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Canada's Drug Price Paradox 2007

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Executive summary

Canadians pay much more than Americans for generic drugs because government policies in Canada distort the market for prescription medicines. In currency-equivalent terms, Canadian retail prices for generic prescription drugs in 2006 were on average 115% higher than retail prices observed in the United States for identical drugs. A previous analysis using 2003 data found that prices for generic drugs were 78% higher in Canada. By contrast, Canadian retail prices for brand-name drugs were on average 51% below US prices for identical drugs in 2006. In 2003, the prices for brand-name drugs was 43% lower in Canada on average. For Canadians, this means that since 2003 the cost of generic drugs has risen relative to US prices, while the cost of brand-name drugs has decreased.

The American market for prescription drugs is not affected by the same public-policy distortions 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 lead to an increased use of generic drugs in Canada, as they have in the United States. At the same time, there are good economic reasons to believe that Canadian prices for brand-name drugs would not increase much above current levels.

This study estimates that in 2006 alone federal-provincial-territorial prescription drug policies cost Canadians between $2.5 billion and $6.6 billion in unnecessary spending due to inflated prices for generic drugs and inefficient use of medicines. Over the four years from 2003 to 2006, the total amount of money wasted because of misguided prescription-drug policies in Canada could range from as high as $20 billion to over $26 billion. The findings of this study suggest that 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 2006 were 115% 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:

- 71% were priced higher in Canada than in the United States: Canadian prices for these drugs averaged 181% higher than US prices
- 29% were priced lower in Canada: Canadian prices for these drugs averaged 44% lower than US prices.

By comparison, retail prices for the 100 most commonly prescribed Canadian brand-name drugs cost 51% less in Canada on average than in the United States. Of the 100 most commonly prescribed brand-name drugs in Canada in 2006 that were available in both markets:

- 96% were less expensive in Canada than in the United States: Canadian prices for these drugs averaged 55% lower than US prices
- 4% were more expensive in Canada than in the United States: Canadian prices for these drugs averaged 38% 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 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.

Canada-US generic substitution rates, measured by the percentage of total prescriptions dispensed in 2006, generic versus brand name drugs:

- Canada: 44% generic; 56% brand name
- US: 63% generic; 37% brand name.

Conclusion

If Canada repealed policies that distort the market for prescription drugs, net savings for Canadians could reach between $2.5 billion and $6.6 billion (2006) 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 2006, representing approximately 57% of the entire generic market; as well as the 100 brand-name drugs with the highest prescription volumes in Canada in 2006, representing approximately 69% 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. Canadian government policies 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 2006. 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 2006, ranked by the number of prescriptions dispensed. This sample represents 69% of the total number of brand-name prescriptions dispensed in the Canadian market in 2006.

2. The 100 most commonly prescribed *generic* drug products in Canada in 2006, ranked by the number of prescriptions dispensed. This sample represents 57% of the total number of generic prescriptions dispensed in the Canadian market in 2006.

3. All manufacturers in the Canadian generic market for each of the 100 most commonly prescribed generic drug products in 2006 and their associated market shares defined by the number of prescriptions dispensed for each product in 2006.

All Canadian data were purchased directly from IMS Health Inc. Canada. Brand-name and generic drug-product data was sourced 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 4,700 pharmacies, which represents approximately two-thirds of all retail pharmacies in Canada. The sample, stratified by province, type of store (chain or independent), and store size (large or small), comprises over 2,000 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, 2007].

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 2006 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 two thirds of all pharmacies in Canada, and the datasets selected for this study represent 69% and 57% 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.

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. Inquiries with IMS Health Inc. Canada indicate that there is no

publicly accessible source of data on final retail-consumer purchases for the entire market like that used by IMS Health in Canada to estimate sales volumes and spending. Moreover, US retail prices vary significantly among retailers and geographic locations, making it difficult to extrapolate small samples across the entire market [Graham, 2001; US FDA, 2003].

Estimating US retail prices from manufacturers' direct price or wholesale price is also difficult because detailed data on actual prices paid to manufacturers and wholesalers by retailers varies widely depending on individually negotiated rebates. Detailed price and rebate data is kept private by retailers, wholesalers, and manufacturers because it is proprietary commercial information.

So, while IMS Health can reasonably estimate an average price for the Canadian market, it is difficult to obtain the same degree of accuracy when estimating average prices in the United States. Nonetheless, it is possible to derive a reasonable estimate of 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.

