COST DRIVER ANALYSIS OF PROVINCIAL DRUG PLANS

NOVA SCOTIA

1995/96 - 1998/99

Federal/Provincial/Territorial

Working Group on Drug Prices

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EXECUTIVE SUMMARY

- The Federal Provincial Territorial Task Force on Pharmaceutical Prices[1]0 was established to examine pharmaceutical pricing issues facing provincial drug plans and Canadians in general.
- This Study is an update which reports on pharmaceutical cost drivers in Nova Scotia Pharmacare Program and its beneficiaries over the period 1995/96 to 1998/99.
- An examination of cost drivers, produced by the Patented Medicine Prices Review Board (PMPRB) on behalf of the F/P/T Working Group on Drug Prices, provides both public and private drug plan managers, policy makers and other stakeholders, including consumers, with a better understanding of the major components that influence annual changes in pharmaceutical spending.
- The focus of the report was to disaggregate annual changes in the cost of drugs into five components: price effect, volume effect, entry of new drugs, exiting drugs and others. A further break out of cost drivers was done by therapeutic class and patent status.
- Between 1995/96 and 1998/99 total drug expenditures increased by $15.4 million. On average, between 1995/96 and 1998/99 per unit price changes seen by the province were responsible for -19.1% of the expenditure change, volume change or utilization was responsible 89.1%, entry of new drugs was responsible for 30.3% and exiting drugs and other factors were responsible for -0.5% and -0.2% of expenditures changes, respectively. The findings suggest that utilization and entry of new drugs accounted for the largest increase in expenditures over the period with expenditures rising significantly despite a little change in the average per unit price. The contribution of each of these factors changes dramatically from year to year. Further work is required to understand the sensitivity of the model, the impact of cost containment policies and the entry and market penetration of new drug therapies.
- In 1998/99, drugs that existed in 1995/96 and newer drugs (drugs that were introduced after 1995/96) accounted for 75.7% and 24.3%, respectively, of total drug expenditures.
- In 1995/96 the proportion of total expenditures accounted for by patented drugs was 36.3%. By 1998/99, patented drugs accounted for 49.8% of total expenditures.
- Among patented medicines, category 3 drugs made up the largest share of total patented drug expenditures. In 1998/99, drugs categorized as having little, moderate or no improvement (category 3) accounted for 59.0% of total patented drug expenditures. The share of line extension (category 1) and break through or substantial improvement (category 2) drugs were 35.6% and 1.8%, respectively.

[1] Presently known as F/P/T Working Group on Drug Prices

- In 1998/99, drugs in nine Anatomical Therapeutic Chemical (ATC) groups (Cardiovascular Systems, Alimentary Tract and Metabolism, Nervous System, Respiratory System, Anti-neoplastic and Immunomodulating Agents, Sensory Organs, Musculo-skeletal System, General Anti-infectives for Systemic Use, and Blood and Blood-Forming Agents) accounted for $67.3M or 94.6% of total expenditures.
- Over the period 1995/96 to 1998/99, drugs in the Cardiovascular Systems groups contributed to the largest share of the increase in drug expenditures, accounting for 46.9% of growth. This group was followed by drugs in the classes Alimentary Tract and Metabolism (19.1%), Respiratory System (7.9%) and Nervous System (6.5%).
- In order to identify which disease groups are contributing proportionately more to increases in pharmaceutical expenditures, the analysis was broken down to the second level of their ATC classification. The study revealed that Lipid Reducing Agents in Cardiovascular Systems had the highest contribution to percentage increases in expenditures over the period 1995/96 to 1998/99. The second largest contributor was Agents Acting on the Renin-Angiotensin System (also Cardiovascular Systems), followed by Antacids(Alimentary Tract and Metabolism). These disease groups contributed 31.4%, 20.8%, and 11.4%, respectively, to increases in pharmaceutical expenditures over the period 1995/96 to 1998/99.

COST DRIVER ANALYSIS OF PROVINCIAL DRUG PLANS

NOVA SCOTIA 1995/96-1998/99

1.0 Introduction

In April 1997, the Task Force on Pharmaceutical Prices[2] prepared an overview paper which provided a description of the pharmaceutical sector in Canada, price and expenditure trends, and existing mechanisms used by private and public payers for regulating and/or influencing pharmaceutical prices.

