

Comparisons of Retail Prices of Generic Prescription Drugs in Canada vs. United States: A Comprehensive Study

**A Report Prepared for the
Canadian Generic Pharmaceutical Association**

By

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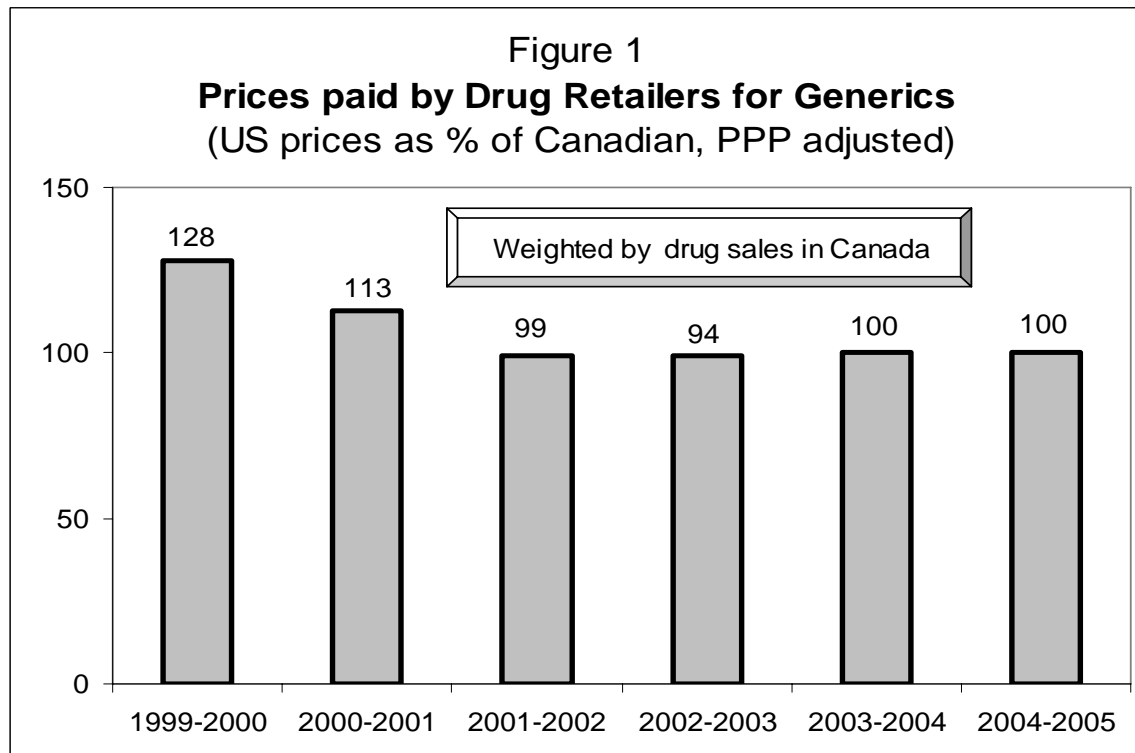
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Executive Summary

This comprehensive study compares the prices of generic prescription drugs in Canada and the United States. It covers 100% of the generic drug presentations that are common to both countries. It provides the most current information on relative prices in Canada and the US for the period July 2000 to June 2005. The statistical methodology employed ensures that all price comparisons are made on an “apples to apples” basis. Purchasing Power Parity (PPP) exchange rates have been used to convert US prices into Canadian dollars to provide an economically meaningful comparison.



Key Findings

- Generic drug prices in Canada and the US have been at parity for the past two years (July 2003 to June 2005)
- Heterogeneity exists in the price of individual generic drugs in both countries. Many drugs are priced higher in the US, while others are higher priced in Canada.
- The relatively unregulated nature of generic drug pricing in the US, as opposed to a higher level of regulation in Canada, may be one of many factors that account for differences in the prices of particular generic drugs in the two countries.

Methodology

The data analysed in this study were obtained from IMS Health in Canada and the US. To arrive at the broadest-based comparative analysis of generic drugs between Canada and the US, price comparisons for the past six years were undertaken (July 2000 – June 2005).

