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Canada's Drug Price Paradox 2008

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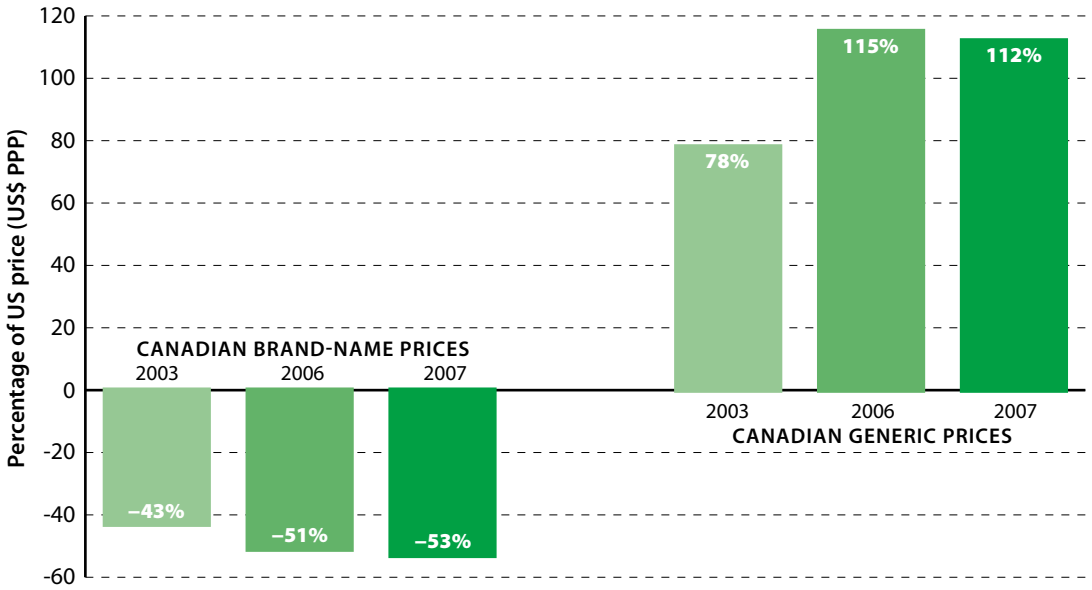
Executive summary

This study regularly (since 2005) compares Canadian and American retail prices for an identical group of the 100 most commonly prescribed brand-name (mostly patented) drugs and the 100 most commonly prescribed generic drugs in Canada. In 2007, this sample of drugs represented approximately 70% of the entire brand-name market and approximately 55% of the entire generic market.

The results confirm that, in 2007, Canadians continued to pay more than double the prices that Americans pay for identical generic drugs because government policies in Canada distort the market for prescription medicines. Meanwhile, Canadian prices for brand-name drugs remain more than half as expensive on average as American prices for identical drugs and are declining over time relative to prices in the United States.

In currency-equivalent terms, Canadian retail prices for generic prescription drugs in 2007 were on average 112% higher than retail prices observed in the United States for identical drugs (see figure 1). Last year's study found similar results; generic prescription drugs in Canada were on average 115% higher than American prices in 2006. This year's findings indicate that average generic drug prices in Canada have slightly declined relative to American prices, yet Canadians are still paying too much (more than double US prices) for their generic medicines. A previous analysis of Canadian and

Figure 1: Differences between prices in Canada and the United States for the 100 most commonly prescribed brand-name, and the 100 most commonly prescribed generic, prescription drugs, 2003, 2006, and 2007, stated as a percentage above or below the US price



Sources: Skinner, 2005; Skinner & Rovere, 2007; authors' calculations.
Data sources: IMS Health Inc. Canada, 2008a; Costco®, 2007.

American drug prices found that average prices for generic drugs were 78% higher in Canada in 2003, indicating that over a five-year period the average cost of generic drugs in Canada has risen substantially relative to US prices.

This year's study also found that in 2007 Canadians paid on average 53% less than Americans for identical brand-name drugs; in 2003 the average price for brand-name drugs was 43% lower in Canada. For Canadians, this means that since 2003 the cost of brand-name drugs has decreased relative to US prices for identical drugs.

The American market for prescription drugs is not distorted by the same public policies that are observed in the Canadian market. Canadian government policies insulate generic drug companies and pharmacy retailers from normal market forces that would put downward pressure on prices for generic drugs. A relatively freer market in the United States produces lower prices for generic drugs. Lower prices in the United States give consumers incentives to substitute generic drugs for comparatively more expensive brand-name drugs at higher rates than the rates seen in Canada. If the Canadian market for prescription drugs was at least as free as the US market, we would expect Canadian prices for generic drugs to eventually fall to US levels. Over time, lower prices would be expected to lead to an increased substitution of generic drugs for brand-name drugs in Canada, as they have in the United States.

In 2007 alone, federal-provincial-territorial policies regulating prescription drugs cost Canadians an estimated $2.9 to $7.5 billion in unnecessary spending due to a combination of inflated prices for generic drugs and inefficient substitution of medicines. Canadians would be much better off if federal and provincial governments repealed policies that distort the market for prescription drugs.

Findings

Adjusting for the purchasing power parity of the Canadian and US dollars, retail prices for the 100 most commonly prescribed Canadian generic drugs in 2007 were 112% more on average than prices for the same generic drugs in the United States. Of the top 100 generic drugs in Canada that were available in both markets,

- 75% were priced higher in Canada than in the United States: Canadian prices for these drugs averaged 161% higher than US prices
- 25% were priced lower in Canada: Canadian prices for these drugs averaged 36% lower than US prices.

By comparison, retail prices for the 100 most commonly prescribed Canadian brand-name drugs cost, on average, 53% less in Canada than in the United States. Of the 100 most commonly prescribed brand-name drugs in Canada in 2007 that were available in both markets,

- 97% were less expensive in Canada than in the United States: Canadian prices for these drugs averaged 56% lower than US prices

- 3% were more expensive in Canada than in the United States: Canadian prices for these drugs averaged 37% higher than US prices.

American consumers also substitute generic versions of drugs for their brand-name originals at higher rates than do consumers in Canada. Lower prices for generic drugs driven by market pressures in the United States create positive incentives for American consumers to make rational cost-benefit choices regarding their use of medicines. By contrast, Canadian public policies often try to force generic substitution by government edict and yet fail to achieve rates of substitution as high as a relatively freer market in the United States. In 2007, Canada-US generic substitution rates, measured by the percentage of total prescriptions dispensed in the year were,

- Canada: 48% generic; 52% brand name
- US: 67% generic; 33% brand name.

Conclusion

If Canada repealed policies that distort the market for prescription drugs, net savings for Canadians could reach between $2.9 billion and $7.5 billion (2007) annually for total retail pharmacy sales of generic and brand-name drugs. The savings would result from greater competition for sales of generic drugs leading to much lower prices and greater voluntary use of generics. In the absence of massive cross-border demand from American consumers, Canadian prices for brand-name drugs should remain significantly below US prices for identical drugs.

Data

Data is based on a sample of retail prices, volumes, dosages, and formulations for the 100 generic drugs with the highest prescription volumes in Canada in 2007, representing approximately 55% of the entire generic market; as well as the 100 brand-name drugs with the highest prescription volumes in Canada in 2007, representing approximately 70% of the entire brand-name market. This dataset is matched to primary data gathered on actual US retail prices that are verified as representative against list prices, known bulk discounts, and published third-party reimbursement prices for the same drugs. The data in this study refer only to prescription drugs in Canada and the United States. Non-prescription or over-the-counter (OTC) drugs are excluded. Prices and volumes apply to retail pharmacy sales only and include pharmacy mark-ups and professional fees unless otherwise stated. Direct institutional sales are excluded.

Introduction

Canadians pay much more than Americans for generic drugs because government policies in Canada distort the market for prescription medicines. The policies of Canadian governments insulate generic drug companies and pharmacy retailers from normal market forces that would put downward pressure on prices for generic drugs. This study compares prices for generic and brand-name drugs in Canada and the United States for the year 2007. Differences between the economics and public policy of the two countries theoretically explain the observed variation in prices for identical drugs. This study estimates the effect on total retail-drug expenditures from price distortions caused by Canadian public policies.

Canadian data

The main Canadian data set used for this study included three lists of drug products.

