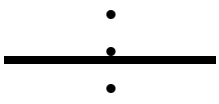
Inter-Provincial Prescription Drug Price Comparison

1995/96 - 1999/00



Prepared by the Patented Medicine Prices Review Board for the

Federal/Provincial/Territorial

Working Group on Drug Prices

Acknowledgement

The Inter-Provincial Prescription Drug Price Comparison was prepared by the Patented Medicine Prices Review Board (PMPRB) at the request of the Minister of Health Canada pursuant to a Memorandum of Understanding. Funding was provided by Health Canada.

The report was produced under the direction of the Working Group on Drug Prices (WGDP), which is a working group of the F/P/T Pharmaceutical Issues Committee (PIC). The contribution of individual member of the WGDP was invaluable.

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Executive Summary

- In Canada, the market for pharmaceuticals is comprised of ten provincial markets each containing different characteristics including population size, GDP per capita, demographic factors and public drug plans. This study compares manufacturers' ex-factory gate prices of patented drugs in provincial markets and retail prices of all drug products covered by six provincial drug plans (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario and Nova Scotia) for the period 1995 to 1999. A primary objective of the study is to investigate whether manufacturers charge different prices in different jurisdictions and whether there are any differences in pricing behaviour between patented and non-patented drug products. Prices are examined both at the retail level and the ex-factory gate level, including a review of wholesale distribution margins and professional fees (dispensing fees) charged by pharmacists to the drug plans.

- Prices of patented drug products were virtually identical in all provincial markets. In 1999, the difference between the highest and lowest ex-factory gate (manufacturers') price was less than 1.3%. For all provinces, roughly two-thirds of provincial prices were within plus-or-minus 2 percent of the corresponding Canada-wide price, with roughly three-quarters of all prices within plus-or-minus 5 percent. This is strong direct evidence that prices of patented drugs did not vary much across provinces between 1995 and 1999.

- This analysis indicates that for purposes of setting prices, patentees treat the Canadian market as one market and not ten different markets. There is convergence in the prices of patented products across the country.

- The sales of patented medicines represented over 60% of the sales of all medicines in Canada in 1999. The ex-factory gate price of patented medicines is regulated by the Patented Medicine Prices Review Board (PMPRB) which has been tracking prices by jurisdiction since 1988.

- All provinces, except Newfoundland, experienced a moderate decline in the prices of patented drugs over the study period (1995-1999). The largest decline occurred in New Brunswick, which saw an annual average decline of 1.1 percent.

- An analysis using provincial drug plan claimed price information, which includes wholesale and retail mark-ups and dispensing fees was also undertaken for six participating provincial drug plans, Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. Claimed price represents the retail price charged at the pharmacy counter and accounts for differences in program design and reimbursement rules.

- The price variation present at the drug plan level is considerably more substantial both for patented and non-patented drugs. An inter-provincial price analysis of generic drugs revealed that prices in Saskatchewan are substantially lower than in the other provinces. For example, if Nova Scotia purchased its generic basket at Saskatchewan' prices, the cost would be 12.3% less in 1999/00.

- The 1999 results for the six provincial drug plans indicate a greater degree of price variation than those obtained with PMPRB data, with a difference between the highest- cost and lowest-cost province of 9.0 percent; wholesale and retail margins are reflected in this analysis. Comparison of the 1999 and 1995 results reveals that the price differences have been narrowing with a high-low difference of 16.3 percent in the earlier year.

- The study shows that prices for patented products do not vary significantly across the country. On the other hand, greater price differences were detected for non-patented medicines and in particular multiple source medicines. Considerable inter-provincial divergence in distribution chain mark-ups and professional fees (pharmacy dispensing fees) was found.

Table of Contents

Table of Figures

List of Tables

1 Introduction

The Canadian market for pharmaceuticals is comprised of ten provincial markets. These markets differ by population size, income per capita, demographic factors and the characteristics of provincial drug coverage programs. This study uses Patented Medicine Prices Review Board (PMPRB) databases to compare ex-factory gate prices of patented drug products in provincial markets over the period 1995 to 1999. A study of retail prices for all drugs claimed to six provincial drug plans, Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia is also conducted. The primary objective is to determine whether pharmaceutical manufacturers charge substantially different prices across provinces or simply employ a one-price strategy across Canada.

Information on inter-provincial price differences can be useful to provincial drug plan managers and other purchasers. Such information can also assist the PMPRB in carrying out its task of ensuring patented drug products are not sold at excessive prices in any Canadian market. Finally, the present study may provide a starting point for subsequent research on pricing behavior in Canadian pharmaceutical markets.

Section 2 examines the ex-factory gate prices of patented drugs in all ten provinces.[1] The prices used here are average ex-factory transaction prices, that is, prices patentees charge their customers net of all discounts and rebates. These prices are used by the PMPRB to conduct price reviews and are based on the transaction-level records that patentees must regularly submit to the PMRBP under the *Patented Medicines Regulations*.

Section 3 examines drug prices using information from administrative databases maintained by provincial drug plan managers in Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. Prices in this section include wholesale and retail mark-ups, but exclude profession and/or dispensing fees. This section deals jointly with patented and non-patented drugs. Section 4 examines the patented, non-patented and generic sub-markets separately, again using provincial drug plan data.

2 Ex-factory Gate Inter-Provincial Price Analysis - Patented Drugs

As noted above, this section gives results on inter-provincial price variability based on data submitted to the PMPRB. For any year of analysis these data cover only currently patented drug products and all of the analysis presented in this section are based on a common basket of drugs common to all jurisdictions. By design, the measures of revenue and quantity used to obtain price are consistent in their construction across all provinces and territories.

The results reported in this section are based on average "per pill" prices at the drug product level charged to all classes of customers. The term "drug product", as used here, signifies a unique Drug Identification Number (DIN). The transaction-level records in the PMPRB databases include information on pack size, which allows the identification of the number of physical units (that is, the number of "pills") involved in a given transaction. Prices were thus obtained by first calculating the number of physical units in each reported transaction, rolling up revenues and the number of physical units across records for each DIN by province and year, and then simply dividing each resulting aggregate revenue[2] value by the corresponding aggregate number of physical units.[3]

Table 2-1 gives the cost of purchasing the basket of drug products common to all provinces in the years 1999 and 1995. In 1999 it cost $14,996 to purchase one unit of each DIN in the common basket[4] of 412 products in the highest-cost province (Newfoundland), but $14,810 in the lowest-cost province (Saskatchewan). This amounts to a difference of less than 1.3 percent between the highest and lowest priced jurisdiction. For no province did the cost of the 1999 common basket deviate from the corresponding Canada-wide value of $14,911 by as much as 1 percent. Note that costs obtained with 1995 data have a range of nearly 6 percent, suggesting inter-provincial price differences have narrowed in recent years. Note as well that a comparison of 1999 and 1995 provincial rankings reveals little time-wise correlation: for example, the highest-cost province of 1995, New Brunswick, has the second lowest cost in 1999. These results offer no evidence of systematic provincial bias in patented drug pricing.

