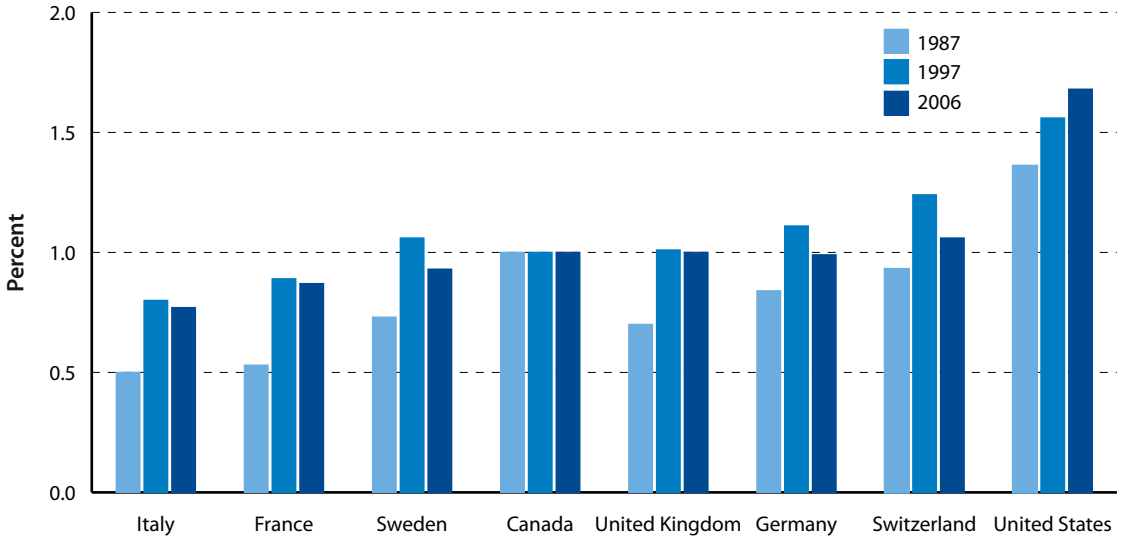
[3] "Excessive" is a word used in the PMPRB's legal mandate. The authors do not endorse the idea that it is legitimate for government to regulate prices at all. The purchase of prescription drugs is a voluntary transaction between patients (and their insurers) and drug manufacturers. The definition of what constitutes an "excessive" price is determined by supply and demand and is not appropriately determined by arbitrary government decisions.

drugs in Canada (shown as a constant) and the average prices (at market exchange rates for each particular year) for the same patented drugs for the years 1987, 1997, and 2006 in France, Germany, Italy, Sweden, Switzerland, the United Kingdom, and the United States [PMPRB, 2007].

As figure 4 shows, the average price (at market exchange rate) of Canadian patented drugs in 1987 was higher than that in every other country of the select group except for the United States. This trend somewhat changed by 1997, when the average Canadian price (at market exchange rate) for patented drugs was lower than that in all of the comparison countries except Italy and France. In 2006, the average Canadian price for patented drugs was higher than average patented drug prices in Italy, France, Sweden and Germany. However, average drug prices in Canada were equivalent to those in the United Kingdom, and were priced lower than the same basket of drugs in Switzerland and the United States.

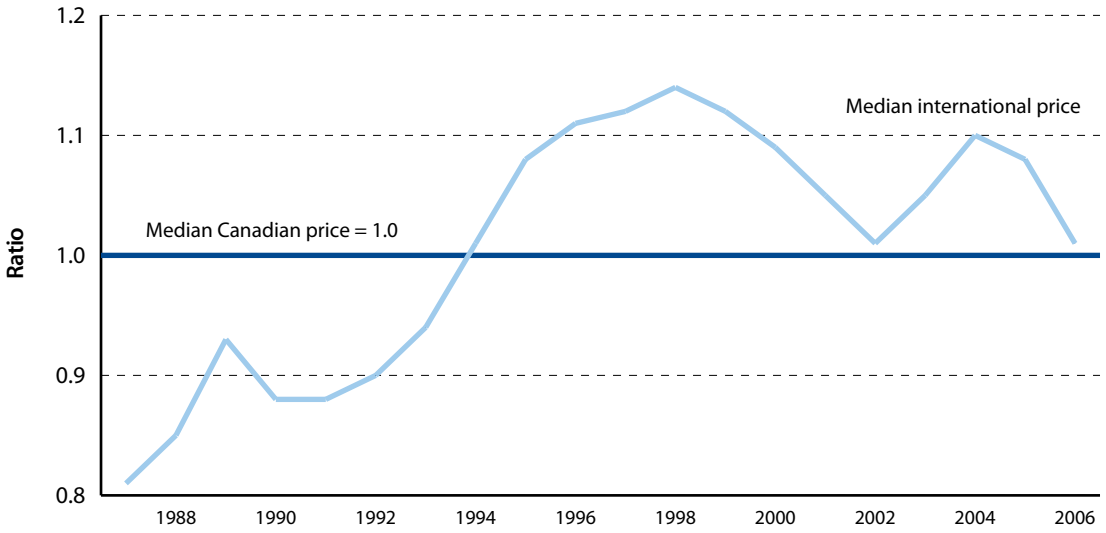
In order to further compare patented drug prices internationally, the PMPRB monitors the median international price (MIP), which is calculated from the observed prices in the comparator countries [PMPRB, 2007]. Figure 5 shows the average ratio of the MIP to the Canadian price for patented drugs between 1987 and 2006. Over the twenty-year period, median Canadian prices for patented drugs were lower than their international counterparts 70% of the time. In 1987, MIPs were 19% lower than Cana-