Every Active Ingredient (AI) for which there are comparable presentations in both countries was examined in this study. To ensure valid comparisons, the analyses were undertaken at the finest level of disaggregation possible. Generic prices were compared only when five characteristics of the generic drug in question are matched in Canada and the US. These characteristics are:

- Active Ingredient
- Dosage form (tablet, injection, etc.)
- Unit by which strength/concentration is measured
- Actual strength/concentration
- Pack size

This level of specificity is necessary to ensure that comparisons between Canadian and US generic drugs are valid (“apples to apples”). Studies that do not match based on all of these five characteristics could produce misleading results.

If government policy related to generic pharmaceutical products is to be optimally formulated, a clear understanding of the structure of the market being regulated is necessary. Fundamental to this is a clear picture of pricing in the generic drug sector. This comprehensive analysis of prices of generic drugs in Canada and the US is an attempt to provide such an understanding.

Several studies are currently available comparing the price of generic drugs in Canada and the US. These studies vary in terms of the data being analysed, the time period covered, the analytical and statistical methodologies employed, and the underlying assumptions. Furthermore, most existing studies focus only on a few generic drug products and presentations, and hence provide a limited view of the market. Other studies that cover the market in a more comprehensive manner do not match generic drugs on the five characteristics used in this study, which means these comparisons may not be valid. As a result of these differences in their overall approach, it is not surprising that the conclusions reached in these studies are often at variance with each other.

The methodology in this study is not subject to the fore mentioned criticisms. It is broader in scope, covering 100% of the comparable generic market. It is also far more exacting and demanding in making price comparisons at the most precise level possible.

1. Introduction

Many studies have compared the prices of generic prescription drugs in Canada and the United States. These studies vary in terms of the data used, the time period covered, the analytical and statistical methodologies employed, as well as the underlying assumptions. It is therefore not surprising that the conclusions vary significantly from one study to another. Some of these studies are analysed in “*A Review of Current Research on International Price Comparisons of Generic Pharmaceuticals: Overview and Methodological Considerations*,” D’Cruz, Fleischmann and Shuper (2005). The authors found that these differences make comparisons between studies difficult, and hence place into question the conclusions they reached about pricing differences between Canada and the US.

The objective of this study is to undertake a broad-based analysis that will contribute to improved understanding of relative prices in the Canadian and US markets. Such a study may prove useful to policy makers dealing with issues related to prices in the generic pharmaceutical market. If government policy is to be optimally formulated, policy makers need to have the clearest understanding of pricing behaviour in the market they are regulating. Thus a precise picture of the actual pricing structure of the generic market is required. Previous studies do not provide this clarity, while the current study attempts to fill this void.

For this study, data on generic prescription drugs in Canada and the US was analysed at the finest level of detail available. Price comparisons are undertaken at a very fine level of disaggregation. Prices are compared only when there is a match in Canada and the US by the five characteristics described above.

2. Breakdown of the Generic Pharmaceutical Market

This study measures the prices of generic prescription drugs in Canada and the United States as paid by drug retailers (pharmacies and pharmacy sections of other retail stores such as supermarkets and general merchandise stores). It focuses on prices paid by drug retailers to wholesalers and manufacturers. Sales to hospitals are not included in this analysis.

Prescription drugs include those for which there is currently a patent or patents (Part A, Box 1) and those for which the patent has expired. Once the patents expire, generic drug companies may enter the market (Part B, Box 1). Four possible scenarios can occur once the patents expire (Part B). The first case only the brand-name company produced the product (block 1) and there is no entry into the market by generic manufacturers. At the other extreme (block 4), only generic pharmaceutical companies produce the product.

Once patents expire the most likely scenario would be the intermediate cases (blocks 2 and 3) where both the brand-name company and generic companies produce the product. The difference between these two cases relates to how the brand-name company supplies the market. This can be done either under the brand name, under a licensing agreement with a generic manufacturer, or both.

The coverage of the current study is highlighted by the shaded area in Box 1, where generic drug prices charged to retail stores are measured. Off-patent drugs sold under the brand name are not measured. If, however, the brand-name company enters the generic market via a licensing agreement with a generic company, these data would be included.

Box 1: Breakdown of the Prescription Drug Market		
Part A Drugs under patent protection	Only brand-name companies produce (or others by agreement)	
Part B Drugs for which the patent has expired	1	Only brand-name companies produce
	2	Both brand-name Companies and generic companies produce
	3	Both generic companies and brand-name companies produce, but the brand-name company works through a generic manufacturer (authorized generics)
	4	Only generic companies produce

3. Data

Data obtained from IMS Health Canada and IMS Health in the United States covered the six-year period from July 2000 to June 2005. Thus the analyses are based on 12-month periods from July to June.