2006 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 labelled as *Average Wholesale Price* (AWP) [Red Book, 2006].

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: 95]. 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: 95]. 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: 95].

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 low-income people) 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 to compare directly to 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 merely used to verify that the US retail prices collected for this study can be reasonably generalized across the US market.

Costco® and Walgreen's® Actual Retail Prices (RP)

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 AWP to FUL and at least one actual US retail price for each of the drugs in the Canadian sample. For ease of data collection and to make the sample as representative as possible, this study primarily used the online pharmacy drug-price information and ordering services of Costco® and Walgreen's®, two major US retail pharmacy chains, to obtain actual US price and other drug information for comparison to the Canadian data purchased from IMS Health. The Costco® price-search service was primarily used; Walgreen's® was used to supplement missing data. According to the retailers, pharmacies located in Costco® 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®, 2007; Walgreen's® 2007]. List prices also reflected the full cash-purchase price. The actual price data from Costco® and Walgreen's® was collected between February 2, 2007 and April 5, 2007 and verified as of May 5, 2007.

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 2006 US-to-Canadian currency Purchasing Power Parity (PPP) rate of 1.23 Canadian dollars to the US dollar set by the Organisation for Economic Cooperation and Development (OECD) [OECD, 2007]. 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 2006, 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 2007. 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 2006 and 2007. According to the US Bureau of Labor Statistics, the 2006 annual inflation rate for prescription drugs averaged 2.6% [US Bureau of Labor Statistics, 2007]. Therefore, observed 2007 US prices were adjusted to remove the 2.6% inflation that took place during 2006 in order to make the Canadian and US prices comparable across time periods. Due to the fact that 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 in Canadian and US prices for generic drugs

The 100 most commonly prescribed generic drug products sold in Canada in 2006, measured by the number of prescriptions dispensed from retail pharmacies, are ranked in table 1 (page 21). An analysis of the top 100 generic-drug products sold in Canada in 2006 identified 56 separate generic active ingredients, which are listed in table 2 (page 24). Of these 56 active ingredients, 8 were not at all available, or not yet generically available, in the United States. This left 48 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 48 active ingredients that were generically available in both markets, the Canadian price averaged 115% higher than the US price for the same drugs.

- Of the 48 drugs that were generically available in both markets, 34 (71% of the sample) were more expensive in Canada; 14 (29%) were less expensive.

- For the generic drugs that were more expensive north of the border, Canadian prices averaged 181% higher than US prices. For the generic drugs that were less expensive in Canada, the Canadian price averaged 44% lower than US prices [table 3. page 25].

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.

- The 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]
- The Fraser Institute [Skinner, 2005]
- Palmer D'Angelo Consulting International [PDCI, 2005]
- Patented Medicines Price Review Board of Canada [PMPRB, 2006]

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, who must pay retail prices.

Differences in 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].

The top 100 brand-name drug products sold in Canada in 2006, measured by the number of prescriptions dispensed from retail pharmacies, are ranked in table 4 (page 26). Of the top 100 brand-name drugs in Canada for 2006, 16 were either not available in the United States, not listed in the *Red Book*®, or an equivalent brand name could not be identified. This left 84 identifiable, equivalent branded drugs available in both markets in the sample.

- The Canadian prices for the 84 drugs available in both markets averaged 51% lower than prices for the same drugs in the United States.

- Of these 84 drugs, 81 (96%) were less expensive in Canada than in the United States. The Canadian prices for these drugs averaged 55% 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.

Use 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. Below are the Canada-US generic substitution rates, based on the data available to this study [IMS Health, 2007; GPhA, 2006 (GPhA cites IMS Health US data)].

Percentage of total prescriptions dispensed in each market in 2006, generic versus brand-name drugs

- Canada: 44% generic; 56% brand-name
- US: 63% generic; 37% 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. The 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.

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. [1] 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.

- Policies forcing substitution of generics eliminate the possibility of price competition between off-patent, brand-name drugs and generics altogether. [2] 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.

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[1] 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].

[2] 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 brands even when the drug molecules are not identical [Graham and Tabler, 2005].

- 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 direct-to-pharmacy, fixed-reimbursement system to offer rebates to retailers that are "bundled" across many products in exchange for exclusive distribution rights. This frequently results in a virtual monopoly within particular retail pharmacy chains for a particular generic label. Because pharmacies are reimbursed directly, discounts are not passed on to consumers. [3]

- 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 the product capacity to compete with big established firms. Health Canada requires every new drug to be approved by regulators. Potential competitors in the generic drug market in Canada would need to develop and win approval for a large basket of drugs before having the product capacity 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.