The Task Force on Pharmaceutical Prices has made progress in the following areas:

- price trend analyses for the period 1990 to 1997 for prescription drug products covered by six provincial drug plans;
- an analysis of the relationship between price levels of generic and brand name drugs over the period 1990 to 1997;
- international price comparisons for the 1996 top selling non-patented single source drug products;
- comparisons of prices of non-breakthrough or non-substantial improvement (category 3) patented drugs introduced in 1995 and 1996 to other medicines in their therapeutic class; and,
- a comparison of prescription drug prices in six provincial drug plans (1990-1997).

This study updates a report on cost drivers of total pharmaceutical spending in Nova Scotia Pharmacare Program over the period 1995/96 to 1998/99[3]. Information on prices, quantities, total expenditures and market shares were obtained from the Nova Scotia Pharmacare Program database. Health Canada's Drug Product database was used to ensure that only those drugs defined by the *Food and Drug Act* were included. The Drug Product database was also used to identify all drug products by their respective ATC classification. Finally, the Patented Medicine

[2] The Task Force has representatives from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Health Canada and the Patented Medicine Prices Review Board. It was established to examine one of six pharmaceutical issues identified at the April, 1996 meeting of F/P/T Ministers of Health. The other issues included utilization, marketing, wastage, consumer education and research and development. The work is overseen by the Pharmaceutical Issues Committee, which reports to the Advisory Council on Health Services (ACHS).

[3] The previous study was conducted on a calender basis and price was calculated at the DIN level, this study is based on a fiscal year and price is calculated at the chemical level, ie. price for a chemical with an identical ingredient, strength, route, schedule and form. This change in definition was adapted in order to capture the substitution within multi-source markets and represent the contribution of each cost driver component in the model.

Prices Review Board database was used to group drugs according to patent status and category.

The report is divided into the following sections: section 2 describes why a study of cost drivers provides important information to all stakeholders in the health care sector; section 3 describes the focal points of the cost driver analysis; section 4 reports on the growth of total drug costs in public and private drug plans for Nova Scotia over the period 1995/96 to 1998/99; section 5 presents the findings followed by a conclusion in section 6.

2.0 Why Study Cost Drivers?

An examination of cost drivers provides both public and private drug plan managers, policy makers and other stakeholders including consumers with a better understanding of the major components that influence annual increases and trends in pharmaceutical spending. During the 1990's, increases in the annual cost of drugs in Canada was, on average, approximately 10% per year[4]. This growth in total spending was occurring while average annual increases in overall prices was less than 3%[5]. This demonstrates that changes in annual costs of pharmaceuticals are reflective of a combination of many factors. These factors are summarized in Figure 1.[6]

Figure 1

Factors Affecting Total Drug Expenditures

1. Changes in the total population
2. Changes in the demographics and health status of the population (i.e. towards those with increased medication needs)
3. Changes in the unit prices of drugs (both patented and non-patented)
4. Changes in retail and wholesale mark-ups, and dispensing fees
5. Changes in the prescribing habits of physicians (i.e. from older, less expensive medications to newer, relatively more expensive medications [± improved therapeutic effect] to treat the same underlying diagnosis)
6. Changes in utilization of drugs on a per patient basis (i.e. more medications per patient per year)
7. Trends towards using drug therapy instead of other treatments (e.g. as alternatives to surgery in some cases)
8. New diseases to be treated and old diseases to be treated or better treated
9. Extended patent protection, barriers to entry and reduction in competition

[4] 1994 and 1996 had exceptionally low growth rates of approximately 3%

[5] Statistics Canada, CANSIM, Series P200202

[6] This figure was partly reproduced from the PMPRB's Discussion Paper, "*Examining the Role, Function and Methods of the Patented Medicine Prices Review Board.*", November 1997.

While it is difficult to quantify the relative effect that the above factors[7] may have on increases in drug costs, some studies have attempted to do so.[8] These studies have employed different methodologies to assess the impact of the different factors. The main findings from these studies are that price changes represent only one factor which influence changes in the total cost of drugs. Other important factors include utilization (i.e. changes in the amount of drugs consumed) and the influence from the introduction of new drugs.

[7] Another factor worth mentioning is the shift to community care over the last several years. In addition to replacing surgery, community based drug plans are experiencing utilization increases because more treatment is taking place in the community, that previously may have required hospitalization. An example of this trend is the growth in community based palliative care.