Figure 4: Ratio of average international prices to average Canadian prices for patented prescription drugs, 1987,1997 and 2006



Source: Patented Medicine Prices Review Board (PMPRB) (2007).

Figure 5: Ratio of average median international price (MIP) to median Canadian price, patented drugs, 1987-2006



Source: Patented Medicine Prices Review Board (2007).

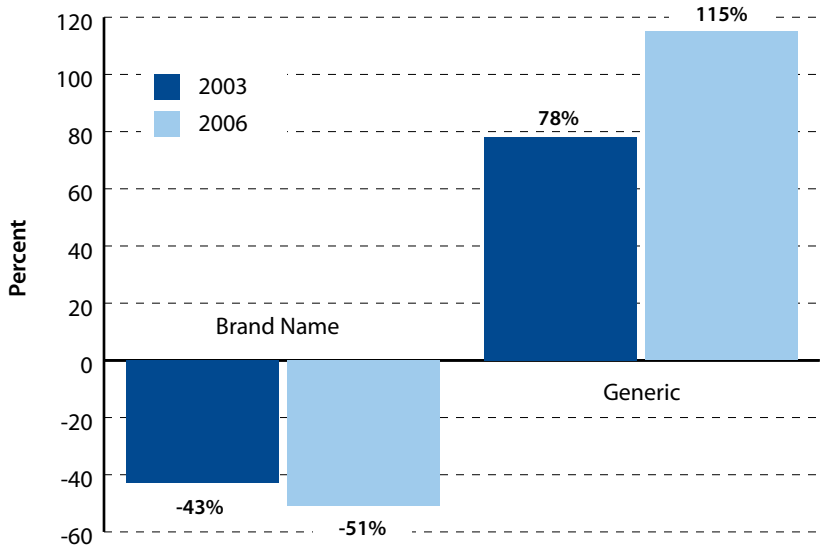
dian prices, and in 1997, MIPs were 12% higher than Canadian prices. In 2006, Canadian drug prices remained below the international median.

The Fraser Institute's research comparing Canadian and American drug prices has also confirmed that the prices of patented drugs are much lower in Canada. Skinner and Rovere [2007b] looked at a sample of the 100 most commonly prescribed brand-name (mostly patented) drugs in Canada in 2006, and compared the prices of these drugs to those of the same drugs in the United States. The analysis showed that Canadian prices for patented, brand-name drugs were 51% lower on average than American prices for the same drugs, measured in US dollars at purchasing power parity [figure 6].

The PMPRB's analysis of average international prices and median international prices suggests that patented drug prices in Canada are not excessive compared to similar countries.[4] Moreover, the Fraser Institute's research confirms that Canadian prices for patented medicines are far below US prices for identical drugs. These findings show that Canadian Medicare is not uniquely affected by high prices for new

[4] Five of the seven countries used for comparison by the PMPRB also apply price controls to patented drugs. Thus, Canadian prices are not even being compared to market prices in those cases, but to prices held below market rates by arbitrary rules imposed by governments in those countries.

Figure 6: Canada-US price differences for 100 most commonly prescribed brand name and 100 most commonly prescribed generic prescription drugs, 2003 and 2006, as a percentage of the US Price, in US dollars at PPP



Source: Skinner and Rovere (2007b).

drugs, and that this cannot be the cause of unsustainable financing under Canada's government health insurance programs.

New drugs, small markets, and high research and development costs mean a high price per patient but a small impact on budgets

The introductory prices of many new drugs are much higher now than what they were in the past. This is because the cost of drug development remains high, but the market for many new drugs is very small. Research indicates that, on a risk-adjusted basis, it costs nearly $900 million (adjusted to 2002 US dollars) on average to develop a new drug [Adams and Brantner, 2006; DiMasi et al., 2002; DiMasi, 2001]. Many of the new, expensive drugs are being used to treat very small patient populations. As the market for these drugs is extremely small, a higher price per unit must be charged in order to recover the total costs of research and development. However, because many new drugs treat small patient populations, the overall impact of new drugs on budgets is often smaller than what might be expected.