1. The 100 most commonly prescribed brand-name drug products in Canada in 2007, ranked by the number of prescriptions dispensed. This sample represents 70% of the total number of brand-name prescriptions dispensed in the Canadian market in 2007.

2. The 100 most commonly prescribed generic drug products in Canada in 2007, ranked by the number of prescriptions dispensed. This sample represents 55% of the total number of generic prescriptions dispensed in the Canadian market in 2007.

3. All manufacturers in the Canadian generic market for each of the 100 most commonly prescribed generic drug products in 2007 and their associated market shares defined by the number of prescriptions dispensed for each product in 2007.

All Canadian data were purchased directly from IMS Health Inc. Canada. Data on brand-name and generic drug products was derived from IMS Health's *CompuScript* database. According to IMS Health, the *CompuScript* database estimates the number of prescriptions dispensed by Canadian retail pharmacies. The *CompuScript* sample is drawn from a panel of over 5,700 pharmacies, which represents more than 70% of retail pharmacies in Canada. The sample, stratified by province, type of store (chain or independent), and store size (large or small), comprises over 5,200 stores and is representative of the total number of stores in Canada. Records are collected electronically each month from participating pharmacies. After passing through various quality-control checks, the sample data are projected to the total number of pharmacies in each province and provincial totals are summed to provide a national estimate. The

data elements available include extended units. The extended unit may be pills (for oral solids), millilitres (for liquids), doses (for some inhalers), and grams (for powders). Also available is the cost of the prescription as dispensed. This includes all mark-ups and the pharmacist's professional fee [IMS Health Inc. Canada, 2008a]. The *CompuScript* data includes all prescription drugs dispensed in pharmacies. This encompasses "non-ethical" drugs, over-the-counter (OTC) medicines that can be purchased with or without a prescription by a physician. Although the *CompuScript* data includes these drugs, for the purpose of this study OTC drugs were excluded when comparing Canadian and American drug prices.

Canadian data set

- drug product name
- active ingredient(s) (i.e. common drug name)
- manufacturer
- formulation (e.g. orals, solid)
- extended unit type (e.g. tablets)
- available dosage strengths per drug product (e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid)
- total prescriptions dispensed per drug product
- total prescriptions dispensed per drug product by dosage strength
- total extended units dispensed per drug product
- total extended units dispensed per drug product by dosage strength
- average extended units dispensed per prescription, per drug product by dosage strength
- total cost of dispensed prescriptions per drug product including all pharmacy mark-ups and professional fees
- average prescription cost per drug product including all pharmacy mark-ups and professional fees all manufacturers in the Canadian generic market for each of the most commonly prescribed 100 generic drug products in 2007 and their associated market shares defined by the number of prescriptions dispensed for each product.

The data does not represent a random sample of the entire market for brand-name and generic prescription drugs in Canada. However, since the *CompuScript* database represents 70% of all pharmacies in Canada, and the datasets selected for this study represent 70% and 55% of the entire number of prescriptions dispensed for each of their respective classes of drugs, it is reasonably safe to extrapolate these findings to the total market for brand-name and generic prescription drugs in Canada [IMS Health Inc. Canada, 2008a].

American data

Comparing Canadian drug prices with American drug prices is complicated by the lack of published data that identifies actual average prices paid by consumers in the United States. For this study, we collected a convenience sample of actual, commonly available, US retail prices that were verified as national and representative against list prices, known bulk discounts, and published third-party reimbursement prices for the same drugs. It is possible to derive a reasonable estimate of national average prices based on available data identifying manufacturers' list prices or average wholesale prices (AWP), actual published federal upper-limit (FUL) prices for US government agencies, actual retail prices published online with major (national) US pharmacies, published research estimating the size of rebates offered to major third-party payers, and the percentage of retail sales affected by third-party reimbursement. For this study, US data on drug prices, drug formulations, dosage strengths, and prescription sizes were obtained from the following sources.

2007 Thomson™ Red Book®

Average Wholesale Price (AWP)

The *Red Book®* is the central source of data on manufacturers' list prices for the US pharmaceutical market. Prices listed in the *Red Book®* are labeled as *Average Wholesale Price* (AWP) [*Red Book®*, 2007].

For the purposes of researching US drug prices, it is especially important to note that AWP is not reflective either of average prices or of the actual prices paid by wholesalers or pharmacies in the United States. This is because AWP is only used as a benchmark for calculating individually negotiated discounts and rebates to large government and private-sector third-party payers like Medicare, Medicaid, Veteran Affairs, Federal Supply Services, private insurers, health maintenance organizations (HMOs), and pharmacy benefit managers (PBMs), as well as bulk retail buyers. Therefore, AWP data does not provide a realistic picture of actual prices for drugs in the United States; previous research comparing AWP data to actual retail prices in the United States confirms this [Skinner, 2005]. Nevertheless, it is possible to use AWP to make a rough estimate of actual average prices in the market by first accounting for the proportion of the market for prescription drug sales in the United States that is affected by third-party payer rebates and discounts.

For instance, there is data available that estimates the numbers of prescriptions that are reimbursed by third-party payers compared to those that are paid for by cash customers. According to research published by Canada's Patented Medicines Price Review Board (PMPRB), the proportion of cash customers in the US market has been steadily decreasing in recent years, from 63% of retail prescriptions in 1990 to only 25% by 1998 [PMPRB, 2003]. According to these figures, at least 75% of retail prescriptions in the United States are reimbursed by third-party payers, and are therefore sold at prices that are significantly lower than the AWP prices.

Second, it is also possible to estimate the magnitude of the discounts achieved over the three quarters of the market for retail prescription drugs that is covered by third-party reimbursement. The size of the discount from AWP depends on the particular terms of the rebates negotiated by third-party payers and the class of drugs concerned. PMPRB's research indicates that, because of volume discounting, generic drug prices tend to be 50% to 60% below AWP, while branded drug prices are 13% to 15% below AWP [PMPRB, 2003]. As mentioned above, these discounts apply to at least three quarters of the market.

The validity of the PMPRB's estimate of the size of the average discount is confirmed by comparing AWP list prices with actual prices paid by US government agencies from the US Federal Supply Schedule (FSS). In the United States, prices for drugs purchased by federal agencies are set by the Federal Supply Schedule (FSS). FSS prices match the lowest price obtainable in the American market. According to the US General Accounting Office (GAO), average FSS prices for generic drugs are more than 50% below the AWP price. Moreover, the US Department of Veteran Affairs (VA) has been able to negotiate prices even lower than FSS prices through purchase contracts for select drugs [PMPRB, 2003]. Because three quarters of the market obtains retail drug discounts that are similar in size to the FSS price, the average retail price for drugs in the United States is obviously much lower than the AWP price and, especially for generic drugs, may in fact be strongly skewed toward the lower FSS price. Inasmuch as the actual primary data on retail prices that was collected for this study approximates the kinds of discounts achieved by FSS and other third-party payers, it may be reasonably assumed that average prices are reflected in the retail price data presented here.

Federal Upper Limit (FUL) price

The *Red Book*® also publishes the Federal Upper Limit (FUL) price for generic drugs when such a price is available. The FUL price is that reimbursed by Medicaid (the state-run, health-insurance program funded by the US federal government for those with low incomes) for prescription drugs for its beneficiaries. According to the *State Medicaid Manual*, these reimbursement limits were established to ensure that the US federal government acts as a prudent payer by taking advantage of current market prices for multiple-source drugs. Previous research has confirmed that FUL prices are significantly below AWP [Skinner, 2005]. Yet, the FUL prices represent a conservative estimate of actual prices because the discounts from AWP are smaller than those achieved by FSS and other third-party payers.

Nevertheless, neither AWP nor FUL prices are used as a comparison for IMS Health's Canadian retail price data. Instead, actual US retail pharmacy prices are used to compare to the actual Canadian retail pharmacy prices. AWP and FUL prices, estimates of third-party insurance coverage, and the magnitude of bulk discounts achieved by insurers are used only to verify that the US retail prices collected for this study can be reasonably generalized across the American market.