[8] See for example Green Shield Canada *"A Report on Drug Costs", 1994*; Gorecki, P.K., *"Controlling Drug Expenditures in Canada, The Nova Scotia Experience",* 1991; Angus, D.E. et al. *"Sustainable Health Care for Canadians",* 1995*;* and, Brogan Inc. (1998) "Handbook on Private Drug Plans: 1993 - 1996.

3.0 Focus of Report

This analysis attempts to break out annual changes in the cost of drugs into the following major components:

- annual volume (utilization) changes of older and newer drugs;
- annual price changes of older and newer drugs[9];
- annual influence from the introduction of new drugs (patented and non-patented); and,
- annual influence of newer drugs by therapeutic class or disease groups.

This analysis provides some insight into several factors outlined in Figure 1. Each of these factors is examined to assess their individual influence on annual drug cost changes. In other words, an evaluation of what percentage of the increase in annual cost of drugs is attributed to each of the above components will be done[10]. It is important to note that a more detailed review of price levels (rather than annual price change), substitution of older drugs and trends in treatment costs are areas that need to be considered in much greater detail in further research and analysis.

A further disaggregation of cost drivers by therapeutic class allows an investigation of whether certain disease groups are experiencing proportionately greater increases in annual costs. Furthermore, an investigation of the extent to which new drugs are being substituted for older drugs and the relative cost of new drugs to older drugs can be done. Finally, breaking out the drugs into patented and non-patented drugs allows us to examine drugs by therapeutic novelty. In other words, to what extent is the introduction of new patented drugs that are line extensions (category 1), breakthrough or substantial improvement drugs (category 2) or, moderate, little or no improvement drugs (category 3) influencing annual changes in drug costs.

[9] New drugs are defined at the chemical, dose, form and route level. Generic bioequivalent products are not considered as new drugs in the major component decomposition.

[10] See Appendix 1 for methodology details and methodological and definitional changes from previous cost driver studies.

4.0 Trends in Nova Scotia Drug Expenditures

The Nova Scotia Pharmacare Program has undergone some major changes over the past few years and hence, a brief description of the Pharmacare Program may be helpful.

4.1 General Information

The Nova Scotia Government provides prescription drug coverage through both the Department of Health (DOH) and the Department of Community Services (CS). The Seniors' Pharmacare Program began October 1, 1974, Community Service Pharmacare Plans, began in September 1, 1975 and the first Special Drug Plan began October 1, 1976, with new special drug plans being added as recently as August 1, 1998. The Programs are administered by Maritime Medical Care Inc. for the Insured Programs Branch of the Nova Scotia Department of Health. See Appendix 2 for detailed information on eligibility.

4.2 Major Changes since 1990

- In 1990, Maximum Allowable Cost (MAC) was introduced: only pay lowest in interchangeable category; Co-pay introduced: $3.00 per prescription to an annual maximum of $150.
- In 1991, Co-pay increased to 20% per prescription to an annual maximum of $150.
- In 1993, Co-pay increased to $400 per year maximum for non-GIS (Guaranteed Income Services) Seniors', $150 per year for low income Seniors' (GIS); Trial Prescription Program (part-fill on high cost drugs with high incidence of ADR).
- In 1995, the new Nova Scotia Senior's Pharmacare Program was implemented with an annual premium of $215 per year. A maximum co-payment level was set at $200 for all registered Seniors' (previously at $150 for GIS recipients and $400 for non-GIS recipients). A rebate plan was also set up with a maximum payment of $300 for low income Seniors'.
- June 1996 - New Formulary Published
- September 1996 - Seniors were permitted to opt out of Nova Scotia Seniors Pharmacare Program.
- Other benefit adjustments: de-listed cough and cold preparations, antihistamines, compounds, anorexients, oral vitamin and mineral preparations, calcium supplements, exception status for high cost specialized drugs.
- November 1997, Professional Fee was set at $8.65; if drug cost was over $105 the professional fee increased to $12.98 (1.5 times the regular professional fee).

4.3 Total Retail Private and Public Drug Expenditures[11]

Since the early 1980s, drug expenditures in Nova Scotia, as in the rest of Canada, have been the fastest growing component of total health care spending. In 1997 expenditures grew by 10.6% and 4.7% in 1998. These rates are faster than the annual rate of inflation, as measured by the Consumer Price Index (CPI) during this period.