In a previous edition of this annual report, we illustrated this point by conducting a brief analysis of the impact of the introduction of three new expensive medicines

on government health spending. The three medicines analyzed were *Herceptin*, *Velcade*, and enzyme replacement therapy for Fabry's disease. *Herceptin* is a drug that is widely believed to be effective in reducing the recurrence of breast cancer in women. *Herceptin*'s price is reported to be over $35,000 (adjusted to 2006 Canadian dollars) per patient for a full course of treatment, but because the number of patients the drug is meant to treat is so small (about 5,000 Canadian women), the annual total cost of the treatment represents an estimated $175 million (adjusted to 2006 Canadian dollars) [CBC News, 2006, Aug. 30]. Therefore, the total cost of this drug represents only about 1.8% of the $9.5 billion spent by governments on prescription drugs in Canada in 2005 [CIHI, 2005]. Similarly, *Velcade*, a new drug that treats a cancer of the blood that affects 1,500 Canadians per year costs $50,000 per patient [Abraham, 2005, Aug. 22], representing a total estimated cost of $75 million annually—less than 1% of annual government spending on prescription drugs across Canada in 2005. The story is the same for patients suffering from Fabry's Disease, which affects only 1 in 100,000 Canadians, or 320 patients in all. The disease causes the lack of a vital enzyme in the body, which leads to kidney failure, heart disease, strokes, and premature death. New enzyme-replacement therapies approved by Health Canada in early 2004 cost an average of $250,000 per patient [Fabry Society, 2005, Sept. 1]. The total estimated potential annual impact on government drug budgets from the enzyme replacement therapies is $80 million, or less than 1% of the amount spent annually by governments in Canada on drugs in 2005 [CIHI, 2005]. Thus, these drugs represent small additional spending when compared to existing levels of spending on prescription drugs by governments.

But the cost of these drugs is even more miniscule when compared to overall health expenditures by governments. Taken together, the $330 million cost of funding these three drugs would add only 0.3% [calculation 2] to total overall government health care expenditures in Canada in 2005.

Calculation 2: Cost of three expensive new drugs with small patient populations relative to overall total government (G) health expenditures (HEX), and government spending on prescription (R_x) drugs.

2005 GHEX = 98795.4 ($millions)	[Source: CIHI, 2005]
2005 GR_x = 9481.4 ($millions)	[Source: CIHI, 2005]
2005: 3 new drugs cost = 330 ($millions)	[Sources: various above]
2005: 3 new drugs cost % of GR_x = 330 / 9481.4 = 3.5%	[Source: Author]
2005: 3 new drugs cost % of GHEX = 330 / 98795.4 = 0.3%	[Source: Author]

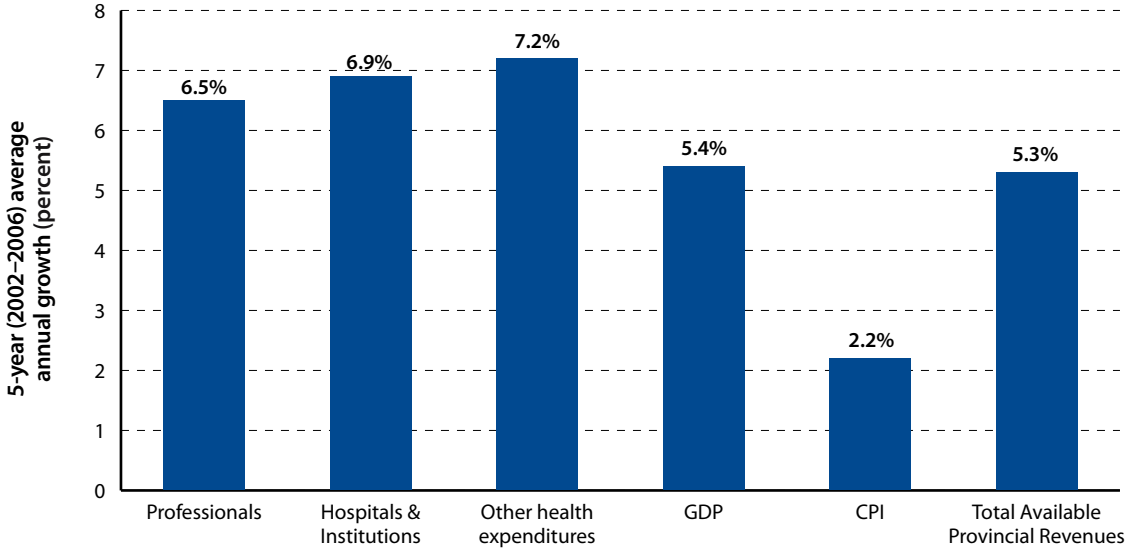
The impact of all types of drugs on government health care costs

Non-drug spending on health growing at unsustainable pace

Hypothetically, if it were possible to eliminate government spending on drugs altogether, government expenditures on the remaining components of health care would still be growing at an unsustainable pace.