Actual Retail Prices (RP) from Costco®

The resources available to this project did not permit the mass primary collection of data on US retail prices on a scale that would achieve a representative sample size that could be extrapolated to the entire market. Instead, the research design called for a comparison of actual US retail price for each of the drugs in the Canadian sample. For ease in collecting data and to make the sample as representative as possible, this study used the online pharmacy drug-price information and ordering services of Costco®, a major US retail pharmacy chain, to obtain actual US price and other drug information for comparison to the Canadian data purchased from IMS Health. Previous editions of this study have used Walgreens® to supplement missing data, however Walgreens® no longer publishes pharmaceutical prices on their website. According to Costco®, their pharmacies located in retail outlets nationwide offer pricing consistent with those listed on the website, which reflected the full-cash purchase price including pharmacy mark-ups and professional fees [Costco®, 2008]. List prices also reflected the full cash-purchase price. The actual price data from Costco® was collected between January 28, 2008 and February 15, 2008 and verified as of March 18, 2008.

American data set

- drug product name
- active ingredient(s) (i.e. common drug name)
- manufacturer
- formulation (e.g. orals, solid)
- extended unit type (e.g. tablets)
- available dosage strengths per drug product (e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid)
- standard extended units dispensed per prescription, per drug product by dosage strength
- prescription cost per drug product including all mark-ups and professional fees.

Methodology

The data sources used for this study listed drug dosage strengths and prescription sizes that sometimes differed between Canada and the United States for the same drug products. In order to make the data comparable between markets, all drug prices were converted to common dosage units. In almost all cases, this was measured in terms of a price per milligram of active ingredient. By converting to a price-per-dosage unit, prescriptions of various sizes and dosages could be made comparable for each drug product.

Canadian sales volumes per formulation and dosage for each drug product were available in the Canadian dataset. Unfortunately, the same level of detail was not available from the three sources of US price data. To improve comparability on average pricing, this study assumed that US sales volumes would follow Canadian patterns and made volume-weighted adjustments to the US data so that it would match Canadian sales volumes per drug formulation and dosage.

Data sources contained many entries for generic drug products as there are multiple manufacturers in the market producing the same active ingredient. Therefore, all generic manufacturers producing the same active ingredient were aggregated into one entry with a weighted average price based on actual sales volumes per product for all common dosage strengths and drug formulations.

In order to make prices comparable across currencies, the Canadian prices were converted to US dollars at the 2007 US-to-Canadian currency Purchasing Power Parity (PPP) rate of 1.22 Canadian dollars to the US dollar set by the Organisation for Economic Co-operation and Development (OECD) [OECD, 2008]. The PPP rate is used to reflect a currency's actual purchasing power relative to the same basket of goods in different countries. The PPP rate is a useful measure for consumers who will only shop in their domestic markets because it should accurately reflect their transaction costs (excluding indirect costs) in their own country.

The Canadian dataset is current through the full year 2007, representing the most recent full year of data available at the time of research. By necessity, actual US retail price data was obtained through primary research and was therefore current to 2008. The difference in years between the Canadian and US datasets required the US data to be adjusted to remove the effect of normal price inflation that occurred between 2007 and 2008. According to the US Bureau of Labor Statistics, the 2007 annual inflation rate for prescription drugs averaged 1.4% [US Bureau of Labor Statistics, 2008]. Therefore, observed 2008 US prices were adjusted to remove the 1.4% inflation that took place during 2007 in order to make the Canadian and US prices comparable across time periods. Becasue all prices have been converted to US dollars, Canadian-to-US price differences are stated as a percentage of the US price: e.g., price difference = (CAD – US) / US.

Findings

Differences between Canadian and US prices for generic drugs

Table 1 (pp. 12–14) ranks the 100 most commonly prescribed generic drug products sold in Canada in 2007, measured by the number of prescriptions dispensed from retail pharmacies. An analysis of the top 100 generic-drug products sold in Canada in 2007 identified 56 separate generic active ingredients, which are listed in Table 2 (pp. 15). Of these 56 active ingredients, 13 were not available at Costco®, or not yet generically available in the United States, and three were sold as "over the counter" (OTC) products in the American market. This left 40 active-ingredient drug compounds that were available as generic drugs in both Canada and the United States.

- In a direct comparison between actual retail prices in Canada and the United States for all 40 active ingredients that were available as generics in both markets, the Canadian price averaged 112% higher than the US price for the same drugs.

- Of the 40 drug compounds that were available as generics in both markets, 30 (75% of the sample) were more expensive in Canada; 10 (25%) were less expensive.

- For the generic drugs that were more expensive in Canada, Canadian prices averaged 161% higher than US prices. For the generic drugs that were less expensive in Canada, the Canadian price averaged 36% lower than US prices [table 3, p. 16].

Studies showing prices for generic prescription drugs to be higher in Canada than in the United States

The findings of this study confirm other published research on Canadian and US prices for generic prescription drugs. All of the following, chronologically listed, studies have found that prices for generic prescription drugs are higher on average in Canada than in the United States.

- Fraser Institute [Graham and Robson, 2000]
- Palmer D'Angelo Consulting International [PDCI, 2002]
- Patented Medicines Price Review Board of Canada [PMPRB, 2003]
- US Food and Drug Administration, Dep't of Health and Human Services [US FDA, 2003]
- US Food and Drug Administration [Associated Press, 2004]
- Fraser Institute [Skinner, 2005]
- Palmer D'Angelo Consulting International [PDCI, 2005]

- Patented Medicines Price Review Board of Canada [PMPRB, 2006]
- Competition Bureau Canada [Government of Canada, 2007]

Other studies

Only one published study has found that Canadian generic drug prices were on average lower than in the United States. The analysis by Danzon and Furukawa [2003] included non-prescription (over-the-counter) drugs in their data sample and their results are not comparable to the prescription-only prices studied here. Danzon and Furukawa also used data from the IMS Health *Midas* set, which is recorded at manufacturer-price levels, excluding wholesaler and pharmacy mark-ups and, therefore, is not comparable to the data sets of retail prices used in this study. Their study also used 1999 data, making the comparison to this one somewhat dated. Danzon and Furukawa also did not adequately adjust for the applicability of bulk discounts to the market. For instance, Canada's PMPRB cites US government estimates that more than 75% of the market is covered by third-party insurance and therefore obtains prices discounted below list prices [PMPRB, 2003]. Danzon and Furukawa do not indicate what percentage of the market is covered by third parties in their estimate. The discounts they discuss are even much smaller than the conservative, standard 20% mark-up applied by the *Red Book*® to estimate AWP when a manufacturer does not supply the list price [*Red Book*®, 2006]. Their estimated discounts are also much smaller than those estimated by the PMPRB or the US government. Therefore, Danzon and Furukawa's estimates of US price levels for generic drugs are probably significantly overstated at the retail level.

Another study, by D'Cruz et al. [2005], found parity between Canadian and US prices for generic drugs. However, the analysis used seriously flawed and misleading methodology; its findings should be entirely rejected. To make Canada-US prices comparable, the authors correctly converted prices to a common dosage unit (e.g. price per mg). This method properly accounts for differences in pack sizes and dosage formulations between Canada and the US, truly making prices comparable. However, the authors then decided to compare only similar pack sizes in Canada and the United States. This is not standard methodology and completely defeats the purpose of doing the conversion to a common dosage unit in the first place. It is common to have larger pack sizes at discounted prices in the United States. This allows American consumers to get more for their money or, in other words, to reduce the price per unit. There is no legitimate rationale for excluding these cases. By including only the least economical sales of US generic products, the selection bias skews the results on price comparisons and produces a meaningless measurement. It is telling that even after such unorthodox methods, the authors could only show results suggesting that Canada-US prices for generic drugs were at parity. Finally, their comparisons were made using wholesale prices, even though wholesale prices mean nothing to consumers, insurers, and public drug programs, which must pay retail prices.