Table 2-1 Sum of Unit Prices, 1999 and 1995

PMPRB Data (Patented Drugs) Common Basket				
Province	1999		1995	
	Sum	Rank	Sum	Rank
Newfoundland	$14,996	1	$5,231	4
P.E.I	$14,859	8	$5,216	7
Nova Scotia	$14,867	6	$5,184	9
New Brunswick	$14,840	9	$5,346	1
Quebec	$14,962	2	$5,248	3
Ontario	$14,941	4	$5,252	2
Manitoba	$14,962	3	$5,189	8
Saskatchewan	$14,810	10	$5,225	5
Alberta	$14,885	5	$5,217	6
British Columbia	$14,859	7	$5,047	10
Canada	$14,911		$5,204	
Number of Observations	412		409	

By way of comparing trends in aggregate price levels, Table 2-2 presents a chained Laspeyres price index for each province covering the period 1995-1999. Although a common basket of drug products is used for each year, quantity-weights applied in constructing a given province's index reflect its own consumption patterns. These quantity-weights change from year to year in accordance with observed shifts in the distribution of consumption among products. Note as well that the common basket of drugs products will change from year to year, as new products enter and old products leave the Canadian market.

The results in Table 2-2 indicate that all provinces except Newfoundland experienced a moderate decline in the prices of patented drugs over the study period. The largest decline occurred in New Brunswick, which saw an annual average decline of 1.1 percent. Interestingly, all provinces posted a substantial single-year decline in 1996, which accounts for most of the overall 1995-1999 decline. In the exceptional case of Newfoundland the 1996 decline was reversed by a 1997 rise in overall prices.

Table 2-2 Chained Laspeyres Price Indices by Province, 1995 – 1999

PMPRB Data (Patented Drugs)
Common Basket

Year	# of DINs	NF		PE		NS		NB		QU		ON		MN		SK		AB		BC	
		Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change
1995		100.00		100.00		100.00		100.00		100.00		100.00		100.00		100.00		100.00		100.00	
1996	331	97.42	-2.58	98.18	-1.82	97.36	-2.64	95.89	-4.11	97.88	-2.12	99.30	-0.70	98.85	-1.15	98.04	-1.96	99.26	-0.74	99.05	-0.95
1997	301	100.09	2.74	97.80	-0.38	97.06	-0.30	96.41	0.54	97.21	-0.69	99.66	0.36	98.78	-0.06	98.08	0.04	99.12	-0.14	99.19	0.14
1998	307	100.79	0.70	97.94	0.14	96.42	-0.66	96.02	-0.41	97.06	-0.15	99.78	0.12	98.39	-0.39	98.19	0.11	99.29	0.17	98.78	-0.41
1999	330	100.78	-0.01	97.80	-0.14	96.43	0.01	95.85	-0.18	96.67	-0.41	99.67	-0.11	98.23	-0.16	97.85	-0.34	98.51	-0.79	98.95	0.17
Average			0.19		-0.56		-0.90		-1.06		-0.84		-0.08		-0.45		-0.54		-0.38		-0.26

Large inter-provincial variations in drug product prices will produce correspondingly large positive and negative deviations from Canada-wide average prices. Systematic provincial biases in pricing will be reflected in the distributions of such deviates: generally high-cost (low-cost) provinces should display a high proportion of large positive (negative) deviations. Table 2-3 provides a breakdown of such deviations by province. The distributions of deviations are remarkably similar across provinces. For all provinces roughly two-thirds of provincial prices were within plus-or-minus 2 percent of the corresponding Canada-wide price, with roughly three-quarters of all prices within plus-or-minus 5 percent. This is strong direct evidence that prices of patented drugs did not vary much across provinces over the study period.

Table 2-3 Deviations From Canada-Wide Prices[5], 1995 - 1999 (% of DINs)

PMPRB Data (Patented Drugs)										
Range	NF	PE	NS	NB	QU	ON	MN	SK	AB	BC
< 0.90	14.3	10.0	15.1	11.3	8.4	5.1	9.5	13.4	11.8	9.4
0.90 to 0.95	5.7	4.7	3.6	3.8	6.1	3.5	5.0	4.9	4.6	3.7
0.95 to 0.98	4.8	5.0	4.9	6.0	6.9	5.2	6.7	5.7	5.3	3.6
0.98 to 1.00	17.3	21.1	17.6	20.3	24.2	28.5	20.8	20.0	21.7	23.7
Equal	8.0	7.5	4.7	8.5	10.1	11.1	8.4	9.0	8.6	9.0
1.00 to 1.02	29.9	28.5	27.9	29.6	28.9	28.6	29.1	27.5	32.0	28.9
1.02 to 1.05	6.3	8.7	6.8	7.3	6.0	6.1	7.0	7.1	6.3	7.9
1.05 to 1.10	5.6	4.1	5.7	5.2	4.6	5.5	4.7	4.9	3.5	5.7
> 1.10	8.1	10.5	13.7	7.9	4.8	6.4	8.8	7.7	6.2	8.1

Table 2-4 provides yet another way to gauge the magnitude of inter-provincial price differences. Consider any entry in the upper array of this table. Let “x” be the province indicated in the corresponding row label, “y” the province indicated in the corresponding column label. Then the selected entry represents what the quantities purchased in province “x” would have cost had they been purchased at the prices prevailing in province “y”. Entries on the diagonal, being province “x” quantities at own prices, are actual expenditures. On-diagonal entries thus serve as benchmarks: by comparing the off-diagonal entries in a given row to that row’s on-diagonal value we can determine whether province “x” quantities would have cost more or less in province “y” and by how much. The results of all such comparisons are given in the lower array: each index value is the ratio (multiplied by 100) of the corresponding upper array entry to the relevant on-diagonal value.