When health spending is analyzed according to the use of funds spent, spending between 2002 and 2006 on non-drug components of health care has consistently grown at an unsustainable rate, while accounting for between 91.4% and 90.7%, respectively, of total government spending on health [figure 7]. On average, spending on health professionals grew by 6.5% annually; spending on hospitals and institutions grew by 6.9% per year; and spending on government health, administration, research, and other areas together grew by 7.2 % annually [CIHI, 2007a]. These annual growth rates are between 1.2 and 1.3 times higher than the average annual growth in Canada's gross domestic product (GDP) of 5.4% [Statistics Canada, 2007a]; between 3.0 and 3.3

Figure 7: Average annual growth in government health expenditure (GHEX), non-drug uses of funds only, compared to GDP, CPI, and total available provincial revenue from all sources, 2002-2006



Sources: Canadian Institute for Health Information (2007a); Statistics Canada (2007a, b, c).

times higher than the average annual growth in general inflation (CPI) of 2.2% [Statistics Canada, 2007b]; and between 1.2 and 1.4 times higher than the average annual growth in consolidated available provincial revenues from all sources of 5.3% [Statistics Canada, 2007c].

This means that, even if governments did not spend anything on drugs, government spending on all other medical goods and services would still be rising at an unsustainable rate. The fact that non-drug medical goods and services make up over 90% of government expenditure on health strongly suggests that efforts to contain health care costs by targeting drugs are misguided.

No statistical link between rising share of health budget spent on drugs and overall growth rates in total health spending

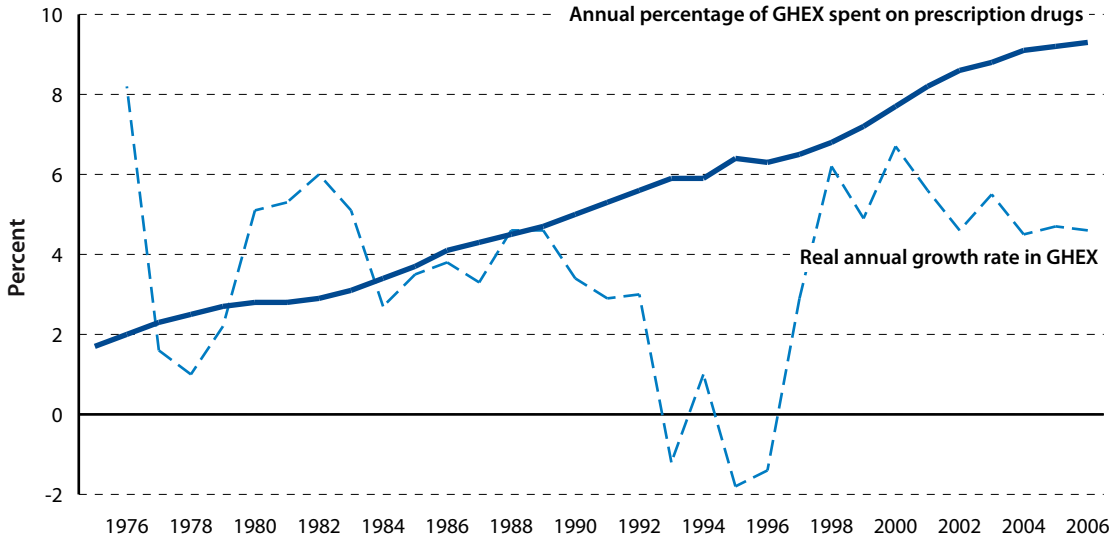
We tested the claim that spending on drugs is a primary cause of the unsustainable rate of growth in government health spending using another analysis. If such a claim were true, then as prescription drugs have increased as a percentage of government health budgets over time, we should expect to observe accelerating inflation-adjusted rates of growth in government health spending over the same period. But this is not observed.

Data from 1975 to 2006 show that, on a national basis, the annual inflation-adjusted growth rate for overall government health expenditures varies, and is not in a linear relationship with the constantly increasing percentage of government spending on drugs [figure 8]. The proportion of government spending on drugs relative to total spending on health has increased consistently over the period studied, suggesting that spending on drugs has taken the place of spending on other non-drug health care areas.