Table 1: 100 most commonly prescribed, generic prescription drug products in Canada for 2007

Rank	Manufacturer	Active Ingredient (s)	Estimated number of dispensed prescriptions
1	APOTEX	FUROSEMIDE	4,121,000
2	RATIOPHARM	SALBUTAMOL	4,058,000
3	NOVOPHARM	VENLAFAXINE	4,017,000
4	APOTEX	RAMIPRIL	3,778,000
5	APOTEX	HYDROCHLOROTHIAZIDE	3,659,000
6	APOTEX	AMOXICILLIN	3,615,000
7	APOTEX	OMEPRAZOLE	2,821,000
8	NOVOPHARM	HYDROCHLOROTHIAZIDE	2,581,000
9	APOTEX	LORAZEPAM	2,571,000
10	APOTEX	AMITRIPTYLINE	2,526,000
11	GENPHARM PHARM	METFORMIN	2,231,000
12	APOTEX	OXAZEPAM	2,017,000
13	APOTEX	PREDNISONE	1,806,000
14	APOTEX	METFORMIN	1,802,000
15	NOVOPHARM	METOPROLOL	1,795,000
16	APOTEX	ALLOPURINOL	1,727,000
17	APOTEX	WARFARIN	1,716,000
18	APOTEX	NAPROXEN	1,687,000
19	RIVA	CALCIUM/COLECALCIFEROL	1,636,000
20	LINSON PHARMA INC	ACETAMINOPHEN/OXYCODONE	1,490,000
21	RATIOPHARM	RAMIPRIL	1,490,000
22	RIVA	ACETYLSALICYLIC ACID	1,443,000
23	PHARMASCIENCE	METFORMIN	1,442,000
24	APOTEX	METOPROLOL	1,416,000
25	SANDOZ CANADA INC	BISOPROLOL	1,407,000
26	APOTEX	CITALOPRAM	1,407,000
27	EUROPHARM	CALCIUM/ERGOCALCIFEROL	1,300,000
28	APOTEX	ACETAMINOPHEN	1,258,000
29	PHARMASCIENCE	CLONAZEPAM	1,255,000
30	APOTEX	SIMVASTATIN	1,218,000
31	NOVOPHARM	FUROSEMIDE	1,197,000
32	NOVOPHARM	LORAZEPAM	1,175,000
33	NOVOPHARM	GLYBURIDE	1,172,000
34	RATIOPHARM	ACETAMINOPHEN/CAFFEINE/CODEINE	1,150,000
35	APOTEX	RANITIDINE	1,088,000

Table 1, continued: 100 most commonly prescribed generic prescription drug products in Canada for 2007

Rank	Manufacturer	Active Ingredient (s)	Estimated number of dispensed prescriptions
36	APOTEX	CEPHALEXIN	1,074,000
37	APOTEX	FOLIC ACID	1,067,000
38	NOVOPHARM	AMOXICILLIN	1,037,000
39	APOTEX	PAROXETINE	1,012,000
40	APOTEX	GLYBURIDE	1,004,000
41	NOVOPHARM	ALENDRONATE	981,000
42	APOTEX	SALBUTAMOL	980,000
43	APOTEX	IBUPROFEN	973,000
44	APOTEX	METOPROLOL	934,000
45	APOTEX	DIVALPROEX	929,000
46	APOTEX	SERTRALINE	921,000
47	RATIOPHARM	ACETAMINOPHEN/OXYCODONE	917,000
48	GENPHARM PHARM	SIMVASTATIN	904,000
49	APOTEX	ATENOLOL	899,000
50	NOVOPHARM	SPIRONOLACTONE	884,000
51	APOTEX	ALENDRONATE	873,000
52	NOVOPHARM	ATENOLOL	872,000
53	RATIOPHARM	METFORMIN	855,000
54	APOTEX	PENICILLIN V	850,000
55	APOTEX	DIAZEPAM	841,000
56	PHARMASCIENCE	CLONAZEPAM	840,000
57	TARO PHARMACEUTICA	WARFARIN	822,000
58	PHARMASCIENCE	HYDROCHLOROTHIAZIDE	812,000
59	NOVOPHARM	METFORMIN	801,000
60	PHARMASCIENCE	ACETYLSALICYLIC ACID	795,000
61	APOTEX	HYDROCHLOROTHIAZIDE/TRIAMTERENE	794,000
62	NOVOPHARM	ACETAMINOPHEN	784,000
63	GENPHARM PHARM	PAROXETINE	773,000
64	APOTEX	BISOPROLOL	765,000
65	GENPHARM PHARM	RANITIDINE	745,000
66	NOVOPHARM	ACETYLSALICYLIC ACID	734,000
67	APOTEX	TRAZODONE	719,000
68	GENPHARM PHARM	CITALOPRAM	716,000
69	PHARMASCIENCE	ATENOLOL	712,000
70	APOTEX	RISPERIDONE	708,000

Table 1, continued: 100 most commonly prescribed generic prescription drug products in Canada for 2007

Rank	Manufacturer	Active Ingredient (s)	Estimated number of dispensed prescriptions
71	APOTEX	DIGOXIN	706,000
72	APOTEX	CALCIUM	697,000
73	RANBAXY PHARMA CAN	ZOPICLONE	693,000
74	APOTEX	CLONAZEPAM	685,000
75	RATIOPHARM	BETAMETHASONE	682,000
76	APOTEX	ZOPICLONE	680,000
77	PHARMASCIENCE	METOPROLOL	665,000
78	GENPHARM PHARM	ZOPICLONE	658,000
79	RATIOPHARM	CITALOPRAM	634,000
80	APOTEX	IRON FERROUS	621,000
81	APOTEX	DILTIAZEM	613,000
82	APOTEX	SULFAMETHOXAZOLE/TRIMETHOPRIM	610,000
83	RATIOPHARM	ATENOLOL	606,000
84	EUROPHARM	ERGOCALCIFEROL	606,000
85	APOTEX	AZITHROMYCIN	604,000
86	NOVOPHARM	GABAPENTIN	596,000
87	TARO PHARMACEUTICA	HYDROCORTISONE	593,000
88	PHARMASCIENCE	CITALOPRAM	578,000
89	GENPHARM PHARM	CLONAZEPAM	573,000
90	GENPHARM PHARM	GLYBURIDE	573,000
91	APOTEX	TEMAZEPAM	566,000
92	NOVOPHARM	DIVALPROEX	564,000
93	SANDOZ CANADA INC	BUPROPION	563,000
94	TARO PHARMACEUTICA	BETAMETHASONE	553,000
95	TARO PHARMACEUTICA	DOCUSATE	546,000
96	APOTEX	FENOFIBRATE	546,000
97	SANDOZ CANADA INC	DILTIAZEM	526,000
98	PHARMASCIENCE	IRON FERROUS	520,000
99	PHARMASCIENCE	DOCUSATE	514,000
100	APOTEX	PRAVASTATIN	501,000

Source: IMS Health Inc., 2008.

Table 2: 100 most commonly prescribed, generic drug products in Canada for 2007, grouped by active ingredient

Rank	Active ingredient(s)	Rank	Active ingredient(s)
1	FUROSEMIDE	29	PAROXETINE
2	SALBUTAMOL*	30	ALENDRONATE*
3	VENLAFAXINE	31	IBUPROFEN
4	RAMIPRIL*	32	DIVALPROEX*
5	HYDROCHLOROTHIAZIDE	33	SERTRALINE
6	AMOXICILLIN	34	ATENOLOL
7	OMEPRAZOLE	35	SPIRONOLACTONE
8	LORAZEPAM	36	PENICILLIN V*
9	AMITRIPTYLINE	37	DIAZEPAM
10	METFORMIN	38	HYDROCHLOROTHIAZIDE/TRIAMTERENE
11	OXAZEPAM	39	TRAZODONE
12	PREDNISONE	40	RISPERIDONE*
13	METOPROLOL	41	DIGOXIN
14	ALLOPURINOL	42	CALCIUM*
15	WARFARIN	43	ZOPICLONE*
16	NAPROXEN	44	BETAMETHASONE
17	ACETAMINOPHEN/OXYCODONE	45	IRON FERROUS*
18	ACETYLSALICYLIC ACID*	46	DILTIAZEM
19	BISOPROLOL	47	SULFAMETHOXAZOLE/TRIMETHOPRIM
20	CITALOPRAM	48	ERGOCALCIFEROL*
21	ACETAMINOPHEN*	49	AZITHROMYCIN*
22	CLONAZEPAM	50	GABAPENTIN
23	SIMVASTATIN	51	HYDROCORTISONE
24	GLYBURIDE	52	TEMAZEPAM
25	ACETAMINOPHEN/CAFFEINE/CODEINE*	53	BUPROPION
26	RANITIDINE	54	DOCUSATE*
27	CEPHALEXIN	55	FENOFIBRATE*
28	FOLIC ACID	56	PRAVASTATIN

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold Over-the-Counter (OTC) in the United States.