In 1998 total retail spending on prescription drugs was $315.2 million which was divided into public spending at $134.1 million and private spending at $181.1 million.[12] The provincial drug plan portion or public expenditures of prescription drug plans portion was $94.7 million or 70.6% of total public expenditures in 1998. Public (other) comprises the remaining 29.4% or $39.4 million, which represents drug expenditures in hospitals and federal programs. Total retail spending, i.e. public and private spending including OTC drugs, was $427.2 million in 1998. Total spending (public and private) on prescription drugs was 73.8% of total retail spending.

Over the years, the share of total public spending as a part of total spending has remained steady. In 1995, total public spending accounted for 31.3% of total spending. In 1998, total public spending accounted for 33.4% of total spending.

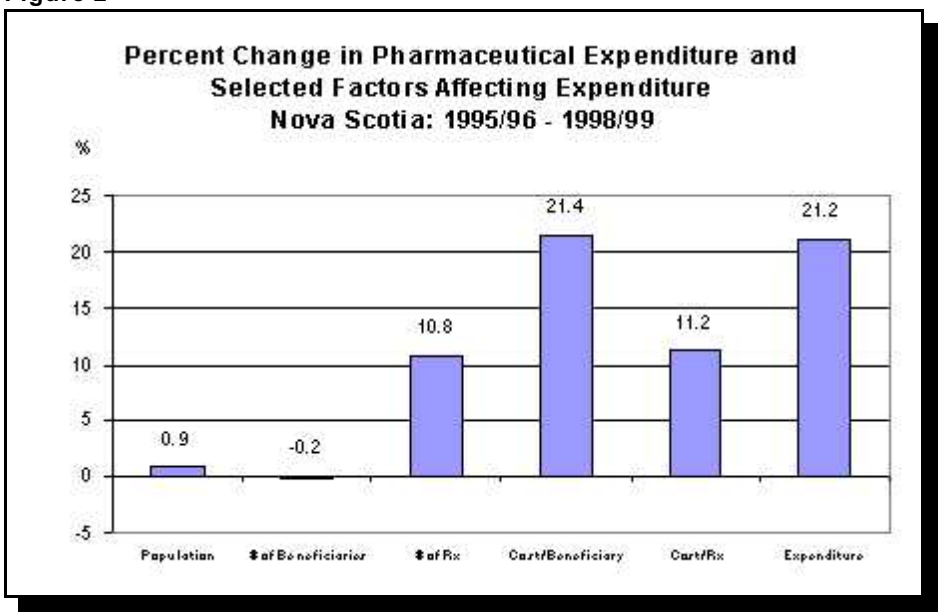
4.4 Factors Affecting Pharmaceutical Expenditures

Figure 2 summarizes some of the important factors described above in Figure 1 that may have contributed to growth in total pharmaceutical expenditures over the period 1995/96 to 1998/99. The figure shows that Nova Scotia's population increased by 0.9% over this period. Prescriptions per capita covered under public programs rose by 9.9%. The average cost per prescription rose by 11.2%.

[11] The figures used in this section are based on Health Canada and CIHI numbers. Expenditure levels used for 1998 are preliminary estimates.

[12] Private spending includes co-pays and deductibles payed by beneficiaries of provincial prescription drug plans.

Figure 2



It is important to note that many factors may influence the cost of a prescription. These include: manufacturers' unit price; wholesale and retail mark-ups; changes in the size of prescriptions; changes in prescribing habits of physicians (i.e. from older less expensive therapies to newer relatively more expensive ones); the trend towards using drug therapy instead of other treatments; and, the inclusion of new indications and new drugs for diseases in which drug therapy was not previously available .

Section 5 below provides a more complete evaluation of the relative magnitude different factors have on changes in annual drug expenditures.

5.0 Analysis

5.1 Drug Expenditures in Nova Scotia's Pharmacare: 1995/96 to 1998/99[13]

During the period 1995/96 to 1998/99, total Nova Scotia Pharmacare expenditures on drug products considered in this analysis increased from $56.0 million to $71.4 million. These amounts differ from the total Pharmacare expenditures, for the following reasons:

- drugs were only included in this analysis if they could be matched to those drugs in the Health Canada Health Protection Branch (HPB) database;
- the expenditure figures do not include dispensing fees and non-drug expenditures such as diagnostic test strips.
- the expenditure figures include patients portion of the accepted ingredient cost[14];

5.2 Breakdown of Changes in Expenditure by Components

The change in total annual expenditures has been broken out into the following components: Price Effect, Volume Effect, Entry of New Drugs, Exiting drugs and Others[15]. Table 1 summarizes the relative contribution each of the above components have on the total annual change in expenditures.