Table 2-4 Cross-Province Cost Estimates, 1999

PMPRB Data (Patented Drugs)
Values (Millions of Dollars)

	NF	PE	NS	NB	QU	ON	MN	SK	AB	BC	CA
NF	$38.7	$38.9	$38.8	$38.6	$38.6	$38.5	$38.5	$38.6	$38.4	$38.5	$38.5
PE	$10.3	$10.3	$10.3	$10.3	$10.3	$10.2	$10.3	$10.3	$10.2	$10.3	$10.2
NS	$87.9	$87.6	$87.7	$87.6	$87.5	$87.4	$87.2	$87.3	$87.2	$87.3	$87.4
NB	$104.9	$105.0	$105.6	$105.0	$104.1	$104.4	$104.3	$105.1	$104.0	$104.4	$104.3
QU	$946.0	$943.0	$949.4	$944.4	$941.2	$941.8	$940.9	$945.4	$938.5	$941.0	$941.3
ON	$1,506.3	$1,500.7	$1,513.5	$1,505.2	$1,497.0	$1,496.8	$1,497.0	$1,506.1	$1,494.1	$1,496.9	$1,497.0
MN	$95.9	$96.3	$97.2	$95.5	$95.5	$95.2	$95.2	$96.5	$94.6	$94.9	$95.2
SK	$63.5	$63.1	$63.5	$63.5	$63.6	$63.1	$63.5	$63.1	$63.1	$63.3	$63.2
AB	$358.5	$360.2	$361.8	$359.0	$356.6	$356.7	$356.9	$359.7	$356.2	$357.4	$356.7
BC	$354.8	$354.2	$355.8	$355.1	$354.6	$352.5	$353.4	$353.0	$352.6	$352.8	$353.0
CA	$3,566.7	$3,559.4	$3,583.7	$3,564.4	$3,548.9	$3,546.6	$3,547.2	$3,565.1	$3,538.9	$3,546.7	$3,547.0

Index

	NF	PE	NS	NB	QU	ON	MN	SK	AB	BC	CA
NF	100.0	100.5	100.3	99.9	99.9	99.5	99.6	99.8	99.3	99.5	99.6
NS	100.3	100.0	100.8	100.4	100.3	99.8	99.9	99.9	99.3	99.9	99.8
PE	100.1	99.8	100.0	99.9	99.8	99.6	99.4	99.5	99.4	99.4	99.6
NB	99.8	100.0	100.5	100.0	99.1	99.4	99.3	100.1	99.0	99.4	99.3
QU	100.5	100.2	100.9	100.3	100.0	100.1	100.0	100.5	99.7	100.0	100.0
ON	100.6	100.3	101.1	100.6	100.0	100.0	100.0	100.6	99.8	100.0	100.0
MN	100.8	101.1	102.1	100.3	100.3	100.0	100.0	101.4	99.4	99.7	100.0
SK	100.6	100.0	100.6	100.7	100.7	100.0	100.5	100.0	99.9	100.2	100.2
AB	100.6	101.1	101.6	100.8	100.1	100.1	100.2	101.0	100.0	100.3	100.2
BC	100.6	100.4	100.9	100.6	100.5	99.9	100.2	100.0	99.9	100.0	100.1
CA	100.6	100.4	101.0	100.5	100.1	100.0	100.0	100.5	99.8	100.0	100.0

The results in Table 2-4 and Figure 2-1 strongly attest to a high degree of price-uniformity across the provinces. In no case does costing-out a given province's quantities at another province's prices yield an amount that differs from actual expenditures by more than 2.1 percent. In the great majority of cases the difference is well within plus-or-minus 1 percent. This implies that even the higher-cost provinces identified in Table 2-1 would gain little in expenditure savings from adopting the lowest observed prices. The gain would be even less if prices were set at Canada-wide average levels: the entries in the "CA" column, which provide these estimates, show that only New Brunswick could expect to save more than one-half of 1 percent of its expenditures on patented drug products.

Figure 2-1 Percent Difference Using Jurisdiction Specific Utilization and Canadian Average Ex-Factory Gate Prices – Patented Drugs 1999

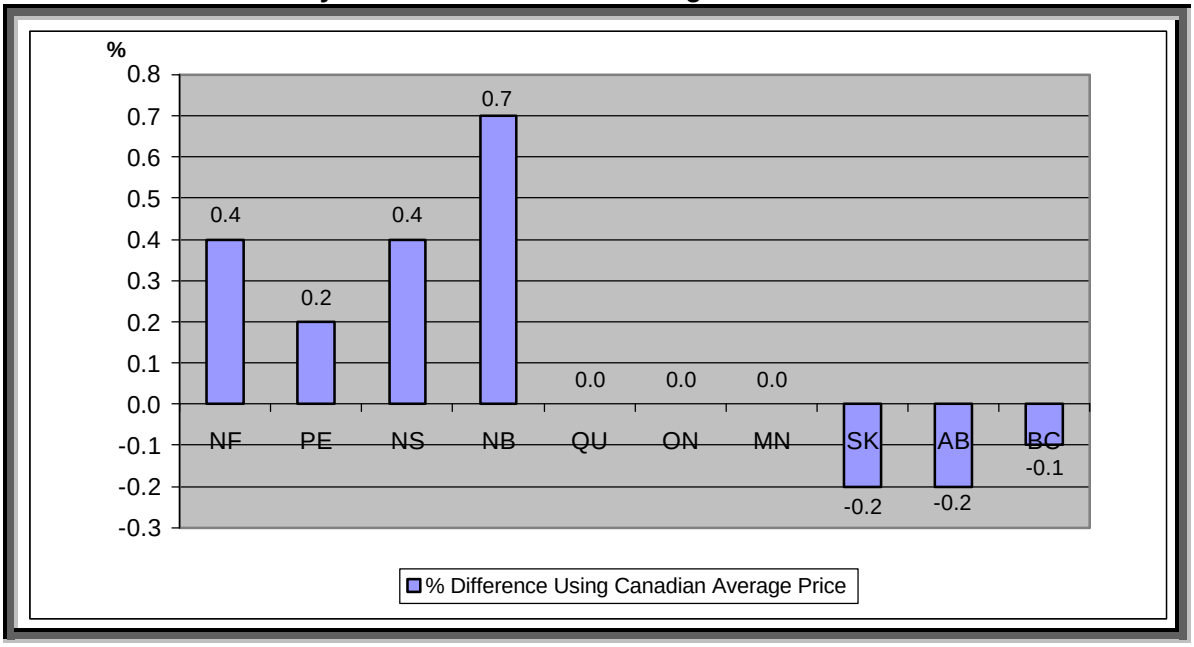


Table 2-5 compares provincial prices to corresponding Canada-wide values by customer class and Figure 2-2 provides the distribution of revenue sales by class of customer in 1999. Each entry in the table is the average of provincial-to-Canada-wide price ratios across the relevant set of drug products. Each of the reported price ratios is restricted to prices reported within the indicated customer class. On the whole, the results presented in Table 2-5 again suggest little inter-provincial price variation. The results for the pharmacy sector are especially striking: deviations of provincial prices from Canada-wide values seem negligible here. There is some evidence of more variability in the hospital and wholesale sectors. In particular, prices to hospitals in Prince Edward Island, Nova Scotia and Saskatchewan seem to be appreciably higher than elsewhere. Values for all other provinces are easily within plus-or-minus 2 percent of Canada-wide average values.