Increasing use explains rising proportion spent on drugs

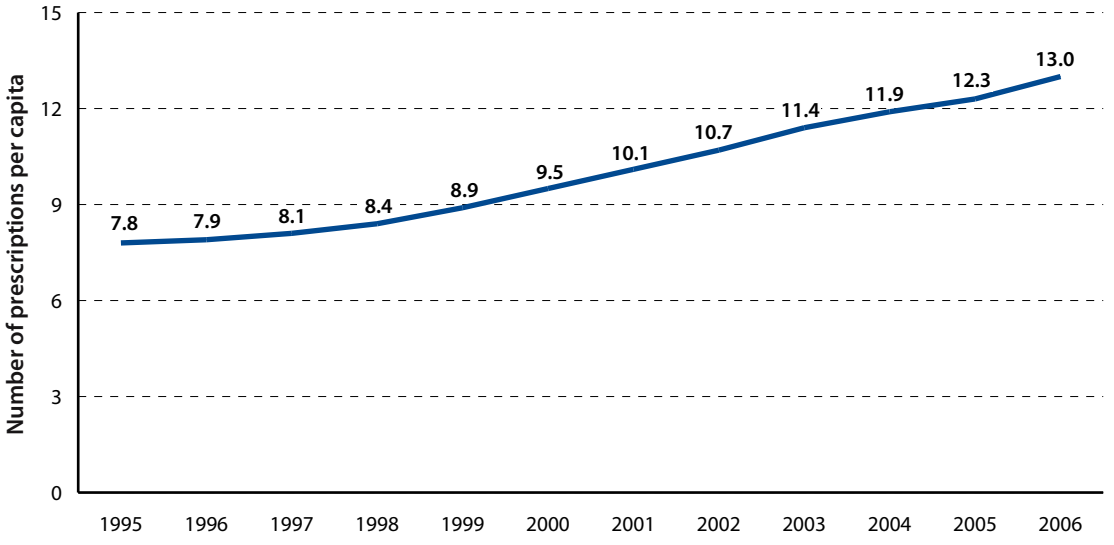
The rising percentage of the health budget spent on drugs is a direct result of the development of new drug therapies and the increasing use of drugs to replace other medical treatments [CIHI, 2005]. Figure 9 shows the rising per capita use of drugs between 1995 and 2006 (the only period for which data were available). In this context, "use" is defined as the number of retail prescriptions dispensed per person annually. The number of prescriptions dispensed has risen, even when adjusted for growth in the population. This is the main reason that drugs have risen as a percentage of total government spending on health.

Figure 8: Annual percentage change in inflation-adjusted government health expenditure (GHEX) and annual percentage change in the percentage of GHEX spent on prescription drugs in Canada, 1975-2006



Sources: Canadian Institute for Health Information (2007a); Statistics Canada (2007a, b, c).

Figure 9: Number of retail prescriptions dispensed per capita in Canada, 1995-2006



Source: IMS Health Inc. Canada (2006); authors' calculations.

Drugs are a cost-efficient and cost-saving medical technology

How can spending on drugs be increasing as a percentage of government spending on health, and not be the primary cause of unsustainable growth rates in government expenditure on health? Research shows that drugs can be a cost-effective, cost-efficient, and cost-saving medical technology. A *cost-effective* drug produces a marginal benefit that is equal to, or better than, any alternative treatment at a fixed cost [Weimer and Vining, 1999: 274]. A *cost-efficient* drug produces a marginal benefit that is equal to, or greater than, its own marginal cost [Danzon, 1993]. A *cost-saving* drug is one that, when used, substitutes for alternative medical treatments, leading to lower overall spending than would have occurred if it had not been used [Han and Wang, 2005].

Drugs, considered one of the most effective forms of medical technology, are being used more than ever because they are an excellent substitute for older, less effective, or less efficient ways of treating illness. Previous research has recognized that there is a strong statistical relationship between drug spending and health outcomes. An analysis of health outcomes among Canadian provinces found that the two provinces with the highest levels of expenditure on drugs averaged 584 fewer infant mortalities annually, and showed a six-month increase in life expectancy at birth, compared to other provinces [Cremieux et al., 2005]. In addition, that study's results indicate that there was a significant increase in health benefits in Canada corresponding to an increase in pharmaceutical spending between 1981 and 1998. The study concluded that there is a quantifiable positive relationship between drug spending and health outcomes.[5]

Another study found similar results when comparing the use of drugs at the international level. The research discovered that pharmaceutical spending has a positive and significant effect (both statistically and economically) on remaining life expectancy at age 40 and at age 60, whereas non-pharmaceutical health care spending appears to have no measurable effect on life expectancy, either at birth, at age 40, or at age 60 [Frech and Miller, 1999]. Drugs can also have a cost-saving effect on overall health expenditures because they can be a substitute for invasive surgery or lengthy courses of treatment in the hospital. In this way, drugs can reduce risks, pain, and discomfort to patients, improve recovery times, and reduce more costly expenditures on other forms of medical treatment. Research has estimated that, for every dollar spent on new drugs, between $3.95 and $7.00 is saved on non-drug spending elsewhere [Lichtenberg and Virabhak, 2002]. Additional research suggests that if we spent less on new drug technologies and relied instead on older, less efficient types of medi-

[5] The results of a study by Cremieux and Ouellette indicate that "the observed increase from 1981 spending levels has already saved over 15,000 lives" [2002: 115].

cal treatment, we could end up with even higher overall health care costs than we have right now.[6]