[13] Expenditures represent claimed drug cost for seniors plans

[14] Expenditures were based on total approved acquisition cost as this was the only available field which excluded pharmacy mark-up and dispensing fees; thus the patients portion of the drug cost is included in the expenditures. It is important to note that for the purpose of the major component decomposition, it was necessary to estimate the actual claimed price in the community. As it is standard practice in Nova Scotia to submit the MAC price rather than the actual acquisition cost of those drugs part of the MAC program, the manufacturer's list price was used rather than the claimed price.

[15] Others represent the cross effect of price and volume. The cross effect is an interaction term between changes in prices and changes in quantity. That is, it is a measure of the correlation between price changes and the quantity changes. If a large change in price corresponds with a large change in quantity the cross effect will be significant. The negative sign indicates that the changes are moving in opposite directions and are significant in magnitude. A negative cross effect is recorded when a large decrease in price is accompanied by a large increase in quantity, or conversely, a large increase in price is accompanied by a large decrease in quantity.

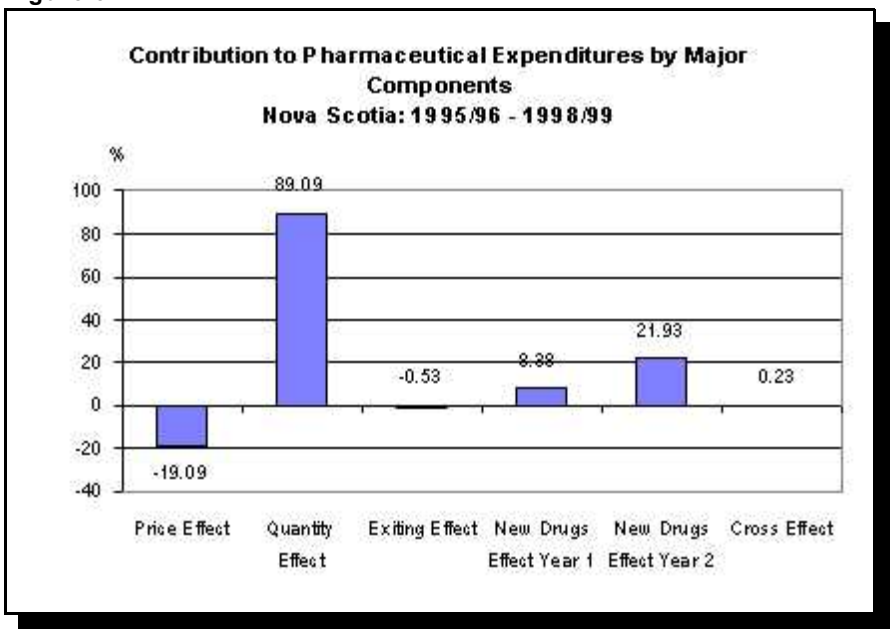
Table 1

Average Contribution to Pharmaceutical Expenditures by Major Components
Nova Scotia: 1995/96 - 1998/99

Year	Price Effect (%)	Quantity Effect (%)	Exiting Drugs Effect (%)	New Drugs Effect Year of Introduction (%)	New Drugs Effect Second Year (%)	Cross Effect (%)
1996/97	-80.00	171.90	-1.30	14.00	0.00	-4.50
1997/98	-31.30	80.20	-0.60	10.80	43.00	-2.10
1998/99	2.70	68.30	-0.30	5.90	20.90	2.40
Average	-19.09	89.09	-0.53	8.38	21.93	0.23

On average, between 1995/96 and 1998/99 per unit price changes seen by the province were responsible for -19.1%[16] of the expenditure change, volume change or utilization was responsible for 89.1%, entry of new drugs was responsible for 30.3%, and exiting drugs and other factors were responsible for -0.5% and 0.2% of expenditures changes. The findings demonstrate that utilization and the entry of new drugs accounted for the largest increase in expenditures over the period. Table 1 also indicates that the impact of new drugs was significant in both the year of their introduction (8.4%) and the following year (21.9%).

Figure 3



[16] It is important to note that this does not mean that prices declined by 19.09% over the time frame, a marginal decline in a popular drug may drive large negative price effects, as well, the introduction of generic substitution played an important role in reducing the cost of multiple source markets over the period of analysis.