Table 2-5

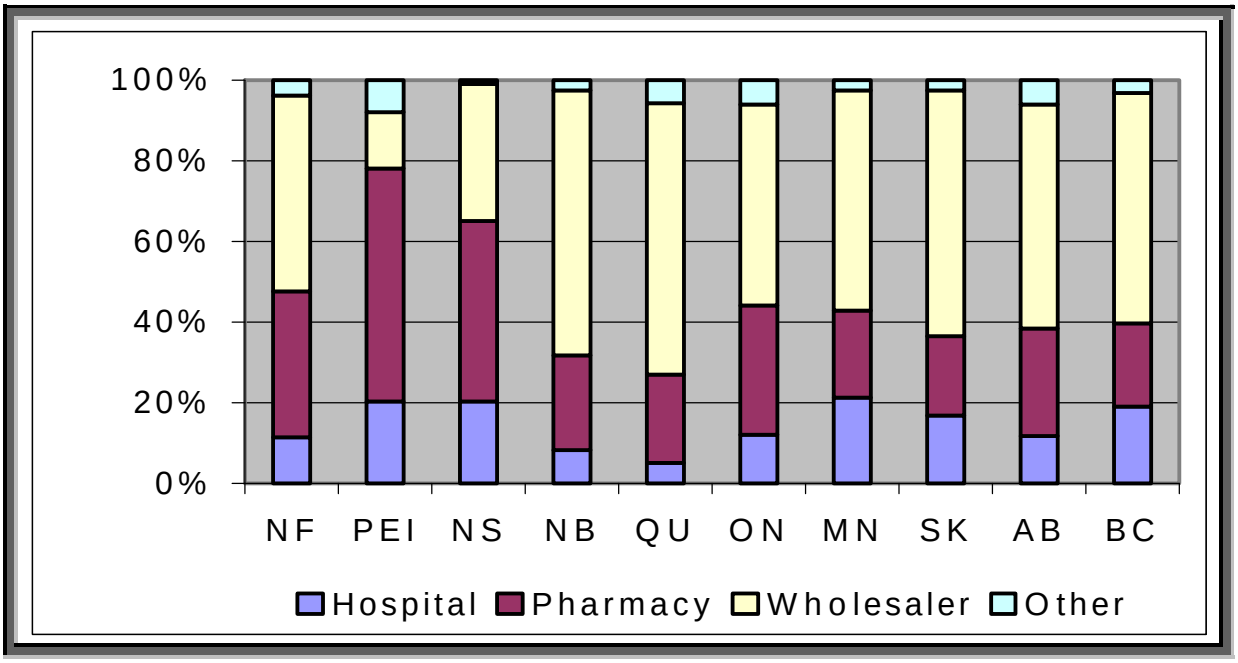
Average Provincial to Canada-Wide Price Ratio by Customer Class
PMPRB Data (Patented Drugs) 1999

	Number of Observations	NF	PEI	NS	NB	QU	ON	MN	SK	AB	BC
Hospital	97	1.034	1.082	1.064	1.009	1.001	1.000	0.997	1.067	0.988	0.989
Pharmacy	243	0.999	0.999	0.993	1.003	0.999	0.999	0.993	0.998	0.996	1.006
Wholesalers	53	1.006	1.012	1.058	1.012	1.028	1.005	1.024	1.006	0.989	1.007
Others	41	1.062	0.991	0.965	1.005	0.970	1.005	0.995	1.025	1.03	1.022
All	412	1.012	1.027	1.005	1.008	1.005	1.000	0.998	1.008	0.999	1.005

Revenue Shares by Customer Class, PMPRB Data (Patented Drugs) 1999

	NF	PEI	NS	NB	QU	ON	MN	SK	AB	BC
Hospital	11.3	20.4	20.4	8.1	5.2	11.9	21.3	16.7	11.8	18.9
Pharmacy	36.5	57.8	44.7	23.6	21.7	32.1	21.7	19.8	26.5	20.7
Wholesaler	48.6	14.1	33.9	65.7	67.5	49.9	54.5	60.9	55.7	57.3
Other	3.6	7.7	1.0	2.6	5.7	6.1	2.6	2.6	6.0	3.1

Figure 2-2 Sales Revenue by Class of Customer for a Common Basket of Drugs - 1999



3 Inter-provincial Drug Plan Price Analysis - (All Drugs)

Table 3-1 through 3-5 present results obtained using provincial drug plan data. In each instance and for all provinces the reported results are based on measure of "claimed" per pill price. (Results for "accepted" per pill price - that is, the price accepted for reimbursement - are given in Appendix I.) Calculations were restricted to products in capsule and tablet form, because of apparent inconsistencies in unit definitions frequently produced implausibly large variations price variations among other products. A small number of outliers (again, products displaying implausibly large price variations) were also excluded from the data.[6] All results reported in this section were produced using a DIN-level definition of product.

It is critical to understand the nature of "claimed cost" in considering these results. In the most basic terms, "claimed" price is the retail price charged by the pharmacy for the ingredient portion of the prescription. Although the ex-factory price charged by manufacturers accounts for most of "claimed" price in all provinces, reported values also include wholesale and retail mark-ups. The sizes of these mark-ups are known to vary from province to province, which imparts a margin and an element of variability not present in PMPRB data. We should therefore expect measures obtained using these data to imply a somewhat greater degree of inter-provincial price variation than those of Section 2.

Table 3-1 presents analysis of the wholesale and retail mark-ups for each of the six jurisdictions included in this section of the report. The average retail margin is calculated for 1995/96 and 1999/00 using the PMPRB information on manufacturers' prices[7] and comparing that price with the claimed and accepted price in each of the jurisdictions. This analysis is restricted to a common basket of patented drugs. Only patented drugs are used due to the availability of ex-factory price data in the PMPRB database. In order to minimize unit definition variability, the analysis is restricted to tablets and capsules. Average dispensing fees for the prescriptions included in this portion of the analysis were also presented in order to provide a fuller inter-provincial comparison of the retail market.

On average, Saskatchewan accepted the highest drug cost margin for patented drugs in 1995/96 and 1999/00. The difference between the manufacturers' price and the accepted price in 1999/00 averaged 17.1%. This margin includes both a wholesale mark-up and a pharmacy mark-up, which is somewhat unique to Saskatchewan's provincial drug plan. In Saskatchewan, pharmacists must submit their actual acquisition cost (AAC), which may include a wholesale mark-up (if purchased from a wholesale). However, pharmacists are also permitted to charge a pharmacy mark-up, which is dependent on the ingredient cost of the prescription. Other jurisdictions either allow a flat mark-up, which would include wholesale and/or pharmacy mark-up (the relative proportion depending on where the pharmacy purchased the product), or operate based on an actual acquisition cost policy with no additional opportunity for pharmacy mark-up.