The data used are very detailed and include: sales in dollars and units ('extended units' in IMS terminology), for each Active Ingredient in the two markets. The data were provided at the individual manufacturer level. Furthermore, for each Active Ingredient and manufacturer, there is data on sales by dosage form (tablet, injection, etc.), unit of measure for strength/concentration, strength/concentration and pack size (number of tablets, etc. in a pack) representing in total a very large data set.

As shown in Table 1, over the six-year period, the Canadian data provided more than 26,000 lines for analysis, while there were 86,000 lines of US data. Each line of data contained entries identifying: the Active Ingredient (AI), the manufacturer, dosage form, unit of measure for strength/concentration, strength/concentration and pack size. Thus more than 900,000 data points were processed in this analysis. Additional pieces of information in the data set were not analysed in this study.

Table 1: Data Coverage (Lines of data)

Year (July-July)	1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003	2003 - 2004	2004 - 2005	Total
Canada	4,209	4,532	4,373	4,565	4,434	4,345	26,458
US	14,856	13,620	14,084	14,249	16,432	13,558	86,799

The list of delivery modes and units of measure in the data are provided in Table 2. It is important to note that most Active Ingredients are available in many different delivery modes, and hence many units of measure. In making price comparisons, drugs in Canada were matched to those in the US based on the Active Ingredient as well as the presentation. The presentation includes the dosage and the pack size, as well as the delivery mode and the unit of measure. Unless all of these characteristics are matched, comparisons can be misleading.

Table 2: Variable Descriptions and Units of Measure

A. Delivery Mode

1. Capsules
2. Cream
3. Gel
4. Injections
5. Liquid
6. Lotion
7. Ointment
8. Ophthalmic Solution
9. Oral Suspension
10. Patch
11. Powder
12. Tablet

B. Units of Measure

1. Mg. = Milligram
2. 2% = the Percent
3. Mg/Ml = Milligram per milliliter
4. MU = Milliunit
5. NA = Not available

Data was put into a database (SQL server) with its own language and data format. Extensive checks were undertaken to ensure that the program was providing the exact price comparison. This included matching prices in Canada and the US only when the drug in question was identical both in terms of active ingredient and presentation.

A second set of tests dealt with consideration of any outliers in the sample, such as price levels and price ratios that were noticeably higher or lower than a majority of the observations for a unit of analysis. The underlying data for each of these outliers was reviewed to ensure the observations in question were justified.

A third set of tests involved sending price calculations for several randomly chosen Active Ingredients in some presentations to their respective generic manufacturers. In all cases, prices generated from the IMS Health data were confirmed by the manufacturer.

The final set of checks involved a comparison of the IMS Health prices used in the study with reimbursement prices listed on the Ontario Drug Benefit (ODB) formulary. On net, prices were very similar to those quoted in the ODB formulary. There were several lines of data for which these prices differed. In each case, the results were justified given the underlying data employed to generate those prices.

4. Methodology

Price comparisons were conducted at the finest levels possible. Prices in each of Canada and the US were calculated for units of analysis defined by parameters in Table 3.

Table 3: Matching characteristics used in defining Units of Analysis (UAs)	
1	Active ingredient
2	Dosage form (tablet, injection, etc.)
3	Unit of measure for strength/concentration
4	Strength/concentration
5	Pack size

In many ways, Units of Analysis (UAs) are similar to conducting analyses at the Stock Keeping Unit (SKU) level of the manufacturer. Within the data set, each UA has an entry for each generic drug company manufacturing that drug in that particular presentation. Prices are calculated by dividing dollar sales by extended units. The price of the UA is then defined as the dollar-weighted price within each UA, across manufacturers. Most often, there are multiple manufacturers for each UA.

The analysis compares the US price to the Canadian price for each individual UA. The US price is converted to Canadian dollars using Purchasing Power Parity (PPP) exchange rates that were obtained from the Organization for Economic Cooperation and Development (OECD).

Once relative prices for each UA were established, they were averaged across all of the UAs that matched in the two markets. Weights were constructed representing the dollar share of the matched market that each UA comprises. These weights always sum to one. A weighted price is established using the weights and prices for each UA. Weights can be determined using either the Canadian or US markets. The results presented were derived using Canadian weights.