[3] Table 5 (page 29) 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 potential new competitive entrants to a market. Such monopolies would give less cause for government intervention than those in less contestable markets.

Market-based solutions

Alternatively, 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 directly import cheaper US-sourced generics 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 similar prices and patterns of use for generic drugs as 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, the result would be that average-brand name prices would be expected to remain at, or close to, existing levels in Canada relative to 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 drugs would be expected

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 2006 US dollars for comparability unless otherwise indicated. [6]

The 2006 average price per prescription for brand drugs in Canada was $51.12 (2006 US$, PPP) [IMS Health Inc., 2007; 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 2006 average price per prescription for generic drugs in Canada would have been $9.39 (2006 US$, PPP), which is the actual 2006 average Canadian price per prescription of $20.19 (2006 US$, PPP) [IMS Health Inc., 2007; authors' calculations] discounted by the average Canada-US price difference observed in this study over the 100 most commonly prescribed generics in 2006. If, as expected, lower generic prices produced Canadian rates of generic drug substitution that approximated rates observed in the United States, then brand-name drugs would have accounted for 37% (156.3 million) of the 422.5 million prescriptions dispensed in Canada in 2006, while generics would have accounted for 63% (266.2 million) [GPhA, 2006].

Based on the expected Canadian prices for brand-name and generic drugs, as well as expected brand versus generic rates of use, the total market value for retail prescription drug sales in Canada for the year 2006 would have been $10.5 billion in 2006 US$, PPP or $12.9 billion in 2006 Canadian dollars (see analysis 1 below). This is approximately CDN$6.6 billion (34%) less than the actual 2006 CDN$19.5 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 CDN$2.5 billion in 2006 from the removal of public policies that distort prescription drug markets.

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to compete with generic drugs on price. Therefore, prices for off-patented brand-name drugs should theoretically be under pressure to decline even further than current levels if there were no price controls on patented medicines.

[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 2006 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 2006 = 422,580,023

Expected generic price per R_x in US$, PPP = $9.39

Expected generic % of total R_x = 63%

Expected number of generic R_x = 266,225,414

Total generic spending in US$, PPP = $9.39 per R_x × 266,225,414 R_x = $2,499,856,637

Current brand price per R_x in US$, PPP = $51.12

Expected brand % of total R_x = 37%

Expected number of brand R_x = 156,354,609

Total brand spending in US$, PPP = $51.12 per R_x × 156,354,609 R_x = $7,992,847,612

Expected total R_x spending = $2,499,856,637 + $7,992,847,612 = $10,492,704,249 ($US, PPP) = $12,906,026,227 (CDN$)

Actual total 2006 R_x cost: $19,504,068,000 (CDN$)

Total R_x expenditure savings lost in 2006, CDN$: $19,504,068,000 − $12,906,026,227 = $6,598,041,773

Analysis 2: Lower estimate of the lost savings on total R_x expenditure using expected free-market prices and actual 2006 generic drug use

Total number of R_x dispensed in 2006 = 422,580,023

Expected generic price per R_x in US$, PPP = $9.39

Actual 2006 generic % of total R_x = 44%

Actual 2006 number of generic Rx = 185,935,210

Total generic spending in US$, PPP = $9.39 per R_x × 185,935,210 R_x = $ 1,745,931,622

Current brand price per R_x in US$, PPP = $51.12

Actual 2006 brand % of total R_x = 56%

Actual 2006 number of brand R_x = 236,644,813

Total brand spending in US$, PPP = $51.12 per R_x × 236,644,813 R_x = $12,097,282,841

Expected total R_x spending = $1,745,931,622 + $12,097,282,841 = $13,843,214,463 (US$, PPP) = $17,027,153,789 (CDN$)

Actual total 2006 R_x cost: $19,504,068,000 (CDN$)

Total R_x expenditure savings lost in 2006, CDN$: $19,504,068,000 − $17,027,153,789 = $2,476,914,211

Conclusion

Governments in Canada defend their interference in pharmaceutical markets by claiming such policies reduce prescription drug costs 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 substantial.