A disaggregation of the margin reported for Saskatchewan revealed that in 1995/96 the wholesale up-charge averaged 6.8%, and in 1999/00 it represented 7.2%. The remainder (approximately 10%) represents average pharmacy mark-up; in 1999/00, the wholesale mark-up represents 42% of the total mark-up presented in Table 3-1. Although Saskatchewan pays the highest up-charge, the province had the second lowest average dispensing fee. In 1999/00, the average dispensing fee accepted by the drug plan was $6.15.

It is also worth noting that in British Columbia the difference between the claimed mark-up and the accepted mark-up is substantial. Other than the maximum wholesale up-charge policy, the actual acquisition policy and reference based pricing may influence these results. (Further analysis based on accepted price is presented in the Appendix.) In Ontario, although the distribution margin is limited by the 10% maximum pharmacy mark-up policy, the average up-charge for patented medicines is calculated to be 13.97%.[8]

Table 3-1 Inter-provincial Retail Margins and Dispensing Fees

ANALYSIS BASED ON ALL ORAL PATENTED TABLETS AND CAPSULES - COMMON BASKET						
Jurisdiction	Up-charge 1995/96 (Claimed Price)	Up-charge 1995/96 (Accepted Price)	Up-charge 1999/00 (Claimed Price)	Up-charge 1999/00 (Accepted Price)	Average Prescription Dispensing Fees 1995	Average Prescription Dispensing Fees 1999
BC	10.55%	8.49%	10.39%	5.26%	$3.14	$6.07
AB	3.23%	3.23%	9.52%	9.52%	$10.67	$9.74
SK*	17.92%*	17.42%	17.17%*	17.14%	$6.29	$6.15
MN	6.58%	6.58%	10.01%	10.01%	$6.69	$6.83
ON	9.09%	9.09%	13.97%	13.97%	$5.93	$6.26
NS	5.02%	5.17%	7.22%	5.69%	$9.16	$9.15
*NOTE: Based on Claimed Prices, the average wholesale up-charge was 6.8% in 1995/96 and 7.2% in 1999/00						

Table 3-1 provides a bridge between the analysis presented in Section 2 and the analysis presented below. Table 3-2 has the same structure as Table 2-1. The 1999 results indicate a greater degree of price variation than those obtained with PMPRB data, with a difference between the highest- and lowest-cost province of 9.0 percent. Still, all provinces, except British Columbia, are within plus-or-minus 4 percent of the Canada-wide value of $787. Comparison of the 1999 and 1995 results reveals the same narrowing of range observed in Table 2-1, with a high-low difference of 16.3 percent in the earlier year. Note as well that Table 3-2 contains an indication of time-wise correlation in rankings that was not seen in Table 2-1: this is consistent with the conjecture that the larger inter-provincial differences observed in this instance more likely reflect differences in wholesale and retail mark-up practices than pharmaceutical industry pricing behaviour.[9]

Table 3-2 Sum of Unit Prices, 1999 and 1995

Provincial Drug Plan Data Common Basket				
Province	1999		1995	
	Sum	Rank	Sum	Rank
Nova Scotia	$816	2	$481	4
Ontario	$768	6	$459	5
Manitoba	$805	4	$494	3
Saskatchewan	$813	3	$494	2
Alberta	$785	5	$430	6
British Columbia	$837	1	$500	1
Canada	$787		$469	
Number of Observations	1,329		989	

Table 3-3 presents chained Laspeyres price indices for the set of drug products common to all provinces in a given year. Here again, weights applied in constructing a given province's index represent own consumption patterns as reflected in claims against its drug plan. There is much less coherence among these indices than among those reported in Table 2-2. Four of the provinces - Nova Scotia, Ontario, Manitoba and British Columbia - show modest declines over the study period. Saskatchewan shows a pronounced decline, while Alberta shows a considerable increase.

Table 3-3 Chained Laspeyres Price Indices by Province, 1995 - 1999

Provincial Drug Plan Data													
Year	Number of DINs	NS		ON		MN		SK		AB		BC	
		Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change	Index	% Change
1995		100.00		100.00		100.00		100.00		100.00		100.00	
1996	974	100.13	0.13	99.42	-0.58	99.22	-0.78	98.37	-1.63	107.52	7.52	100.02	0.02
1997	1057	100.15	0.02	98.98	-0.45	98.75	-0.48	95.16	-3.27	106.80	-0.67	99.69	-0.33
1998	1128	100.03	-0.12	98.83	-0.14	98.38	-0.38	93.75	-1.47	106.40	-0.38	98.84	-0.85
1999	1199	99.82	-0.21	97.86	-0.98	97.99	-0.40	92.53	-1.30	105.68	-0.67	97.15	-1.71
Avg			-0.04		-0.54		-0.51		-1.92		1.39		-0.72

Table 3-4 presents results on deviations of provincial prices from Canada-wide average prices. Broadly speaking, the results reported here suggest considerably larger deviations from Canada-wide average prices than those reported in Table 2-3: more than 60 percent of price deviations are beyond plus-or-minus 2 percent in all provinces. Distributions differ markedly from province to province. Deviations in Ontario and Alberta are heavily skewed toward the negative, consistent with the results in Table 3-2 indicating these are relatively low-cost provinces. Deviations tend to be positive in all other provinces.

Table 3-4 Distribution of Deviations from Canada-Wide Average Prices, 1995 - 1999 (% of DINs)

Provincial Drug Plan Data						
Range	NS	ON	MN	SK	AB	BC
< 0.90	2.2	6.2	5.2	4.2	10.6	0.3
0.90 to 0.95	5.7	15.2	2.4	4.3	10.9	0.7
0.95 to 0.98	16.4	41.3	3.1	6.5	27.5	1.1
0.98 to 1.00	21.5	27.1	3.6	9.0	18.1	2.0
Equal	1.8	0.7	0.6	1.3	1.5	0.5
1.00 to 1.02	10.9	4.4	7.2	14.0	12.3	8.2
1.02 to 1.05	15.4	1.7	15.5	26.9	11.6	29.9
1.05 to 1.10	10.4	1.3	33.8	16.8	3.9	36.0
> 1.10	15.7	2.0	28.5	17.0	3.6	21.3

Table 3.5 presents cross-province cost estimates of the same sort as Table 2.4. Here again, results obtained with provincial drug plan data suggest somewhat more inter-provincial price variability than those obtained with PMPRB data. British Columbia, in particular, emerges as a relatively high-cost province: it could save as much as 4.3 percent of expenditures if Canada-wide average prices were charged within its borders, and 6.8 percent if it enjoyed the same prices as Ontario. Nova Scotia, Manitoba, Saskatchewan and Alberta would all realize savings on the order of 2 percent of expenditures at Canada-wide average prices. Ontario, on the other hand, would incur additional expenditures of 1.9 percent.