To summarize, all price comparisons are calculated using the prices paid in the US compared to the prices paid in Canada, but restricted to those presentations that are identical in both markets. The US prices are then converted to Canadian prices using PPP exchange rates. The relative price emerging from this procedure answers the following question:

Taking the consumption patterns of generic prescription drugs in Canada as given, how much would it cost to purchase that basket of generic drugs in the US, relative to what it would cost to purchase that same basket of drugs in Canada?

5. Results

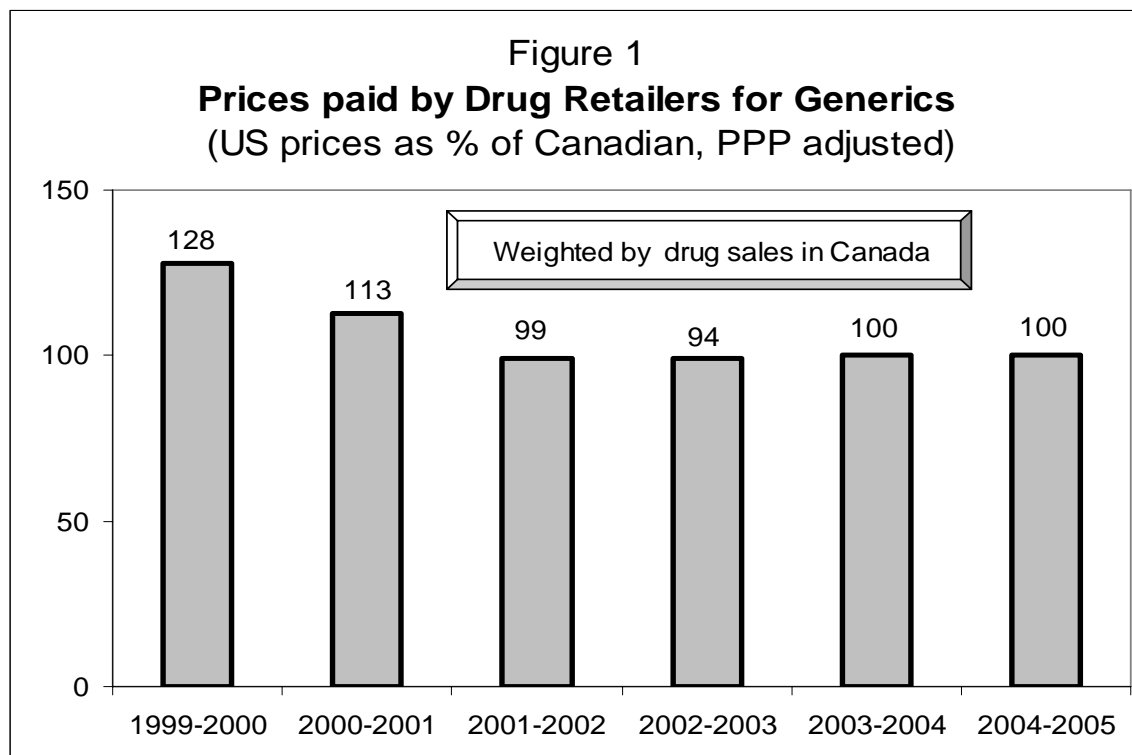
5.1 Overall Weighted Average Price Comparisons

Although there is data on all sales of generic drug in Canada for each manufacturer and for each presentation, the entire market is not covered in this study. Since the objective of this study is to compare prices for generic drugs in Canada to those in the US, only those drugs for which there is a match at the Unit of Analysis level were included, this ensuring the accuracy of the price comparisons.

Table 4 provides details on how much of the total market is covered in this study. It confirms that the price comparisons derived are broad based. In 2005, they covered more than \$1.2 billion in sales, 720 Units of Analysis, and 207 Active Ingredients. This coverage represented 56.2% of the total generic market in Canada in 2005.

Table 4: Total Generic Drug Market in Canada and the Study's Coverage						
	1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003	2003 - 2004	2004 - 2005
Generic Drug Market (\$ thousand)	1,103,015	1,188,197	1,386,025	1,572,617	1,870,594	2,227,959
Number of Active Ingredients	278	288	303	311	332	335
Coverage in the study						
Number of Units of Analysis	679	680	674	681	712	720
Number of Active Ingredients	171	177	188	192	203	207
Market Covered (\$ thousand)	431,035	502,221	736,949	847,625	948,030	1,252,325
Percentage of Market Covered	39.1	42.3	53.2	53.9	50.7	56.2

The result of this price comparison across all matched Units of Analysis is provided in Figure 1.