Source: IMS Health Inc. Canada, 2008a.

Table 3: Differences between retail prices in Canada and the United States as a percentage of the US price (US$2007 PPP) over the most commonly prescribed, generic prescription drug products (56 active drug ingredients) available in both countries in 2007

Rank	Active ingredient(s)	Price differences	Rank	Active ingredient(s)	Price differences
1	FUROSEMIDE	23%	29	PAROXETINE	130%
2	SALBUTAMOL	*	30	ALENDRONATE	*
3	VENLAFAXINE	–41%	31	IBUPROFEN	69%
4	RAMIPRIL	*	32	DIVALPROEX	*
5	HYDROCHLOROTHIAZIDE	82%	33	SERTRALINE	362%
6	AMOXICILLIN	186%	34	ATENOLOL	214%
7	OMEPRAZOLE	135%	35	SPIRONOLACTONE	–29%
8	LORAZEPAM	–7%	36	PENICILLIN V	*
9	AMITRIPTYLINE	97%	37	DIAZEPAM	17%
10	METFORMIN	55%	38	HYDROCHLOROTHIAZIDE/TRIAMTERENE	18%
11	OXAZEPAM	–69%	39	TRAZODONE	374%
12	PREDNISONE	204%	40	RISPERIDONE	*
13	METOPROLOL	63%	41	DIGOXIN	40%
14	ALLOPURINOL	129%	42	CALCIUM	*
15	WARFARIN	29%	43	ZOPICLONE	*
16	NAPROXEN	220%	44	BETAMETHASONE	25%
17	ACETAMINOPHEN/OXYCODONE	–17%	45	IRON FERROUS	*
18	ACETYLSALICYLIC ACID	*	46	DILTIAZEM	32%
19	BISOPROLOL	–65%	47	SULFAMETHOXAZOLE/TRIMETHOPRIM	83%
20	CITALOPRAM	482%	48	ERGOCALCIFEROL	*
21	ACETAMINOPHEN	*	49	AZITHROMYCIN	*
22	CLONAZEPAM	166%	50	GABAPENTIN	167%
23	SIMVASTATIN	694%	51	HYDROCORTISONE	–11%
24	GLYBURIDE	–1%	52	TEMAZEPAM	9%
25	ACETAMINOPHEN/CAFFEINE/CODEINE	*	53	BUPROPION	–45%
26	RANITIDINE	338%	54	DOCUSATE	*
27	CEPHALEXIN	221%	55	FENOFIBRATE	*
28	FOLIC ACID	–77%	56	PRAVASTATIN	169%

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold over-the-counter (OTC) in the United States.

Source: IMS Health Inc. Canada, 2008a; Costco®, 2007.

Differences between the Canadian and US prices for brand-name drugs

The price of brand-name drugs in Canada follows the pattern one would expect: Canadian prices are lower on average than US prices. There are two possible explanations for this. First, the findings are consistent with the fact that Canada, unlike the United States, imposes price controls on patented medicines and most of the 100 top-selling branded drugs are patented. Second, Canadian average incomes are lower than American incomes and, therefore, even without price controls, economic theory predicts that Canadian drug prices should be lower on average than US prices [Danzon and Furukawa, 2003].

Table 4 (pp. 18–21) ranks the top 100 brand-name drug products sold in Canada in 2007, measured by the number of prescriptions dispensed from retail pharmacies. Of the top 100 brand-name drugs in Canada for 2007, 11 were either not available in the United States, not listed in the *Red Book*®, or an equivalent brand name could not be identified. In addition, 10 drugs were not available at Costco® and 4 drugs were sold as "over the counter" (OTC) products. This left 75 identifiable, equivalent branded prescription drugs available in both markets in the sample.

- The Canadian prices for the 75 drugs available in both markets averaged 53% lower than prices for the same drugs in the United States.

- Of these 75 drugs, 73 (97%) were less expensive in Canada than in the United States. The Canadian prices for these drugs averaged 56% lower than American prices for the same drugs.

- The remaining three (4%) were more expensive in Canada than in the United States. Canadian prices for these drugs averaged 38% higher than American prices for the same drugs.

Table 4: Differences between retail prices in Canada and the United States as a percentage of the US price (US$2007 PPP) for the 100 most commonly prescribed, brand-name prescription drug products available in both countries in 2007

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Price differences
1	LIPITOR	PFIZER	ATORVASTATIN	14,235,000	–40%
2	SYNTHROID	ABBOTT PCD	LEVOTHYROXINE	10,723,000	–61%
3	NORVASC	PFIZER	AMLODIPINE	7,147,000	–28%
4	ASAPHEN	PENDOPHARM	ACETYLSALICYLIC ACID	5,606,000	*
5	PANTOLOC	NYCOMED CANADA INC	PANTOPRAZOLE	5,245,000	–49%
6	CRESTOR	ASTRAZENECA	ROSUVASTATIN	4,713,000	–57%
7	ALTACE	SANOFI-AVENTIS	RAMIPRIL	4,302,000	–54%
8	PARIET	JANSSEN-ORTHO INC	RABEPRAZOLE SODIUM	3,869,000	–71%
9	TYLENOL W/COD #3	JANSSEN-ORTHO INC	ACETAMINOPHEN/CAFFEINE/CODEINE	3,618,000	–69%
10	SEROQUEL	ASTRAZENECA	QUETIAPINE	3,464,000	–66%
11	ADALAT XL	BAYER HEALTHCARE	NIFEDIPINE	2,942,000	–26%
12	PLAVIX	BMS-SANOFI	CLOPIDOGREL	2,668,000	–99%
13	ALESSE	WYETH PHARMACEUTIC	ETHINYLESTRADIOL/LEVONORGESTREL	2,647,000	*
14	ATIVAN	WYETH PHARMACEUTIC	LORAZEPAM	2,647,000	–88%
15	NEXIUM	ASTRAZENECA	ESOMEPRAZOLE	2,639,000	–58%
16	ACTONEL	P&G PHARMA	RISEDRONATE	2,591,000	–53%
17	CELEBREX	PFIZER	CELECOXIB	2,438,000	–62%
18	EFFEXOR XR	WYETH PHARMACEUTIC	VENLAFAXINE	2,415,000	–60%
19	FLOVENT HFA	GLAXOSMITHKLINE	FLUTICASONE	2,333,000	–19%
20	ELTROXIN	GLAXOSMITHKLINE	LEVOTHYROXINE	2,263,000	*
21	PREVACID	ABBOTT PCD	LANSOPRAZOLE	2,197,000	–61%
22	PREMARIN	WYETH PHARMACEUTIC	ESTROGENIC SUB,CONJUGATED	2,194,000	–75%
23	NASONEX	SCHERING-PLOUGH	MOMETASONE	1,967,000	–30%
24	AVAPRO	BMS-SANOFI	IRBESARTAN	1,933,000	–45%
25	DIOVAN	NOVARTIS PHARMA	VALSARTAN	1,792,000	–46%
26	VASOTEC	MERCK FROSST CAN	ENALAPRIL	1,686,000	–21%
27	ATACAND	ASTRAZENECA	CANDESARTAN	1,683,000	–43%
28	TRI-CYCLEN	JANSSEN-ORTHO INC	ETHINYLESTRADIOL/NORGESTIMATE	1,645,000	–57%
29	COVERSYL	SERVIER LAB	PERINDOPRIL	1,627,000	–57%
30	FLOMAX CR	BOEHRINGER ING	TAMSULOSIN	1,583,000	–74%
31	COUMADIN	BMS PHARMA	WARFARIN	1,569,000	–64%
32	ZYPREXA	LILLY	OLANZAPINE	1,566,000	–57%

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold over-the-counter (OTC) in the United States.