Table 3-5 Cross-Province Cost Estimates, 1999

Provincial Drug Plan Data Expenditures (Millions of Dollars)							
	NS	ON	MN	SK	AB	BC	CA
NS	$20.9	$20.1	$21.0	$20.2	$20.7	$21.5	$20.5
ON	$899.6	$869.4	$913.9	$885.2	$905.7	$929.9	$886.0
MN	$115.5	$111.2	$115.8	$113.7	$115.5	$118.7	$113.7
SK	$77.4	$73.9	$78.0	$75.0	$76.7	$79.6	$73.2
AB	$148.6	$142.5	$149.0	$147.4	$148.5	$152.7	$145.8
BC	$220.6	$210.8	$222.6	$218.4	$220.9	$226.2	$216.5
CA	$1,482.6	$1,427.8	$1,500.3	$1,460.0	$1,488.0	$1,528.5	$1,455.7
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	96.2	100.6	96.9	99.4	102.9	98.1
ON	103.5	100.0	105.1	101.8	104.2	107.0	101.9
MN	99.8	96.0	100.0	98.2	99.8	102.6	98.2
SK	103.1	98.5	104.0	100.0	102.2	106.1	97.6
AB	100.1	96.0	100.4	99.2	100.0	102.8	98.2
BC	97.5	93.2	98.4	96.6	97.7	100.0	95.7
CA	101.8	98.1	103.1	100.3	102.2	105.0	100.0

4 Inter-provincial Drug Plan Price[10] Analysis – (Patented and Non-patented)

As noted above, the results presented in Section 3 encompass patented and non-patented drugs. It is of some interest to determine whether the patterns of inter-provincial prices variability detected in the aggregate also appear among patented and non-patented drugs. To this end, Tables 4-1 and 4-3 present cross-province cost estimates based on provincial drug plan data for these sub-markets.[11]

Table 4-1 covers patented drugs only. Although it indicates somewhat less variability than Table 3-5, the same patterns emerge. Ontario remains the lowest-cost province, British Columbia the highest-cost province. Manitoba appears to have slightly higher-than-average patented drug prices. British Columbia would realize an expenditure saving of more than 3.9 percent if its prices were set at Canada-wide average levels, Saskatchewan and Alberta savings of 2.7 and 2.1 percent, respectively.

Table 4-1 Cross-Province Cost Estimates, 1999, Patented Drugs

Provincial Drug Plan Data Expenditure (Millions of Dollars)							
	NS	ON	MN	SK	AB	BC	CA
NS	$10.6	$10.4	$10.4	$10.9	$10.8	$11.0	$10.6
ON	$515.9	$507.6	$517.3	$532.4	$529.6	$538.1	$515.4
MN	$67.9	$66.5	$67.4	$69.4	$69.1	$70.2	$67.6
SK	$43.0	$41.9	$43.2	$43.9	$43.7	$44.4	$42.7
AB	$88.6	$87.1	$88.5	$90.7	$90.3	$91.9	$88.4
BC	$120.1	$117.0	$120.6	$123.2	$122.8	$124.3	$119.5
CA	$846.1	$830.4	$847.4	$870.5	$866.2	$880.0	$844.1
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	98.1	98.3	102.6	101.5	103.9	99.6
ON	101.6	100.0	101.9	104.9	104.3	106.0	101.5
MN	100.7	98.7	100.0	102.9	102.5	104.2	100.3
SK	98.0	95.4	98.3	100.0	99.6	101.1	97.3
AB	98.1	96.4	98.0	100.5	100.0	101.7	97.9
BC	96.6	94.1	97.0	99.1	98.7	100.0	96.1
CA	100.2	98.4	100.4	103.1	102.6	104.2	100.0

Table 4-2[12] covers non-patented drugs only. It shows more price variability than Table 3-5. Ontario again emerges as a low-cost province. Saskatchewan also seems to enjoy below-average prices for non-patented drugs, in contrast to the situation prevailing in its patented drug market. Manitoba and British Columbia appear to pay prices substantially above average. The latter two provinces would realize cost savings within non-patented drugs of 4.6 and 4.8 percent if their prices were set at Canada-wide average levels.

Table 4-2 Cross-Province Cost Estimates, 1999, Non-Patented Drugs

Provincial Drug Plan Data Expenditure (Millions of Dollars)							
	NS	ON	MN	SK	AB	BC	CA
NS	$10.3	$9.7	$10.6	$9.3	$10.0	$10.5	$9.9
ON	$383.7	$361.8	$396.6	$352.9	$376.1	$391.7	$370.7
MN	$47.7	$44.7	$48.4	$44.3	$46.5	$48.5	$46.1
SK	$34.4	$32.0	$34.8	$31.1	$33.0	$35.2	$30.5
AB	$60.0	$55.5	$60.6	$56.6	$58.2	$60.8	$57.4
BC	$100.5	$93.8	$102.0	$95.2	$98.2	$101.8	$97.0
CA	$636.5	$597.4	$652.9	$589.5	$621.8	$648.5	$611.6
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	94.1	103.0	91.1	97.1	101.9	96.7
ON	106.0	100.0	109.6	97.5	103.9	108.3	102.4
MN	98.5	92.4	100.0	91.6	96.1	100.3	95.4
SK	110.4	102.8	111.9	100.0	106.0	113.1	97.9[13]
AB	103.1	95.3	104.1	97.3	100.0	104.5	98.7
BC	98.7	92.1	100.1	93.5	96.4	100.0	95.2
CA	104.1	97.7	106.8	96.4	101.7	106.0	100.0

Table 4-3 covers generic drugs only. The price of a generic is defined at the drug level rather than the DIN level in this section (and in the Appendix) in order to better capture the cost of the bioequivalent product to the province irrespective of the manufacturer. Results here are similar to those in Table 4-2, in all instances Saskatchewan is the lowest-cost province[14] on average when compared to each jurisdiction individually. Prices in Manitoba and British Columbia are again substantially above average. If Manitoba's drug plan program paid an average Canadian price, the cost of utilizing the same basket of products would have been 4.6% or $2 million lower. Similarly, if the cost claimed to British Columbia's Pharmacare program was the average Canadian price, the cost of utilizing the same basket of products would have been 4.8% or $3 million lower. It is important to note that in the case of British Columbia, there is a relatively significant difference between the price claimed to the drug plan and the price accepted by the drug plan. When the same analysis is conducted at the accepted drug price level rather than the claimed price level, the cost of purchasing British Columbia's basket at average Canadian prices is less than 1% lower. Conversely, it costs 6% more to purchase an average Canadian basket at British Columbia's claimed prices and 0.5% less at accepted prices (see Appendix A-3 for further detail on this issue of claimed versus accepted provincial prices). More analysis is required to fully understand the different pricing strategies used by generic manufacturers to set prices in different Canadian markets.