Tables

Table 1: 100 most commonly prescribed generic prescription drug products in Canada for 2006

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
1	APOTEX	FUROSEMIDE	3,801,115
2	RATIOPHARM	SALBUTAMOL	3,793,639
3	APOTEX	HYDROCHLOROTHIAZIDE	3,631,533
4	APOTEX	AMOXICILLIN	3,266,914
5	NOVOPHARM	HYDROCHLOROTHIAZIDE	2,863,240
6	NOVOPHARM	ACETYLSALICYLIC ACID	2,734,753
7	APOTEX	LORAZEPAM	2,652,769
8	APOTEX	AMITRIPTYLINE	2,423,327
9	APOTEX	OMEPRAZOLE	2,018,376
10	GENPHARM	METFORMIN	2,016,702
11	APOTEX	OXAZEPAM	1,947,006
12	PHARMASCIENCE	METFORMIN	1,648,596
13	APOTEX	PREDNISONE	1,641,184
14	APOTEX	NAPROXEN	1,555,605
15	APOTEX	WARFARIN	1,552,469
16	APOTEX	ALLOPURINOL	1,487,411
17	NOVOPHARM	METOPROLOL	1,463,055
18	RIVA	ACETYLSALICYLIC ACID	1,360,589
19	NOVOPHARM	AMOXICILLIN	1,315,967
20	APOTEX	CITALOPRAM	1,270,045
21	APOTEX	SIMVASTATIN	1,260,394
22	RIVA	CALCIUM	1,255,002
23	APOTEX	METOPROLOL	1,205,726
24	PHARMASCIENCE	CLONAZEPAM	1,173,742
25	RATIOPHARM	ACETAMINOPHEN/OXYCODONE	1,165,706
26	APOTEX	RANITIDINE	1,161,913
27	SANDOZ	BISOPROLOL	1,161,448
28	APOTEX	METFORMIN	1,150,448
29	NOVOPHARM	GLYBURIDE	1,143,583
30	APOTEX	METOPROLOL	1,059,125
31	APOTEX	CEPHALEXIN	1,045,626
32	NOVOPHARM	FUROSEMIDE	1,041,109

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
33	APOTEX	PAROXETINE	1,014,329
34	APOTEX	ACETAMINOPHEN	1,014,212
35	LINSON PHARMA INC	ACETAMINOPHEN/OXYCODONE	1,006,755
36	APOTEX	ALENDRONATE	998,196
37	APOTEX	FOLIC ACID	995,347
38	APOTEX	GLYBURIDE	979,705
39	NOVOPHARM	LORAZEPAM	973,583
40	GENPHARM	SIMVASTATIN	966,388
41	APOTEX	IBUPROFEN	961,074
42	NOVOPHARM	ACETAMINOPHEN	931,345
43	APOTEX	SERTRALINE	921,180
44	NOVOPHARM	METFORMIN	883,655
45	APOTEX	LISINOPRIL	882,986
46	APOTEX	PENICILLIN	852,951
47	APOTEX	DIAZEPAM	842,462
48	GENPHARM	PAROXETINE	836,817
49	RATIOPHARM	METFORMIN	826,819
50	APOTEX	DIVALPROEX	823,916
51	PHARMASCIENCE	ATENOLOL	812,213
52	NOVOPHARM	ATENOLOL	808,824
53	APOTEX	TRIAMTERENE/HYDROCHLOROTHIAZIDE	803,532
54	RATIOPHARM	ACETAMINOPHEN/CODEINE	803,028
55	GENPHARM	CITALOPRAM	798,916
56	NOVOPHARM	SPIRONOLACTONE	798,627
57	APOTEX	SALBUTAMOL	794,339
58	TARO	WARFARIN	792,009
59	GENPHARM	RANITIDINE	786,282
60	APOTEX	ATENOLOL	765,941
61	NOVOPHARM	ALENDRONATE	757,315
62	PHARMASCIENCE	CLONAZEPAM	756,672
63	RATIOPHARM	ATENOLOL	723,246
64	GENPHARM	ZOPICLONE	695,822
65	PHARMASCIENCE	METOPROLOL	684,310
66	APOTEX	CALCIUM	641,138
67	APOTEX	BISOPROLOL	627,817
68	APOTEX	TRIMETHOPRIM/SULFAMETHOXAZOLE	622,787
69	APOTEX	CLONAZEPAM	622,397
70	TARO	BETAMETHASONE	621,676