In order to test the substitution effect of drugs for other types of health care at the macro-level, we compared changes in the rate of hospitalization with changes in the percentage of government spending on health on drugs between 1995 and 2005 (the only period for which there were available comparable data). The data show [figure 10] that while drug spending increased as a percentage of total government health expenditure, hospitalization rates have declined. Although this finding does not indicate a definitive causal relationship, the results are generally consistent with other research that indicates that drugs are a cost-efficient and often a cost-saving substitute for non-drug treatment alternatives.[7]

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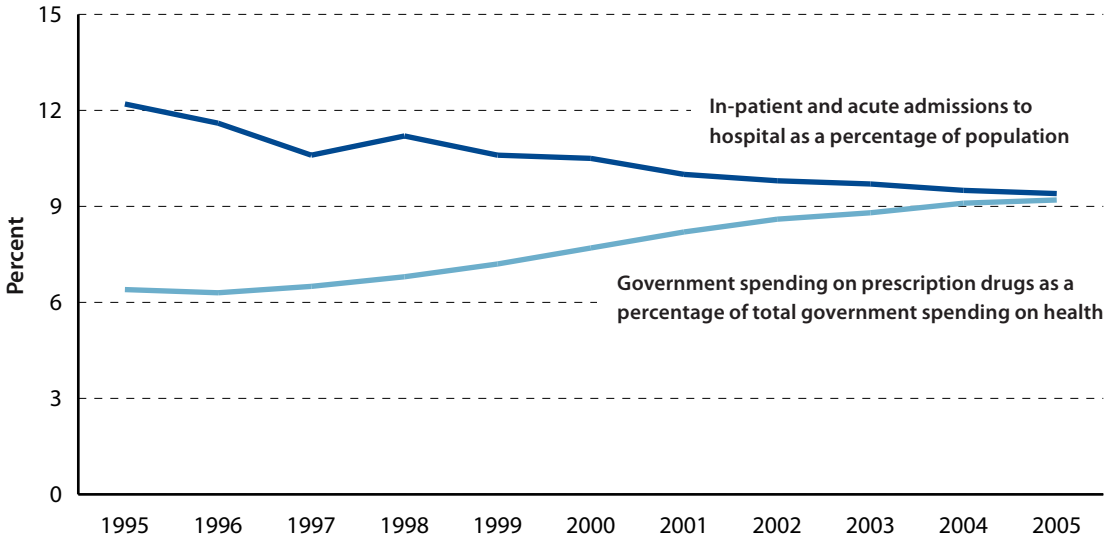
[6] In contrast to Lichtenberg's findings on the cost-saving benefits of newer drugs, there is opposing research that suggests that drugs—and, specifically, new drugs—do not present a reduction in costs for non-drug expenditures. Miller and his colleagues [2005] argue that the number or mix of drugs used is an important indicator in determining the association between drug age and non-drug expenditure. Miller et al. first replicated Lichtenberg's work and confirmed the validity of Lichtenberg's findings. Afterward, using a different method, they analyzed only patterns of use for new cardiovascular drugs and the association of this with non-drug health expenditures. They controlled for the drug quantity and the mix of newer and older drugs as a proxy for controlling severity of illness. They found, unsurprisingly, that the net cost-savings effect of cardiovascular drugs did not apply to the sickest patients. In a study similar to that of Miller et al., Duggan [2005] investigated the effects of new drugs, focusing solely on one therapeutic class. His objective was to determine if new antipsychotics reduce spending on other types of medical care such as hospitalization and other health care services. Duggan's study suggested that new antipsychotic drugs increase the prevalence of diabetes and related illnesses among schizophrenia patients, and, thus, have a negative effect on health outcomes. However, he also found that while antipsychotics increased the prevalence of diabetes among schizophrenia patients, the drugs reduced the occurrence of extra-pyramidal symptoms, but he failed to estimate the savings from this. The studies by Miller et al. and Duggan are interesting, but are not useful for analyzing the overall impact of drugs on health budgets. Despite claims to the contrary, these studies do not contradict Lichtenberg, who analyzed the effects of new drugs averaged across all patients and all illness conditions. The conclusions of the study by Miller et al., in particular, were skewed because the study focused on the sickest group of patients only, instead of on all patients. Also, while specific illnesses such as cardiovascular-related diseases and antipsychotic ailments may cover a large portion of pharmaceutical spending, drug expenditures are fairly divided among other therapeutic classes. The Patented Medicine Price Review Board's annual report for 2006 indicates that, in Canada, there is not one therapeutic class that represents more than 25.6% of the share of sales for patented drugs [PMPRB, 2007]. Therefore, a general analysis of all medical conditions and all drugs related to those conditions should be included in order to analyze the effects of overall pharmaceutical spending effectively.

[7] Other changes that will affect hospitalization include advances in outpatient treatment and day surgery. Many of these advances are complemented by drug therapies that make them possible.