Table 4-3 Cross-Province Cost Estimates, 1999, Generic Drugs

Provincial Drug Plan Data Expenditure (Millions of Dollars)							
	NS	ON	MN	SK	AB	BC	CA
NS	7.2	7.0	7.5	5.9	7.1	7.3	7.0
ON	268.3	259.2	278.7	231.9	264.7	274.8	262.1
MN	37.8	36.3	38.6	33.4	37.0	38.4	36.8
SK	20.5	19.7	21.7	17.8	20.2	20.9	20.0
AB	43.6	41.8	44.1	39.3	42.8	44.3	42.4
BC	72.3	69.4	73.7	65.6	71.1	73.4	70.7
CA	449.6	433.3	464.4	393.8	442.8	459.2	439.0
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	97.0	104.0	82.0	98.4	102.2	97.7
ON	103.5	100.0	107.5	89.4	102.1	106.0	101.1
MN	97.9	94.0	100.0	86.4	95.7	99.4	95.4
SK	115.2	110.9	122.5	100.0	113.5	117.9	112.4
AB	101.8	97.5	103.0	91.8	100.0	103.4	99.0
BC	98.5	94.5	100.4	89.3	96.8	100.0	96.3
CA	102.4	98.7	105.8	89.7	100.9	104.6	100.0

5 Conclusion

Section 2 used a number of methods to examine variations in the factory-gate transaction prices of patented drugs among provinces. The results thus obtained uniformly indicate that province-specific factors such as market size, average levels of household income, demographic composition and provincial policies do not produce substantial inter-provincial price differences. No matter the method of inter-provincial comparison, prices observed across provinces stayed within narrow ranges, with substantial deviations (i.e., beyond plus-or-minus 2 percent) from Canada-wide average prices being rare. The analysis suggests that the patented industry does not segment the Canadian community pharmacy market and that provinces would not gain much in overall expenditure savings if prices within its borders were fixed at the Canada-wide average. An earlier PMPRB study[15] concluded that "for purposes of setting prices, patentees treat the Canadian market as one market and not ten different markets". This still seems true.

Section 3 and 4 compared prices derived from provincial drug plan data. These data suggest a somewhat greater degree of inter-provincial variation than PMPRB transactions data. This is to be expected, given the differing wholesale and retail mark-ups embodied in "claimed" prices. Ontario emerges as the province with the lowest prices, British Columbia as the province with the highest, although the accepted price in British Columbia is only 1.8 % above the Canadian average as compared to 4.3% for the claimed price. Taken at face value, the results of Section 3 and 4 suggest that prices in these two provinces may differ on average by 7 percent or more. Prices in Nova Scotia, Manitoba and Alberta also seem appreciably higher than those in Ontario.

The study shows that prices for patented products do not vary significantly across the country. On the other hand, greater price differences were detected for non-patented medicines and in particular multiple source medicines. Considerable inter-provincial divergence in distribution chain mark-ups and professional fees (pharmacy dispensing fees) was found. Period inter-provincial analysis remains a useful tool for investigating price levels across the country. Further analysis of non-patented multiple source drugs is required to gain an understanding of the source of the inter-provincial price differences identified in this analysis.

Appendix I

A.1 Ex-Factory Gate Inter-provincial Price Analysis

Table A-1 provides several statistics related to the distribution of provincial-to-Canada-wide price ratios observed within each province. Most importantly, the bottom two values in each column are the lower and upper limits of the 95 percent confidence interval centered on the mean provincial-to-Canada-wide price ratio in the corresponding province. (The mean ratio is given by the first entry in each column.) The importance of this interval is that any conjectured value of the true mean price ratio[16] outside its limits can be rejected by the standard statistical hypothesis testing procedure relevant to this case (i.e., the standard t-test). The interval can thus be interpreted as a range of reasonableness for conjectures about the true mean price ratio: intuitively, any conjectured value beyond this range is too far from the reported mean ratio to be believable.

Table A-1 Summary Statistics, 1999

PMPRB Data (Patented Drugs)										
	NF	PE	NS	NB	ON	QU	MN	SK	AB	BC
Mean Ratio	1.0120	1.0270	1.0050	1.0080	1.0000	1.0005	0.9980	1.0080	0.9990	1.0050
Median Ratio	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Standard Deviation	0.1670	0.2870	0.1970	0.0800	0.0310	0.0810	0.0890	0.2360	0.0580	0.0690
Minimum	0.2531	0.3626	0.2958	0.3391	0.6689	0.7425	0.0229	0.0500	0.6197	0.7457
Maximum	2.9258	5.2201	2.9887	2.1413	1.4005	2.1805	1.4138	4.0435	1.3933	2.1129
Lower 95% Confidence Limit	0.9957	0.9990	0.9858	1.0002	0.9970	0.9926	0.9893	0.9850	0.9933	0.9983
Upper 95% Confidence Limit	1.0283	1.0550	1.0242	1.0158	1.0030	1.0084	1.0067	1.0310	1.0047	1.0117

Interpreted in this way, the results in Table A-1 imply that in the larger provinces of Ontario, Quebec, Alberta and British Columbia, as well as Manitoba, all reasonable conjectures about the true mean price ratio are in the range of 0.99 to 1.02. Data for the smaller provinces produce somewhat broader ranges, but only in the case of P.E.I. does a true mean price ratio exceeding 1.035 seem plausible. In summary, the statistical evidence presented in Table A-1 indicates that, with the possible exception of P.E.I., any fundamental provincial bias toward prices greater or less than Canada-wide average prices are small.

A.2 Provincial Data: Inter-provincial Claimed Price Analysis

Table A-2 provides formal statistical evidence like that of Table A-1. Ontario and Alberta again emerge as low-cost provinces: the 95% confidence intervals reported for these provinces indicate a fundamental tendency for prices to be less than corresponding Canada-wide average prices. In contrast, the intervals for Nova Scotia, Manitoba and British Columbia all suggest a pronounced bias toward prices exceeding Canada-wide averages: in all three cases it is possible to statistically reject any conjectured value of the true mean provincial-to-Canada-wide price ratio less than 1.05. Results for Saskatchewan suggest a smaller positive bias.

Table A-2 Summary Statistics, Drug Plan Data, 1999

Provincial Drug Plan Data						
	NS	ON	MN	SK	AB	BC
Mean Ratio	1.06	0.96	1.07	1.03	0.99	1.09
Median Ratio	1.02	0.97	1.06	1.02	0.99	1.04
Standard Deviation	0.15	0.08	0.16	0.16	0.10	0.14
Minimum	0.66	0.52	0.52	0.54	0.51	0.86
Maximum	1.96	1.86	1.95	1.97	1.64	1.92
Lower 95% Confidence Limit	1.0549	0.9601	1.0593	1.0256	0.9812	1.0800
Upper 95% Confidence Limit	1.0715	0.9689	1.0763	1.0429	0.9916	1.0946

A.3 Provincial Data: Inter-provincial Accepted Price Analysis

The information presented in Table A-3 and A-4 corresponds to Table 3-5 and Table 4-3 in the main text. The analysis is based on accepted unit price rather than claimed unit price. This difference does not exist in all the drug plans included in this analysis, however, in the case of British Columbia, Saskatchewan and Nova Scotia, prices submitted (claimed) by pharmacies can be further reduced by the drug plan due to policies that put limits on distribution levels, low cost alternative (generic) policies and in the case of British Columbia reference based pricing.