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
71	GENPHARM	GLYBURIDE	615,736
72	RATIOPHARM	BETAMETHASONE	610,419
73	APOTEX	TRAZADONE	594,668
74	APOTEX	DILTIAZEM	581,574
75	GENPHARM	CLONAZEPAM	570,916
76	TARO	HYDROCORTISONE	568,264
77	APOTEX	AZITHROMYCIN	561,154
78	NOVOPHARM	DIVALPROEX	557,427
79	APOTEX	TEMAZEPAM	547,367
80	APOTEX	ZOPICLONE	544,583
81	APOTEX	IRON FERROUS	541,450
82	APOTEX	PRAVASTATIN	537,948
83	NOVOPHARM	BUPROPION	524,959
84	NOVOPHARM	NAPROXEN	509,215
85	RATIOPHARM	CITALOPRAM	502,681
86	NOVOPHARM	PRAVASTATIN	494,340
87	PRO DOC	CALCIUM	492,794
88	GENPHARM	ATENOLOL	490,544
89	TARO	DOCUSATE SODIUM	482,855
90	PHARMASCIENCE	GABAPENTIN	481,442
91	RATIOPHARM	ACETAMINOPHEN/CODEINE	473,114
92	APOTEX	METRONIDAZOLE	468,943
93	RANBAXY	ZOPICLONE	465,674
94	NOVOPHARM	QUININE	465,364
95	PHARMASCIENCE	MELOXICAM	462,085
96	NOVOPHARM	GABAPENTIN	455,372
97	APOTEX	POTASSIUM	453,813
98	RATIOPHARM	DILTIAZEM	451,721
99	PRO DOC	OXAZEPAM	447,797
100	RATIOPHARM	MEDROXYPROGESTERONE	443,937

Source: IMS Health, 2007

Table 2: 100 most commonly prescribed generic drug products in Canada for 2006, grouped by active ingredient

Rank	Active ingredient(s)
1	FUROSEMIDE
2	SALBUTAMOL *
3	HYDROCHLOROTHIAZIDE
4	AMOXICILLIN
5	ACETYLSALICYLIC ACID *
6	LORAZEPAM
7	AMITRIPTYLINE
8	OMEPRAZOLE
9	METFORMIN
10	OXAZEPAM
11	PREDNISONE
12	NAPROXEN
13	WARFARIN
14	ALLOPURINOL
15	METOPROLOL
16	CITALOPRAM
17	SIMVASTATIN
18	CALCIUM *
19	CLONAZEPAM
20	ACETAMINOPHEN/OXYCODONE
21	RANITIDINE
22	BISOPROLOL
23	GLYBURIDE
24	CEPHALEXIN
25	PAROXETINE
26	ACETAMINOPHEN *
27	ALENDRONATE *
28	FOLIC ACID

Rank	Active ingredient(s)
29	IBUPROFEN
30	SERTRALINE
31	LISINOPRIL
32	PENICILLIN
33	DIAZEPAM
34	DIVALPROEX *
35	ATENOLOL
36	TRIAMTERENE/HYDROCHLOROTHIAZIDE
37	ACETAMINOPHEN/CODEINE
38	SPIRONOLACTONE
39	ZOPICLONE *
40	TRIMETHOPRIM/SULFAMETHOXAZOLE
41	BETAMETHASONE
42	TRAZADONE
43	DILTIAZEM
44	HYDROCORTISONE
45	AZITHROMYCIN
46	TEMAZEPAM
47	IRON FERROUS *
48	PRAVASTATIN
49	BUPROPION
50	DOCUSATE SODIUM
51	GABAPENTIN
52	METRONIDAZOLE
53	QUININE
54	MELOXICAM
55	POTASSIUM
56	MEDROXYPROGESTERONE

Note: * = no identical drug available by prescription in the United States.

Source: IMS Health, 2007

Table 3: Canada-US retail price differences over the most commonly prescribed 56 active drug ingredients available in both Canada and the US in 2006