Figure 10: Percentage of government spending allocated to prescription drugs versus hospitalization rates in Canada, 1995-2005



Sources: Canadian Institute for Health Information (2007a; 2007c).

Some new drugs represent net new costs, but they also represent net new health benefits

It is important to bear in mind that although some new drugs tend to be expensive, we cannot forget the invaluable health improvements that new drugs can bring. Naturally, because some medicines are new treatments that did not previously exist, they can represent net additional expenditures to existing health care budgets. However, new treatments can also represent additional health benefits that did not previously exist and, thus, represent a net gain for patients in terms of health improvements. These improvements are measured in a reduction of mortality, morbidity, and pain. For instance, the increase in the life expectancy and health status of patients with heart disease, cancer, pre-term birth, and acquired immunodeficiency syndrome (AIDS) is a direct result of major pharmaceutical breakthroughs in the 1990s [Kleinke, 2001; Lichtenberg, 2003].

The value of new health benefits associated with innovative medicines can also be quantified in broader economic terms. For example, new medicine may lead to fewer in-patient admissions to hospitals or to faster overall recovery times for treatment populations. Economic evidence indicates that these types of health gains result in reduced productivity losses associated with illness. If productivity losses are taken into account, new drugs provide net socioeconomic benefits. This is because research indicates that newer drugs decrease morbidity and, thus, reduce losses in productivity.

One study suggests that there is a direct correlation between absenteeism and harmful effects on the economy. The authors estimate that absenteeism in Canada costs approximately $2,012 per worker annually [Han and Wang, 2005]. They find that depression, which is the second most prevalent condition next to hypertension, is one of the most common reasons for missed work. The authors claim that pharmacotherapy is essential to reducing the societal and economic burden of depression. Furthermore, their research suggests that newer drugs are even more effective at reducing absenteeism than older ones. Likewise, other research has found that people who consumed newer drugs were significantly less likely to experience absenteeism than people who took older drugs [Lichtenberg, 2001]. Thus, while it is true that medicine generally reduces the rate of morbidity, research also indicates that newer drugs significantly reduce absenteeism in the workplace. Therefore, the indirect economic benefits associated with expensive new drugs must not be overlooked.

The real cause of unsustainable growth in government health spending—the flawed design of government health and drug insurance

Acknowledging the cost-effectiveness and cost-efficiency of drugs as a health care treatment does not in any way suggest that governments should spend more public money on drugs.[8] In fact, government interference in health care markets through public health and drug insurance programs actually impedes the efficient allocation of medical resources. Government health and drug insurance programs are not able to gain the efficiency benefits of new medical technologies like drugs because such programs lack appropriate incentives for patients and providers to make optimal use of medical goods and services. Central planning is unable to compensate for this deficiency. Economic evidence suggests that private-payment health systems (a combination of private insurance and out-of-pocket spending) are better structured to encourage the rational allocation of health technology and to capture overall efficiency gains [Danzon, 1993; Newhouse and the Insurance Experiment Group, 1993].

Any kind of insurance (private or government) insulates the consumer from cost, to some degree, and this can distort supply-and-demand decisions. But unlike private-sector insurance, elected officials who run government programs are highly sensitive to egalitarian political pressures. Political pressures create powerful incentives for politicians to reduce any out-of-pocket expenses and to base premiums on heavy cross-subsidization according to income, instead of on expected use or even equal risk-pooling (i.e., community rating). The resulting absence of consumer price signals removes the neces-

[8] At the same time, the cost-effectiveness, cost-efficiency, and cost-saving effects generally associated with new drugs demonstrate the significant advantage of new drugs because they present value for money while increasing quality of life. When drug insurers determine which products should be added to drug formularies, these effects are sometimes overlooked. In order to cut costs, many government insurers, such as provincial governments in Canada and Medicaid in the United States, do not add new drugs to their formularies because the prices of newer drugs are higher than older drugs already in use. However, instead of reducing costs, these rationing techniques may end up costing the government health systems more in the long run. As J.D. Kleinke has stated, "the more a third-party payer limits patients' access to drugs, the higher its total health care costs are in excess of drug-costs savings" [2001: 48]. Likewise, Stephen B. Soumerai [2004] argues that, when cost-control policies are used by government insurers to forgo the addition of new expensive drugs, patients will likely suffer, and side effects could reduce appropriate care. These harmful health effects could then lead to more costly types of care. Hence, not adding newer, more expensive drugs to formularies could lead to increases in non-drug-related health services. Third party payers must realize that the cheapest drug budget is not necessarily the best choice, and will likely result in greater non-drug health care costs.

sary economic incentives to influence the demand for goods and services. Exposure to price helps to control price inflation and creates incentives for the efficient allocation of resources matching the individual needs and preferences of patients [Herrick, 2006]. The politicization of centrally planned allocation distorts decisions about investment and spending. Political pressures and the impossibly large amount of information required to plan for patients' individual health care needs and preferences are insurmountable structural obstacles faced by government health insurance and drug programs. In contrast, these obstacles are not faced by private-sector insurers who are better able to react to price signals and changes in supply and demand.