The results in Figure 1 indicate that, while prices of generic drugs were higher in the US than in Canada by 28% in 1999 – 2000, the relative US price has fallen. In the most recent years of the study, 2003 – 2004 and 2004 – 2005, the US and Canadian prices were, on average, virtually identical.

Thus, the results indicate that, when averaged across all generic drugs for which a precise match with the US could be made, there is currently no price gap between Canada and the US.

The results in Figure 1 are derived using Canadian and US prices for each individual Unit of Analysis. In order to come up with an average price for the entire market, each price is weighted by its relative importance in the Canadian market. Thus the average price for the portfolio of drugs purchased by Canadians is at parity with those in the US.

5.2 Relative Prices by Delivery Mode

In an analysis of drugs by delivery mode (Table 5), Panel A shows the relative prices for each delivery mode. Panel B provides a breakdown of the Canadian generic market by each delivery mode. These shares are based on that component of the prescription market that was analysed in this study. It is important to note that capsules and tablets (solid oral dosage forms) represented 96% of the market in 2005.

Table 5: Relative Prices (US as % of Canadian) and Market Shares (%) in Canada by Delivery Mode						
	1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003	2003 - 2004	2004 - 2005
Tablet						
Relative Prices	136	115	102	95	100	99
Market share	80.3	81.1	77.3	77.9	79.6	76.5
Capsule						
Relative Prices	88	107	87	87	89	94
Market share	12.6	13.1	18.1	18.1	16.2	19.5
Market share for Solid oral dosage forms (tablets and capsules)	92.9	94.2	95.4	96.0	95.2	96.0
Ophthalmic solution						
Relative Prices	101	117	115	147	184	175
Market share	3.0	2.3	1.8	1.5	1.7	1.5
Injection						
Relative Prices	188	127	127	120	100	112
Market share	0.9	0.8	0.7	0.8	1.0	1.0
Cream						
Relative Prices	91	92	105	117	144	140
Market share	0.6	0.4	0.5	0.5	0.7	0.7
Oral Suspension						
Relative Prices	83	68	73	76	69	68
Market share	2.1	1.9	1.1	0.8	0.5	0.4
Ointment						
Relative Prices	99	85	98	91	88	123
Market share	0.2	0.2	0.2	0.2	0.2	0.2
Liquid						
Relative Prices	88	101	196	48	33	27
Market share	0.0	0.0	0.1	0.1	0.1	0.1
Lotion						
Relative Prices	36	32	31	29	26	112
Market share	0.2	0.1	0.1	0.1	0.1	0.1
Powder						
Relative Prices	346	386	281	329	420	795
Market share	0.1	0.1	0.0	0.1	0.0	0.1
Patch						
Relative Prices	NA	NA	NA	NA	262	285
Market share	NA	NA	NA	NA	0.1	0.0
Gel						
Relative Prices	75	76	72	75	64	66
Market share	0.0	0.1	0.0	0.0	0.0	0.0
Weighted Average	128	113	99	94	100	100