Rank	Active ingredient(s)	Canada-US retail price difference, as a percentage of the US price, US$2006, PPP
1	FUROSEMIDE	163%
2	SALBUTAMOL *	
3	HYDROCHLOROTHIAZIDE	197%
4	AMOXICILLIN	58%
5	ACETYLSALICYLIC ACID	*
6	LORAZEPAM	–10%
7	AMITRIPTYLINE	85%
8	OMEPRAZOLE	103%
9	METFORMIN	80%
10	OXAZEPAM	–68%
11	PREDNISONE	239%
12	NAPROXEN	244%
13	WARFARIN	26%
14	ALLOPURINOL	140%
15	METOPROLOL	75%
16	CITALOPRAM	651%
17	SIMVASTATIN	318%
18	CALCIUM	*
19	CLONAZEPAM	151%
20	ACETAMINOPHEN/OXYCODONE	–39%
21	RANITIDINE	390%
22	BISOPROLOL	–66%
23	GLYBURIDE	12%
24	CEPHALEXIN	271%
25	PAROXETINE	86%
26	ACETAMINOPHEN	*
27	ALENDRONATE	*
28	FOLIC ACID	–75%
29	IBUPROFEN	106%
30	SERTRALINE	494%
31	LISINOPRIL	587%
32	PENICILLIN	–20%
33	DIAZEPAM	44%
34	DIVALPROEX	*
35	ATENOLOL	236%
36	TRIAMTERENE/HYDROCHLOROTHIAZIDE	–1%
37	ACETAMINOPHEN/CODEINE	28%
38	SPIRONOLACTONE	–37%
39	ZOPICLONE	*
40	TRIMETHOPRIM/SULFAMETHOXAZOLE	–34%
41	BETAMETHASONE	53%
42	TRAZADONE	–9%
43	DILTIAZEM	11%
44	HYDROCORTISONE	–82%
45	AZITHROMYCIN	–85%
46	TEMAZEPAM	2%
47	IRON FERROUS	*
48	PRAVASTATIN	68%
49	BUPROPION	–40%
50	DOCUSATE SODIUM	218%
51	GABAPENTIN	315%
52	METRONIDAZOLE	218%
53	QUININE	4%
54	MELOXICAM	320%
55	POTASSIUM	–46%
56	MEDROXYPROGESTERONE	145%

Note: * = no identical drug available by prescription in the United States.

Source: IMS Health, 2007

Table 4: Canada-US retail price differences for the 100 most commonly prescribed brand-name prescription drug products available in both Canada and the United States in 2006

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Canada-US retail price difference, as a percentage of the US price, US$2006, PPP
1	LIPITOR	PFIZER	ATORVASTATIN	12,702,440	–38%
2	SYNTHROID	ABBOTT PPD	LEVOTHYROXINE	9,789,158	–62%
3	ALTACE	SANOFI-AVENTIS	RAMIPRIL	8,957,829	–49%
4	NORVASC	PFIZER	AMLODIPINE	6,314,307	–19%
5	ASAPHEN	PHARMASCIENCE	ACETYLSALICYLIC ACID	5,806,159	*
6	EFFEXOR XR	WYETH	VENLAFAXINE	5,758,317	–52%
7	PANTOLOC	ALTANA PHARMA INC	ALTANA PHARMA INC	4,495,549	–47%
8	TYLENOL W/COD #3	JANSSEN-ORTHO	ACETAMINOPHEN/CODEINE/CAFFEINE	3,957,499	–66%
9	CRESTOR	ASTRAZENECA	ROSUVASTATIN	3,269,973	–54%
10	PARIET	JANSSEN-ORTHO	RABEPRAZOLE SODIUM	3,128,330	–70%
11	SEROQUEL	ASTRAZENECA	QUETIAPINE	2,861,719	–61%
12	ADALAT XL	BAYER	NIFEDIPINE	2,756,385	–26%
13	ALESSE	WYETH	ETHINYLESTRADIOL/LEVONORGESTREL	2,698,647	–60%
14	ATIVAN	WYETH	LORAZEPAM	2,522,332	–87%
15	FLOVENT HFA	GLAXOSMITHKLINE	FLUTICASONE	2,489,565	–96%
16	PLAVIX	BMS-SANOFI	CLOPIDOGREL	2,434,878	–42%
17	PREMARIN	WYETH	ESTROGENIC SUB,CONJUGATED	2,346,569	–77%
18	NEXIUM	ASTRAZENECA	ESOMEPRAZOLE	2,259,353	–53%
19	CELEBREX	PFIZER	CELECOXIB	2,237,042	–57%
20	ACTONEL	PROCTER & GAMBLE	RISEDRONATE	2,223,662	–49%
21	ELTROXIN	GLAXOSMITHKLINE	LEVOTHYROXINE	2,168,024	*
22	RISPERDAL	JANSSEN-ORTHO	RISPERIDONE	2,126,195	–69%
23	PREVACID	ABBOTT PPD	LANSOPRAZOLE	1,927,260	–56%
24	TRI-CYCLEN	JANSSEN-ORTHO	ETHINYLESTRADIOL/NORGESTIMATE	1,852,516	–58%
25	VASOTEC	FROSST	ENALAPRIL	1,832,041	–30%
26	ZYPREXA	LILLY	OLANZAPINE	1,819,304	–52%
27	LANOXIN	VIRCO	DIGOXIN	1,709,594	92%
28	NASONEX	SCHERING	MOMETASONE	1,706,287	–95%
29	AVAPRO	BMS-SANOFI	IRBESARTAN	1,695,589	–31%
30	LOSEC	ASTRAZENECA	OMEPRAZOLE	1,624,736	–49%
31	MARVELON	ORGANON	ETHINYLESTRADIOL/DESOGESTREL	1,500,580	–58%
32	DIOVAN	NOVARTIS	VALSARTAN	1,480,480	–35%
33	ATACAND	ASTRAZENECA	CANDESARTAN	1,450,064	–32%