Table 4, continued: Differences between retail prices in Canada and the United States as a percentage of the US price (US$2007 PPP) for the 100 most commonly prescribed, brand-name prescription drug products available in both countries in 2007

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Price differences
33	MARVELON	SCHERING-PLOUGH	DESOGESTREL/ETHINYLESTRADIOL	1,536,000	–58%
34	ENTROPHEN	PENDOPHARM	ACETYLSALICYLIC ACID	1,348,000	*
35	OXYCONTIN	PURDUE PHARMA	OXYCODONE	1,327,000	*
36	COZAAR	MERCK FROSST CAN	LOSARTAN	1,285,000	–40%
37	DIOVAN HCT	NOVARTIS PHARMA	HYDROCHLOROTHIAZIDE/VALSARTAN	1,235,000	–54%
38	ONE TOUCH ULTRA	LIFESCAN	NON PHARMACEUTICAL INGREDIENT	1,222,000	*
39	EZETROL	MERCK-SCHERING GP	EZETIMIBE	1,214,000	–44%
40	AVALIDE	BMS-SANOFI	HYDROCHLOROTHIAZIDE/IRBESARTAN	1,201,000	–55%
41	ARTHROTEC	PFIZER	DICLOFENAC/MISOPROSTOL	1,197,000	–67%
42	ADVAIR	GLAXOSMITHKLINE	FLUTICASONE/SALMETEROL	1,196,000	–52%
43	SPIRIVA	BOEHRINGER ING	TIOTROPIUM BROMIDE	1,183,000	–61%
44	XALATAN	PFIZER	LATANOPROST	1,181,000	*
45	AVANDIA	GLAXOSMITHKLINE	ROSIGLITAZONE	1,160,000	–46%
46	NITRO-DUR	SCHERING-PLOUGH	NITROGLYCERIN	1,152,000	–60%
47	ASPIRIN	BAYER CCD	ACETYLSALICYLIC ACID	1,107,000	*
48	YASMIN	BAYER HEALTHCARE	DROSPIRENONE/ETHINYLESTRADIOL	1,059,000	–68%
49	ASA	JAMP PHARMA	ACETYLSALICYLIC ACID	1,052,000	*
50	ARICEPT	PFIZER	DONEPEZIL	1,048,000	–24%
51	DILANTIN SODIUM	PFIZER	PHENYTOIN	1,023,000	–75%
52	FLONASE	GLAXOSMITHKLINE	FLUTICASONE	1,002,000	–95%
53	SYMBICORT	ASTRAZENECA	BUDESONIDE/FORMOTEROL	969,000	*
54	LANOXIN	VIRCO PHARMA INC	DIGOXIN	956,000	69%
55	MICARDIS	BOEHRINGER ING	TELMISARTAN	930,000	–44%
56	VIAGRA	PFIZER	SILDENAFIL	929,000	–2%
57	ACCUPRIL	PFIZER	QUINAPRIL	920,000	–43%
58	ZESTRIL	ASTRAZENECA	LISINOPRIL	911,000	–46%
59	SINGULAIR	MERCK FROSST CAN	MONTELUKAST	903,000	–40%
60	BIAXIN XL	ABBOTT PCD	CLARITHROMYCIN	894,000	–50%
61	VALTREX	GLAXOSMITHKLINE	VALACICLOVIR	894,000	–43%
62	DIDROCAL	P&G PHARMA	CALCIUM/ETIDRONIC ACID	856,000	–94%
63	FUCIDIN	LEO PHARMA INC	FUSIDIC ACID	846,000	*
64	ASCENSIA MICROFILL	BAYER HEALTHCARE	NON PHARMACEUTICAL INGREDIENT	816,000	*

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold over-the-counter (OTC) in the United States.

Table 4, continued: Differences between retail prices in Canada and the United States as a percentage of the US price (US$2007 PPP) for the 100 most commonly prescribed, brand-name prescription drug products available in both countries in 2007

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Price differences
65	SENOKOT	PURDUE PHARMA	SENNA	765,000	*
66	FOSAMAX	MERCK FROSST CAN	ALENDRONATE	756,000	–67%
67	ACTOS	LILLY	PIOGLITAZONE	737,000	–44%
68	LYRICA	PFIZER	PREGABALIN	723,000	–40%
69	BIAXIN BID	ABBOTT PCD	CLARITHROMYCIN	722,000	–38%
70	SOFLAX	PENDOPHARM	DOCUSATE	706,000	*
71	TRIQUILAR	BAYER HEALTHCARE	ETHINYLESTRADIOL/LEVONORGESTREL	692,000	–69%
72	ELOCOM	SCHERING-PLOUGH	MOMETASONE	686,000	–74%
73	CONCERTA	JANSSEN-ORTHO INC	METHYLPHENIDATE	681,000	*
74	PROSCAR	MERCK FROSST CAN	FINASTERIDE	651,000	–43%
75	CIPRALEX	LUNDBECK CANADA IN	ESCITALOPRAM	649,000	–33%
76	TRI-CYCLEN LO	JANSSEN-ORTHO INC	ETHINYLESTRADIOL/NORGESTIMATE	631,000	–99%
77	MACROBID	P&G PHARMA	NITROFURANTOIN	629,000	–57%
78	TWINRIX	GLAXOSMITHKLINE	VACCINE, HEPATITIS A INACTIVATED VIRUS/ VACCINE, HEPATITIS B	617,000	*
79	LOPRESOR SR	NOVARTIS PHARMA	METOPROLOL	608,000	–96%
80	CIALIS	LILLY ICOS	TADALAFIL	608,000	4%
81	ADVAIR MDI	GLAXOSMITHKLINE	FLUTICASONE/SALMETEROL	589,000	–62%
82	AVELOX	BAYER HEALTHCARE	MOXIFLOXACIN	588,000	–51%
83	IMOVANE	SANOFI-AVENTIS	ZOPICLONE	582,000	*
84	DIANE-35	BAYER HEALTHCARE	CYPROTERONE/ETHINYLESTRADIOL	572,000	*
85	WELLBUTRIN XL	BIOVAIL PHARMA	BUPROPION	571,000	–80%
86	NOVOLIN GE NPH	NOVO NORDISK CDA	HUMAN INSULIN ISOPHANE	553,000	*
87	HYDROMORPH CONTIN	PURDUE PHARMA	HYDROMORPHONE	549,000	*
88	ATACAND PLUS	ASTRAZENECA	CANDESARTAN CILEXETIL/ HYDROCHLOROTHIAZIDE	545,000	–54%
89	RISPERDAL	JANSSEN-ORTHO INC	RISPERIDONE	544,000	–76%
90	CIPRO XL	BAYER HEALTHCARE	CIPROFLOXACIN	543,000	–54%
91	HUMULIN N	LILLY	HUMAN INSULIN ISOPHANE	536,000	*
92	LOSEC	ASTRAZENECA	OMEPRAZOLE	536,000	–53%
93	ATROVENT HFA	BOEHRINGER ING	IPRATROPIUM	524,000	–98%
94	MICARDIS PLUS	BOEHRINGER ING	HYDROCHLOROTHIAZIDE/TELMISARTAN	511,000	–50%

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold over-the-counter (OTC) in the United States.

Table 4, continued: Differences between retail prices in Canada and the United States as a percentage of the US price (US$2007 PPP) for the 100 most commonly prescribed, brand-name prescription drug products available in both countries in 2007

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Price differences
95	NICODERM	MCNEIL CONSUMER	NICOTINE	507,000	*
96	DIAMICRON MR	SERVIER LAB	GLICLAZIDE	502,000	*
97	EMO-CORT	STIEFEL	HYDROCORTISONE	493,000	*
98	PROMETRIUM	SCHERING-PLOUGH	PROGESTERONE	492,000	–45%
99	CEFZIL	BMS PHARMA	CEFPROZIL	482,000	*
100	TIAZAC XC	BIOVAIL PHARMA	DILTIAZEM	476,000	–40%

Note: * = not available at Costco, no identical drug available by prescription in the United States, or sold over-the-counter (OTC) in the United States.

Source: IMS Health Inc. Canada, 2008a; Costco®, 2007.

Substitution of generic and brand-name drugs in Canada and the United States

Various policies of federal, territorial, and provincial governments in Canada are designed to force patients to use generic versions of drugs. Some of these policies involve forcing recipients of public drug programs to substitute biochemical equivalent, generic active ingredients for the original brand-name drug they were prescribed, even when a brand was specified by a physician. Other policies involve forcing patients to substitute a generic drug that is not biochemically equivalent to the brand-name drug they were prescribed by their physician, because governments believe the generic drug is therapeutically equivalent for the treatment of the same health condition. In some provinces, governments also allow pharmacists to override a physician's prescription in order to make such generic substitutions for patients who are not even recipients of public drug benefits (i.e. patients who are privately insured) [Graham and Tabler, 2005].