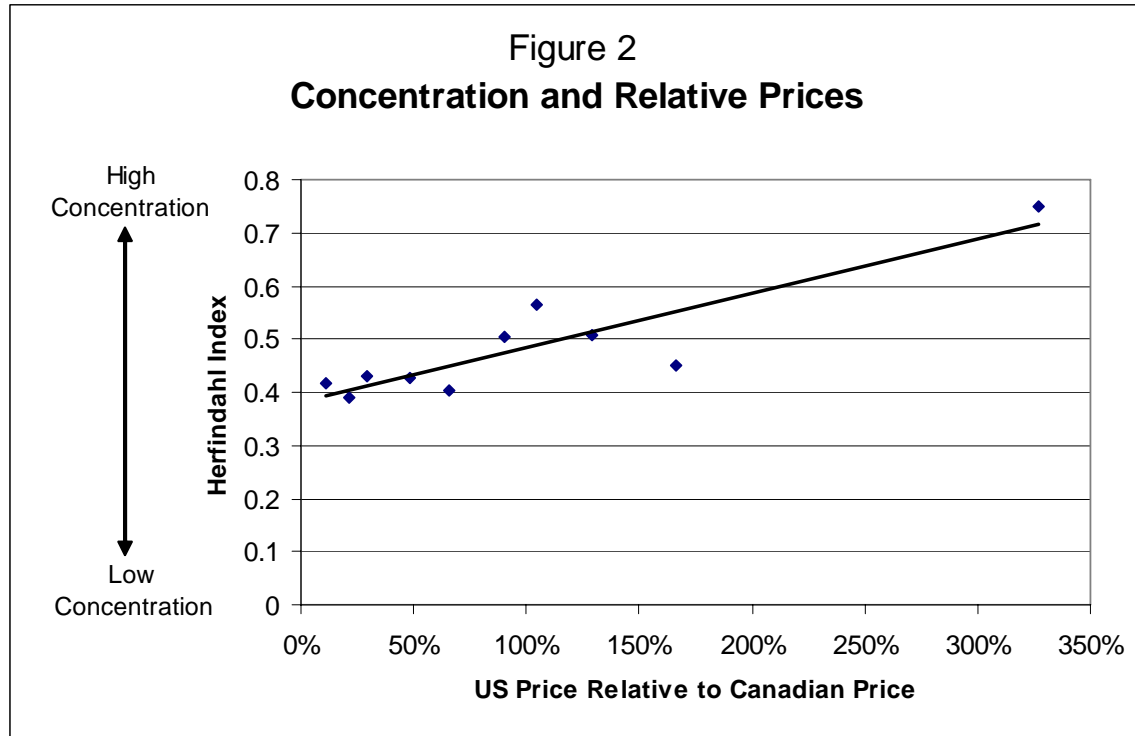
Several observations are immediately apparent about the Canadian generic pharmaceutical market:

- Tablets and capsules (solid oral dosage forms) represented 93% to 96% of the Canadian market during the sample period.
- Tablets represent the largest delivery mode, representing 75% to 80% of the market during the sample period.
- Relative prices for tablets reflect those for the overall market. This is to be expected given that tablets constitute such a large share of the market. The prices for tablets in Canada are, on average, at par with those in the US.
- Capsules have the second largest market share. In 1999 – 2000, that share was 12.58%, but in 2004 – 2005, that share had increased to 19.46% of the market.
- Gels, patches, powders, lotions, liquids, ointments, oral suspensions and injections each accounted for less than 1% of the overall market.

5.3 Impact of US Generic Manufacturers' Pricing Practices

There are many factors that can explain the price differences documented above, one of which is the impact of demand. Others might include pricing practices pursued by US generic drug manufacturers.

An additional analysis that was undertaken involved calculating Herfindahl indexes and relating these to relative prices. The Herfindahl index is a reflection of sales concentration at the Unit of Analysis level. This analysis (Figure 2) indicates that the more concentrated the sales at the Unit of Analysis level are in the US, the higher the average price charged by US generic drug manufactures for those drugs. Given the level of regulation of prices in Canada, this result was not found in the Canadian market.



6. Conclusions

A broad-based comparison of generic prescription drug prices in Canada and the United States was undertaken in this study. The work was carried out at the finest level of analysis possible. Price comparisons were made at Units of Analysis (UAs). These represent categories of drugs that are matched Canada and the US on five characteristics: Active Ingredient; dosage form (tablet, injection, etc.); unit of measure for strength/concentration; strength/concentration, and pack size (number of tablets, etc. in a pack). Within each of these categories, prices for every manufacturer active in that Unit of Analysis were obtained. The price for the Unit of Analysis was then derived using dollar shares of the price charged by each manufacturer.

This comprehensive analysis provides a clearer picture of the generic pharmaceutical market in Canada and the US. Although many existing studies have been published comparing generics in different countries, their results are highly sensitive to the data set, coverage, and methodology used. As such, it is difficult to obtain an accurate picture of relative generic drug prices in Canada and the US based on these past studies. This present analysis brings clarity to the issue of generic pharmaceutical prices in Canada relative to the US.

Several conclusions can be drawn from this analysis.

- The use of careful methodology and comprehensive data sets revealed that the price paid by Canadian pharmacies for the drugs consumed in Canada is, on average, equal to what these drugs would cost in the US.
- While there is parity in generic drug prices in Canada and the US for the portfolio of drugs consumed by Canadians, heterogeneity in drug prices occurs related to delivery mode.
- This analysis demonstrates convincingly that attempting to drug price comparisons at levels of aggregation above the Unit of Analysis level employed in this study can produce misleading results.
- Given the detail and sophistication of the present study, it may provide assistance to policy makers when formulating drug price regulations.