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Canada-US retail price difference, as a percentage of the US price, US$2006, PPP
34	COUMADIN	BRISTOL-MYERS SQUIBB	WARFARIN	1,428,866	–58%
35	FLOMAX	BOEHRINGER INGELHEIM	TAMSULOSIN	1,295,196	–55%
36	COVERSYL	SERVIER	PERINDOPRIL	1,270,341	–51%
37	ARTHROTEC	PFIZER	DICLOFENAC/MISOPROSTOL	1,264,481	–64%
38	NITRO-DUR	SCHERING	NITROGLYCERIN	1,216,735	–78%
39	FLONASE	GLAXOSMITHKLINE	FLUTICASONE	1,201,209	–95%
40	COZAAR	FROSST	LOSARTAN	1,200,703	–40%
41	AVANDIA	GLAXOSMITHKLINE	ROSIGLITAZONE	1,195,330	–46%
42	XALATAN	PFIZER	LATANOPROST	1,167,628	–48%
43	CARBOCAL D 400	EUROPHARM	CALCIUM	1,131,869	*
44	OXYCONTIN	PURDUE PHARMA	OXYCODONE	1,125,266	–63%
45	ADVAIR	GLAXOSMITHKLINE	FLUTICASONE/SALMETEROL	1,101,025	–50%
46	FOSAMAX	MERCK SHARP & DOHME	ALENDRONATE	1,040,892	–47%
47	AVALIDE	BMS-SANOFI	IRBESARTAN/HYDROCHLOROTHIAZIDE	1,025,816	–49%
48	DIOVAN HCT	NOVARTIS	VALSARTAN	1,025,640	–47%
49	ONE TOUCH ULTRA	LIFESCAN	GLUCOSE, BLOOD TESTS	1,018,070	*
50	DILANTIN SODIUM	PFIZER	PHENYTOIN	984,394	–72%
51	ASPIRIN	BAYER INC	ACETYLSALICYLIC ACID	983,542	*
52	BIAXIN BID	ABBOTT PPD	CLARITHROMYCIN	962,516	–58%
53	COMBIVENT	BOEHRINGER INGELHEIM	SALBUTAMOL/IPRATROPIUM	935,446	–98%
54	ACCUPRIL	PFIZER	QUINAPRIL	935,010	–33%
55	DIDROCAL	PROCTER & GAMBLE	ETIDRONIC ACID/CALCIUM	925,799	–94%
56	ARICEPT	PFIZER	DONEPEZIL	906,209	–13%
57	VIAGRA	PFIZER	SILDENAFIL	876,541	10%
58	EZETROL	MERCK-SCHERING GP	EZETIMIBE	824,267	–40%
59	MICARDIS	BOEHRINGER INGELHEIM	TELMISARTAN	806,042	–42%
60	FUCIDIN	LEO	FUSIDIC ACID	803,992	*
61	SYMBICORT	ASTRAZENECA	BUDESONIDE	791,291	*
62	SPIRIVA	BOEHRINGER INGELHEIM	TIOTROPIUM BROMIDE	786,155	–53%
63	SINGULAIR	MERCK SHARP & DOHME	MONTELUKAST	782,079	–40%
64	VALTREX	GLAXOSMITHKLINE	VALACICLOVIR	754,261	–41%
65	SENOKOT	PURDUE PHARMA	SENNA	719,154	*
66	BIAXIN XL	ABBOTT PPD	CLARITHROMYCIN	712,456	–44%
67	CEFZIL	BRISTOL-MYERS SQUIBB	CEFPROZIL	708,668	–61%
68	LIPIDIL SUPRA	FOURNIER	FENOFIBRATE	684,564	–63%
69	ELOCOM	SCHERING	MOMETASONE	675,806	–75%