Government drug insurance programs are notorious for restricting access to new medicines in a misguided attempt to control costs. When government health insurance attempts to provide equal access and 100% insurance coverage for any medical need on a universal basis, the system becomes financially unsustainable. Consequently, when governments are committed to enforcing egalitarian access, they inevitably deny everyone access to the more expensive medical goods and services, such as patented medicines, which are usually the latest and most advanced technologies. This means that, under a government health insurance monopoly like the one that exists in Canada, patients go without the most advanced treatments if they do not have the option to buy private insurance or pay cash for the latest developments in health technology.

Canadian government health insurance is also divided into silos. Government insurance covers 100% of the cost of medical services delivered by hospitals and physicians, but generally does not cover the cost of out-patient goods and services, except in the case of certain sub-populations like seniors, the disabled, and social-welfare recipients. And when government insurance does cover outpatient health care, it does not pay for 100% of the costs.[9] This lack of comprehensive coverage makes the out-of-

[9] Those who argue that restricting access to new medicines under government drug programs is legitimate because dissatisfied beneficiaries are not prevented from paying privately for drugs that are not reimbursed by the government plan have to consider that many of the drugs not covered by government programs are often too expensive to afford without insurance or sufficient liquid assets. There are two reasons why many eligible beneficiaries of government insurance might not be able to obtain private insurance. First, government drug insurance can reduce the availability of private insurance by creating a disincentive to pay privately for something when a subsidized alternative is available from the state [Brown et al., 2006; Lo Sasso and Meyer, 2006]. In Canada, even when government drug insurance benefits are less than what can be obtained in the private sector, the government program is perceived as a substitute because it is politically sold with the false promise of comprehensive coverage for all medically necessary goods and services. Second, when people cannot opt out of the taxes paid to support the government health insurance program, such taxes increase the effective price of obtaining private insurance because private insurance is paid for after taxes. The inability to opt out of paying taxes to fund the government program leaves less income available to pay for

pocket cost of competing health care options much different, and as a result, can create inappropriate incentives to consume inefficient medical care (because it receives a government subsidy) rather than more efficient care (because it does not receive a subsidy or, at least, a full subsidy). Drugs are the primary example of a medical technology that is demonstrably more efficient at improving health outcomes but which, due to the lack of comprehensive insurance coverage offered under government programs, is made comparatively more expensive, thus creating a disincentive for consumers (patients and physicians) to substitute it for less efficient treatment technologies.[10]

private insurance. In practical terms, people who do not have the financial liquidity to pay for private health insurance after paying taxes, but who would otherwise have the income before such taxes, are trapped in a program that does not adequately meet their needs.

[10] Research shows that drug therapies are actually underused as cost-efficient substitutes because of flawed insurance designs [Kleinke, 2004].

Conclusion

At various times throughout the history of Canadian Medicare, the unsustainable growth in government health care spending has been blamed on the cost of paying for physicians, hospitals, and medicines. This misguided focus on the components of health spending has led governments to rely on central planning to cap the supply of physicians [Esmail, 2005] and hold their wages below market rates [Mullins, 2004]; to constrain hospital operating and capital resources [OHA, 2003]; and to restrict access to new technologies and treatments, leaving Canadian patients without the most advanced medical care available [Esmail and Walker, 2006; Skinner, 2005b; Skinner et al., 2007]. However, it is a mistake for policy makers to engage in cost-containment strategies targeting the individual components of health care spending. Unsustainable growth in health spending is a function of the flawed design of government health and drug insurance programs, not of the price of medical treatment or the introduction of new medical technologies.[11]

[11] Under a private insurance system, the limits of consumption and spending are constrained by the individuals' utility functions, their opportunity costs, and, ultimately, their resource limitations because private insurance incorporates the user-pay principle through deductibles, copayments, and premiums. Thus, in a private market, there is no such thing as "sustainability" but only consumer decision-making and trade-offs. The term "sustainability" is only really useful in the context of government spending, which is not subject to the usual structure of utility maximization and trade-offs that happen every minute of every day among countless individuals in the market. Because health care is a "luxury" good in the sense that economists use the term, as income rises, health spending rises faster as there is a greater amount of disposable income available after basic necessities. The problem is not spending growth or high levels of spending, per se, but rather whether we can pay for that spending from government funds alone. That is the key concern.

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創辦於1974年，我們乃一獨立的研究及教育機構，在卡加利、滿地可、坦帕、多倫多及溫哥華均設有辦事處，並在超過七十個國家擁有國際伙伴。我們的工作得到不同人仕、機構及基金透過可免稅捐獻資助。為了保持其獨立性，本研究所不接受政府的撥款或研究合約。

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