These kinds of government-imposed rules are not common in the United States. Therefore, one might expect that Canadian rates of generic substitution for brand-name drugs would be higher than in the United States. The evidence obtained for this study indicates that the reality is exactly the opposite of what one might expect: Americans substitute generic drugs for brand-name drugs at much higher rates than Canadians, even though they are not forced to do so by government edict. Below are the rates for substitution of generics in Canada and the United States, based on the data available to this study [IMS Health Inc. Canada, 2008b; IMS Health Inc., 2008].

Percentage of total prescriptions dispensed in each market in 2007, generic versus brand-name drugs

Canada 48% generic; 52% brand-name
United States 67% generic; 33% brand-name

How public policies in Canada cause inflated prices for generic prescription drugs

There are a variety of federal and provincial public policies that have been previously identified as contributing to inflated prices for generic drugs in Canada [Skinner, 2004, 2005]. The cumulative effect of these public policies has been to inhibit the downward pressure on the retail prices of generic drug products that would occur under normal market conditions. Following is a summary of distortionary prescription drug policies in Canada.

Public policies that distort price competition among retailers of generic drugs

- Drug programs direct public reimbursement of prescriptions to pharmacies instead of consumers. This insulates consumers from the cost; removing incentives for comparative shopping that would put downward pressure on prices.

- Provincial drug programs also reimburse generics at a fixed percentage of the price of the original, brand-name drug. Under fixed-percentage reimbursement, there is no incentive for retailers to undercut each other to win sales. This is because the buyer (government) offers every seller the same price and the price is known in advance.

- Health Canada prohibits Canadians from importing cheaper American generic drugs via the Internet or by other cross-border means [Health Canada, 2002]. This eliminates a potentially competitive means of retail distribution that could put downward pressure on the prices being charged by brick-and-mortar retail pharmacy chains.[1]

Public policies that distort price competition between off-patent, brand-name drugs and generics

- Federal price-control rules create a disincentive for makers of patented brand-name drugs to lower the prices of their products when patents expire. [2] Therefore, the floor price for off-patent, brand-name drugs is fixed at a high level. If governments also use public reimbursement policies that set prices for generics at a fixed percentage of the brand price, then price competition between off-patent brands and generics is drastically reduced. This happens because the prices for off-patent, brand-name drugs cannot move downward in the face of generic competition, as would be expected in the absence of the federal price-control rules.

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[1] This point merely identifies the policy factors affecting economic competition among pharmacy retailers in Canada. Safety issues associated with the internet trade in prescription drugs might make it reasonable for the government of Canada to restrict the cross-border, internet resale trade in drugs.

[2] The unintended effect of federal price controls on patented drugs is to prevent brand-name companies from reducing prices on these products once a patent expires. This is because Canada's price-control policy uses the highest price of the existing drugs in the same therapeutic class as a reference for establishing the maximum allowable price for new patent-protected drug formulations entering the market. Therefore, makers of brand-name drugs are extremely reluctant to reduce the price of the original drug when it goes off patent for fear of inadvertently lowering the maximum allowable entry price for new drugs in the same class. In fact, after the entry of generic competitors into the market for an off-patent drug, the price of the brand-name drug tends to remain high. Thus, Canadian price controls create an artificial incentive for brand-name companies to resist competing on the basis of price with generic firms for sales of off-patent drugs. The result is less downward pressure on the prices of generic drugs and lost savings for consumers of these drugs [Graham, 2000].

- Policies forcing substitution of generics eliminate the possibility of price competition between off-patent, brand-name drugs and generics altogether. [3] When governments force generic substitution for brand-name drugs, generic companies no longer have to compete on price against consumer loyalties toward brand-name drugs. Consumers will buy the drug at a higher price because they have no alternative products.

- Policies that ban direct-to-consumer (DTC) advertising reduce the intensity of price competition between off-patent brands and generics. While a drug is patented, consumer loyalties to the brand-name product are developed through direct-to-consumer advertising. Theoretically, these loyalties linger once a drug's patent expires and consumers have competing generic alternatives available at lower prices. Generics compete with brand loyalty on the basis of price savings. The stronger the brand loyalty, the larger the price savings must be to encourage consumers to switch to the generic alternative. Direct-to-consumer advertising is banned in Canada but is allowed in the United States. Theoretically, this means that generic firms in the United States face stronger incentives to compete on price to overcome brand loyalties than Canadian generic firms. This is a contributing explanation for lower US prices for generic drugs.

Public policies that distort price competition among generic manufacturers

- Large, established generic companies exploit the system of direct-to-pharmacy, fixed-reimbursement supply to offer rebates to retailers that are "bundled" across many products in exchange for exclusive distribution rights. This frequently results in these companies having a virtual monopoly within particular retail pharmacy chains for a particular generic label [table 5]. Because pharmacies are reimbursed directly, discounts are not passed on to consumers.

- The ability of other firms to offer competitive discounting to retailers is hindered by Health Canada's regulatory requirements for new drug approvals, which raise the cost for potential competitors of developing a range of products broad enough to compete with large, established firms. Health Canada requires every new drug to be approved by regulators. Potential competitors in the generic drug market in Canada

[3] According to recent research comparing pharmacare programs in Canada, nine out of 10 provincial governments mandate that pharmacists fill prescriptions with generic versions of non-patented, brand-name medicines unless the prescribing physician specifies otherwise. In some provinces, pharmacists can substitute generic products even when the prescribing physician specifies otherwise. Sometimes governments force the substitution of generics for brand-name products even when the drug molecules are not identical [Graham and Tabler, 2005].

would need to develop and win approval for a large basket of drugs before having a suffcient number of products to compete with the negotiating power of big firms already established with exclusive retail distribution agreements.

- Where it does occur, competition among generic firms on discounting will not trickle down to payers anyway because it is captured by retailers due to indirect, fixed, public reimbursement policies.

Table 5: Overall competition in the generic industry for retail sales in 2007

Company	Prescription volumes	Percent of total volume for top 100 drugs	Value of sales (000's)	Percent of total value of sales for top 100 drugs
APOTEX	62,405,000	52.2	1,452,969	52.5
NOVOPHARM	19,190,000	16.1	486,266	17.6
RATIOPHARM	10,392,000	8.7	255,832	9.2
PHARMASCIENCE	8,133,000	6.8	120,425	4.4
GENPHARM PHARM	7,173,000	6.0	247,643	9.0
RIVA	3,079,000	2.6	30,409	1.1
TARO	2,514,000	2.1	37,095	1.3
SANDOZ	2,496,000	2.1	66,087	2.4
EUROPHARM	1,906,000	1.6	20,860	0.8
LINSON PHARMA	1,490,000	1.2	29,004	1.0
RANBAXY	693,000	0.6	19,944	0.7
Grand Total	119,471,000	100.0	2,766,534	100.0

Note: Table 5 illustrates the commercial concentration in the generic drug industry. This data suggests the presence of barriers to competition. However, a high level of commercial concentration does not necessarily suggest the absence of competitive forces in the market. Baumol [1983] has shown that even a firm with a total monopoly may behave competitively if realistically threatened by the possibility of new competitive entrants to a market. Such monopolies would give less cause for government intervention than those in less contestable markets.

Note: Figures rounded.

Source: IMS Health Inc. Canada, 2008a.

Market-based solutions

If public drug-benefit programs only partially reimbursed consumers directly at a flat percentage of the price of the prescribed drug, all drug sales would be subject to market forces that would put downward pressure on prices. Direct, partial reimbursement of consumers would mean that generic drugs would no longer be publicly reimbursed at a fixed percentage of the original brand-name price. Under direct partial reimbursement, the price paid by recipients of public drug benefits would be only a fraction (e.g. 25%) of the full price of the drug but the price would be real because it would be proportional to the full price of the drug being purchased—not to a fixed comparator. The new real price would introduce an incentive for consumers to shop around for the most cost-efficient alternative available. There would no longer be a fixed, single price in the half of the market affected by government reimbursement. Instead, there would be multiple prices determined by the level of retail competition and price sensitivities of consumers. The resulting competition between retailers would drive down prices over time.