Rank	Product name	Manufacturer	Active ingredient(s)	Estimated number of prescriptions dispensed	Canada-US retail price difference, as a percentage of the US price, US$2006, PPP
70	NICODERM	PFIZER	NICOTINE	663,742	–22%
71	TRIPHASIL	WYETH	ETHINYLESTRADIOL/LEVONORGESTREL	662,000	–57%
72	SOFLAX	PHARMASCIENCE	DOCUSATE	656,104	*
73	IMOVANE	SANOFI-AVENTIS	ZOPICLONE	634,864	*
74	WELLBUTRIN SR	BIOVAIL	BUPROPION	634,347	–75%
75	YASMIN	BERLEX	DROSPIRENONE/ETHINYLESTRADIOL	621,985	–62%
76	DIANE-35	BERLEX	CYPROTERONE/ETHINYLESTRADIOL	603,696	*
77	EURO-D	EUROPHARM	ERGOCALCIFEROL	596,248	*
78	IMDUR	ASTRAZENECA	ISOSORBIDE-5-MONONITRATE	583,870	–76%
79	CONCERTA	JANSSEN-ORTHO	METHYLPHENIDATE	579,866	–37%
80	ASCENSIA MICROFILL	BAYER	GLUCOSE, BLOOD TESTS	578,859	*
81	MACROBID	PROCTER & GAMBLE	NITROFURANTOIN	576,933	–58%
82	ACTOS	LILLY	PIOGLITAZONE	555,033	–12%
83	HUMULIN N	LILLY	INSULIN	551,044	–99%
84	PROSCAR	MERCK FROSST CAN	FINASTERIDE	537,990	–43%
85	TWINRIX	GLAXOSMITHKLINE	VACCINE, HEPATITIS A and B	529,391	–31%
86	NOVOLIN GE NPH	NOVO NORDISK	INSULIN	525,840	–54%
87	LOPRESOR SR	NOVARTIS	METOPROLOL	523,634	–80%
88	AVELOX	BAYER	MOXIFLOXACIN	523,343	–47%
89	TYLENOL W/COD #2	JANSSEN-ORTHO	ACETAMINOPHEN/CODEINE/CAFFEINE	520,377	*
90	TRIQUILAR	BERLEX	ETHINYLESTRADIOL/LEVONORGESTREL	520,171	–59%
91	DURAGESIC	JANSSEN-ORTHO	FENTANYL	514,051	–57%
92	COSOPT	FROSST	DORZOLAMIDE/TIMOLOL	505,142	–54%
93	CIALIS	LILLY ICOS	TADALAFIL	502,518	13%
94	ADVAIR MDI	GLAXOSMITHKLINE	FLUTICASONE/SALMETEROL	501,910	–60%
95	PROMETRIUM	SCHERING	PROGESTERONE	500,211	–39%
96	ADVANTAGE COMFORT	ROCHE DIAGNOSTICS	GLUCOSE, BLOOD TESTS	491,684	*
97	EMO-CORT	STIEFEL	HYDROCORTISONE	484,121	–65%
98	PMS-FERROUS SULFAT	PHARMASCIENCE	IRON FERROUS	474,620	*
99	ESTRACE	SHIRE CANADA	ESTRADIOL	473,627	–78%
100	TIAZAC	BIOVAIL	DILTIAZEM	470,320	–26%

Note: * = no identical drug available by prescription in the United States.

Source: IMS Health, 2007

Table 5: Overall competition in the generic industry for retail sales in 2006

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	54,126,795	51.5	1,217,809	52.4
NOVOPHARM	18,721,733	17.8	323,383	13.9
RATIOPHARM	9,794,310	9.3	229,916	9.9
GENPHARM	7,778,123	7.4	285,479	12.3
PHARMASCIENCE	6,019,060	5.7	144,688	6.2
TARO	2,464,804	2.3	36,852	1.6
PRO DOC	940,591	0.9	7,607	0.3
RIVA	2,615,591	2.5	25,505	1.1
SANDOZ	1,161,448	1.1	18,809	0.8
LINSON PHARMA INC	1,006,755	1.0	18,945	0.8
RANBAXY	465,674	0.4	13,056	0.6
Grand Total	105,094,884	100	2,322,049	100

Note: Figures rounded.

Source: IMS Health, 2007

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