The analysis presented in Table A-3 and Table A-4 reveals that the difference in price between claimed and accepted is most significant in British Columbia. Although British Columbia appeared to have one of the highest price claimed for generic products, the accepted price appears to be significantly lower. For example, in Tale 4-3 it was reported that it would cost 4.6% more to buy a Canadian basket of generic drugs at British Columbia claimed prices and 0.5% less if accepted prices were used.

Table A-3 Cross-Province Cost Estimates, 1999, Common Basket of All Drugs

Provincial Drug Plan Data (Accepted Cost) Expenditure (Millions of Dollars)							
	NS	ON	MN	SK	AB	BC	CA
NS	$20.9	$20.0	$21.0	$20.2	$20.7	$20.2	$20.3
ON	$902.9	$869.7	$914.2	$885.2	$905.9	$880.0	$882.4
MN	$115.8	$111.3	$115.9	$113.7	$115.6	$113.7	$113.3
SK	$77.6	$73.8	$77.9	$75.0	$76.6	$75.4	$72.8
AB	$148.5	$142.4	$149.0	$147.1	$148.4	$145.6	$145.0
BC	$222.2	$211.0	$223.0	$218.7	$221.3	$219.9	$215.8
CA	$1,487.9	$1,428.3	$1,500.9	$1,459.9	$1,488.6	$1,454.8	$1,449.7
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	96.1	100.6	96.7	99.3	96.7	97.5
ON	103.8	100.0	105.1	101.8	104.2	101.2	101.5
MN	99.9	96.1	100.0	98.2	99.8	98.2	97.8
SK	103.5	98.5	104.0	100.0	102.2	100.6	97.1
AB	100.1	96.0	100.4	99.1	100.0	98.1	97.7
BC	101.1	96.0	101.4	99.5	100.6	100.0	98.2
CA	102.6	98.5	103.5	100.7	102.7	100.4	100.0

Table A-4 Cross-Province Cost Estimates, 1999, Generic Drugs

Provincial Drug Plan Data (Accepted Cost) Expenditure (Millions of Dollars), 1999							
	NS	ON	MN	SK	AB	BC	CA
NS	7.2	7.0	7.5	5.9	7.1	6.8	7.0
ON	264.9	259.6	279.2	232.2	265.1	258.6	260.9
MN	37.6	36.4	38.7	33.5	37.1	36.7	36.7
SK	20.6	19.8	21.8	17.8	20.2	19.5	19.9
AB	43.5	41.9	44.3	39.5	43.0	42.7	42.4
BC	72.5	69.7	74.2	66.0	71.5	71.3	70.7
CA	446.3	434.4	465.7	394.9	444.0	435.6	437.7
Index							
	NS	ON	MN	SK	AB	BC	CA
NS	100.0	97.5	104.5	82.4	98.9	94.7	97.4
ON	102.0	100.0	107.5	89.4	102.1	99.6	100.5
MN	97.1	94.0	100.0	86.4	95.7	94.7	94.8
SK	115.7	110.9	122.4	100.0	113.5	109.4	111.6
AB	101.1	97.4	103.1	91.8	100.0	99.2	98.6
BC	101.7	97.8	104.0	92.6	100.3	100.0	99.2
CA	102.0	99.3	106.4	90.2	101.4	99.5	100.0

Endnotes

[1]The two territories were omitted from this analysis because of the limited number of drug products reported.
[2] For all customer types
[3] To the extent that per pill prices differ across package sizes, some of the marginal ex-factory price differences reported in this analysis may be a function of the frequency with which different package sizes are utilized in each jurisdiction.
[4]This basket consists of all DINs for which a positive price was observed in all provinces.
[5] Canada wide prices are defined by adding sales in all the provinces and dividing by the total quantity.
[6]The provincial drug plan data are not disaggregated by customer class. It is thus not possible in this instance to construct provincial-to-Canada-wide price ratios like those in Table 2-5.
[7] The provincial data is analyzed on a fiscal year basis whereas the PMPRB data is based on calendar year prices.
[8] It is possible that the "cost-to-operator" mechanism established by the Ontario Drug Benefit Program is driving this result. Further analysis is required to fully understand this result.
[9] Since patented drugs were used to review the inter-provincial retail differences, some of the inter-provincial price variations may also be driven by pricing strategies of manufacturers of non-patented drugs, particularly generics – a further analysis of generic and non-patented drugs is presented in Section 4.
[10] Claimed Price is used for in this section, for similar results based on accepted price refer to Appendix A.3
[11]Of 1329 DINs covered by Section 3 in 1999, 182 are patented (Table 4-1) and 1147 are non-patented (Table 4.2).
[12] The British Columbia Ministry of Health Services maintains a database which classifies drugs as brand or generic, this data, along with information from the PMPRB and Health Canada was used to uniformly classify drug products. Generally speaking, drugs produced by members of the Canadian Drug Manufacturers' Association were classified as generic; also manufacturers' that had more than 50% of drug plan expenditures accounted for by generic drugs were also classified as generic for the purpose of this analysis. Non-patented drugs include both brand and generic single source and multiple source drug products.
[13] Although Saskatchewan's utilization costs more to purchase at the price of any other jurisdiction, the average Canadian price results in a cost that is actually lower than the cost at Saskatchewan's prices. This apparently anomalous result is driven by the Saskatchewan's contribution to the Canadian price of products primarily used only in Saskatchewan plus the addition of products that are priced lower than in Saskatchewan.
[14] This result is consistent with the analysis presented in the "Pharmaceutical Trends 1995/96 – 1999/00" Report for Saskatchewan.
[15]*Interprovincial Price Comparisons (1988 - 1993)*, November, 1994.
[16]The theoretical model used here is one in which each observed price ratio is treated as a random drawing from a population distribution whose characteristics are unknown. We are principally interested in assessing the mean of the population distribution (i.e., the "true" mean price ratio), since this will reveal whether there is a fundamental tendency for provincial prices to be greater or less than corresponding Canada-wide average prices. It is important to understand that the mean price ratio reported in Table A-1 is merely an estimate of the population mean. As an estimate, it is subject to statistical variability; hence there is a need for hypothesis testing and calculation of confidence intervals.