By contrast, a fixed reimbursement rate removes any downward price pressure. Reimbursing retail pharmacies directly also means that consumers are insulated from the overall price, even if non-proportional, flat user fees are applied to consumers (e.g. a dispensing fee). When government programs do not directly reimburse consumers, the overall price of the drug is constrained only by the negotiating power of governments. And when governments set the reimbursement rate against a fixed brand-name price, there is no negotiating pressure applied to the final price paid by public programs. In this situation, retailers know in advance the price that government is willing to pay, so they charge it to the maximum allowable rate. The only customer is government and, because retailers all get the same reimbursement price, there is no incentive to undercut the competition on final retail price. The end result is that generics cost a little less than the brand-name original but prices do not go nearly as low as they would be expected to under free-market pressures.

Alternatively, under direct partial reimbursement, consumer preferences and price sensitivities would encourage the efficient substitution of generics for brand-name drugs. Therefore, forced substitution policies would no longer be necessary. Repealing the ban on direct-to-consumer (DTC) advertising would further encourage generic firms to compete on the basis of price savings to win sales. The federal government could also avoid the distortions caused by the price-control rules by repealing them altogether. Evidence cited in this study suggests that normal market prices for patented drugs in Canada would likely remain significantly below US prices for identical drugs—even in the absence of price controls. Finally, Health Canada could repeal its ban on imports of cheaper generic drugs from the United States. This would be consistent with Health Canada's policy of allowing the export of cheaper Canadian retail-sourced, brand-name drugs to the United States. Allowing consumers to import

cheaper US-sourced generics directly could increase the level of competition in Canada's retail market for generic drugs, although it would potentially raise concerns about the ability of Health Canada to ensure drug-safety standards.

Estimated direct costs of Canadian polices on the pricing and reimbursement of prescription drugs

This analysis assumes that, if Canada repealed the distortionary policies identified above and allowed market forces to influence drug prices, this would eventually lead to prices and patterns of use for generic drugs similar to those observed in the United States. At the same time, economic theory and research suggest that Canadian prices for brand-name drugs would likely remain near to their current levels, which this study has shown are significantly lower than US prices. This assumption is based on research cited earlier suggesting that differences between Canadian and US prices generally reflect differences in average income between the two countries [Danzon and Furukawa, 2003]. Canadian incomes are lower than American incomes and theoretically this makes Canadian consumers more sensitive to price than Americans. Higher price sensitivities in Canada result in a lower equilibrium price—the price at which supply and demand maximizes profits in a market. Therefore, even in the absence of federal price controls, Canadian prices for brand-name drugs should remain significantly below US levels for identical drugs. [4] This study assumes that either federal price controls on patented medicines will remain in place in Canada or that lower average incomes in Canada will keep Canadian prices for brand-name drugs significantly below US prices and close to current levels if federal price controls were repealed. Under either scenario, average prices for brand-name drugs in Canada would be expected to remain at, or close to, existing levels and remain significantly lower than US prices. [5]

[4] The assumption about stable brand-name prices in Canada is dependent on the absence of massive, cross-border, retail sales to US consumers. If the cross-border trade were to increase demand at the retail level in Canada, this would result in upward pressure on the prices of brand-name drugs sold in Canada [Skinner, 2006].

[5] In addition, previous research has explained how, in the absence of federal price controls, Canadian prices for off-patent brands might go even lower than current levels [Graham, 2000; Skinner, 2005]. Theoretically, price controls on patented drugs create perverse incentives for drug pricing in Canada that artificially inflate the price of branded drugs even after their patents have expired and price controls are no longer in effect. In the absence of this perverse pricing incentive caused by the price-control rules, off-patent, brand-name drugs would be expected to compete with generic drugs on price. Therefore, prices for off-patent, brand-name drugs should theoretically be under pressure to decline even further than current levels if there were no price controls on patented medicines.

Based on the assumptions that arise from the data and analysis presented in this paper, we estimate the savings Canadians could achieve by repealing public policies that distort the market for prescription drugs. All figures are stated at purchasing power parity (PPP) in 2007 US dollars for comparability unless otherwise indicated. [6]

The 2007 average price per prescription for brand drugs in Canada was $53.24 (2007 US$, PPP) [IMS Health Inc. Canada, 2008a; authors' calculations]. Under the assumption that generic prices would be expected to fall to US levels in the absence of Canadian-style distortionary policies, then the 2007 average price per prescription for generic drugs in Canada would have been $9.92 (2007 US$, PPP), which is the actual 2007 average Canadian price per prescription of $21.02 (2007 US$, PPP) [IMS Health Inc. Canada, 2008a; authors' calculations] discounted by the average difference between Canadian and US prices observed in this study over the 100 most commonly prescribed generics in 2007. If, as expected, lower generic prices produced rates of generic drug substitution in Canada that approximated rates observed in the United States, then brand-name drugs would have accounted for 33% (150.3 million) of the 455.5 million prescriptions dispensed in Canada in 2007, while generics would have accounted for 67% (305.2 million) [IMS Health Inc., 2008].

Based on the expected Canadian prices for brand-name and generic drugs as well as the expected balance between brand-name and generic rates of use, the total market value for retail prescription drug sales in Canada for the year 2007 would have been $11 billion in 2007 US$, PPP or $13.4 billion in 2007 Canadian dollars (see analysis 1 below). This is approximately CAN$7.5 billion (36%) less than the actual 2007 CAN$20.9 billion total for retail sales of branded and generic drugs together. If the same analysis is performed under the same price assumptions but using actual Canadian rates of generic substitution (see analysis 2 below), Canadians still would have saved nearly CAN$2.9 billion in 2007 from the removal of public policies that distort prescription drug markets.

[6] The US$ exchange rate is applicable only to a very small percentage of consumers who are willing or able to shop in both countries. The PPP conversion should be considered the more accurate measure of currency adjustment for general comparisons. Economists also universally accept PPP conversion as the most accurate way to make average prices in different markets truly comparable.

Estimated total Canadian spending on prescription drugs in 2007 in the absence of public-policy distortions

Analysis 1: Upper estimate of the lost savings on total R_x expenditure using expected free-market prices and generic drug use.

Total number of R_x dispensed in 2007 = 455,481,000

Expected generic price per R_x in US$, PPP = $9.92

Expected generic % of total R_x = 67%

Expected number of generic R_x = 305,172,270

Total generic spending in US$, PPP = $9.92 per R_x × 305,172,270 R_x = $3,027,308,918

Current brand price per R_x in US$, PPP = $53.24

Expected brand % of total R_x = 33%

Expected number of brand R_x = 150,308,730

Total brand spending in US$, PPP = $53.24 per R_x × 150,308,730 R_x = $8,002,436,785

Expected total R_x spending = $3,027,308,918 + $8,002,436,785 = $11,029,745,704 (US$ PPP) = $13,456,289,758 (CAN$)

Actual total 2007 R_x cost: $20,995,028,000 (CAN$)

Total R_x expenditure savings lost in 2007, CAN$: $20,995,028,000 − $13,456,289,758 = $7,538,738,242

Analysis 2: Lower estimate of the lost savings on total R_x expenditure using expected free-market prices and actual 2007 generic drug use

Total number of R_x dispensed in 2007 = 455,481,000

Expected generic price per R_x in US$, PPP = $9.92

Actual 2007 generic % of total R_x = 48%

Actual 2007 number of generic R_x = 218,630,880

Total generic spending in US$, PPP = $9.92 per R_x × 218,630,880 R_x = $2,168,818,330

Current brand price per R_x in US$, PPP = $53.24

Actual 2007 brand % of total R_x = 52%

Actual 2007 number of brand R_x = 236,850,120

Total brand spending in US$, PPP = $53.24 per R_x × 236,850,120 R_x = $12,609,900,389

Expected total R_x spending = $2,168,818,330 + $12,609,900,389 = $14,778,718,718 (US$ PPP) = $18,030,036,836 (CAN$)

Actual total 2007 R_x cost: $20,995,028,000 (CAN$)

Total R_x expenditure savings lost in 2007, CAN$: $20,995,028,000 − $18,030,036,836 = $2,964,991,164

Conclusion

Governments in Canada defend their intrusion in pharmaceutical markets by claiming such policies reduce the costs of prescription drugs for Canadians. Yet this study shows that Canadians pay much more than they should for generic drugs because government policies distort the market for prescription drugs. The lost savings caused by government policies are considerable.

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