The findings presented above suggest that increases in utilization and coverage of new drugs significantly influence annual changes in expenditures. The expenditure decomposition provides a sense of the relative importance of changes in utilization of existing and newer drugs. It is important to keep in mind that the effects reported represent the relative impact each component had on changes in expenditure levels. The negative price effect in this analysis is greatly influenced by generic competition, which reduces the cost of the entire therapeutic class, and cost containment policies. Absolute price reductions at the DIN level, particularly of top selling newer drug products, are not the main source of the large negative price effect. Future analysis of price level of new drugs and changes in prescribing patterns toward newer therapies; changes in treatment costs and/or the price levels (rather than annual change); marketing strategies for new drugs, rate of new drug market penetration and displacement of older drugs, and impact of public policy would provide more insight into results presented above.

Table 2 breaks out annual total expenditures into "existing" drugs and "newer" drugs. Existing drugs are those drugs that were on the market in 1995/96, i.e., drugs that were introduced in 1995/96 or before. Newer drugs are those drugs that were introduced in 1996/97 or during subsequent years. Expenditures on drugs that existed in 1995/96 fell by an average of 1.1% between 1995/96 and 1998/99, while expenditures on all drugs increased by an average of 8.4% over this period. The share of expenditures on newer drugs rose steadily throughout this period.

Table 2

Pharmaceutical Expenditures
Nova Scotia: 1995/96 -1998/99
(million of dollars)

	All Drugs 1995/96 - 1998/99			Existing Drugs 1995/96 - 1998/99		
Year	Total Expenditure	Difference in Expenditure	% Growth Rate	Total Expenditure	Difference in Expenditure	% Growth Rate
1995/96	56.00	-	-	56.00	-	-
1996/97	58.80	2.80	5.00	56.30	0.30	0.50
1997/98	61.50	2.70	4.60	52.70	-3.60	-6.40
1998/99	71.40	9.90	16.10	54.10	1.40	2.70

Figure 4 shows the contribution of each component as a percentage of average growth. Pharmaceutical expenditures were increasing on average at a rate of 8.4% during the period 1995/96 to 1998/99. Figure 4 shows that both utilization and new drugs were largely responsible for growth in expenditures.

Figure 4

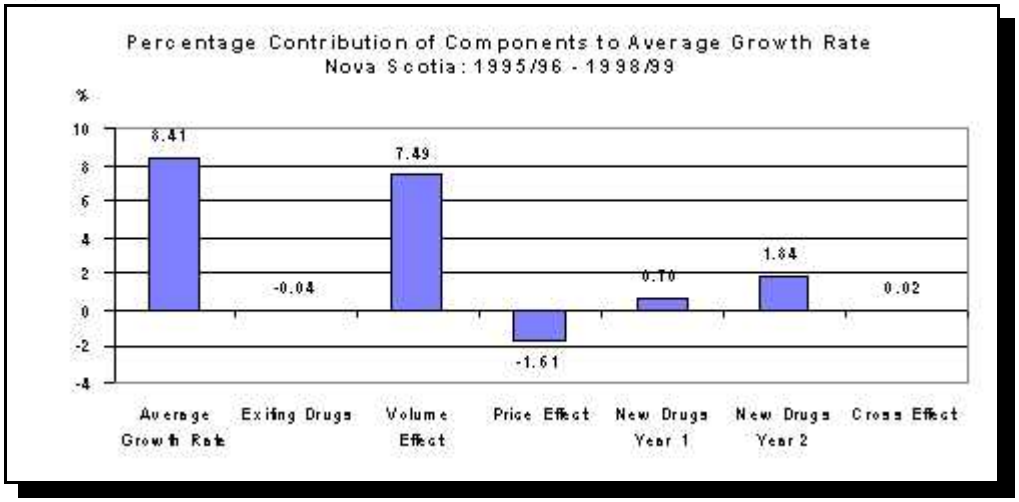


Figure 5 corresponds to Table 2, in that it shows the trends of expenditures on all, new and existing drug products. Figure 5 illustrates that as expenditures on existing drug products were falling over the years, expenditures on new drug products were increasing causing total expenditures to rise. Other than replacement of newer drug products for older drug products, there may be several reasons why expenditures on existing drug products were falling. Prices of older products may have fallen as they were aging, or there may have been switching to other existing less expensive products in response to policy changes. These factors require further analysis.

Figure 5

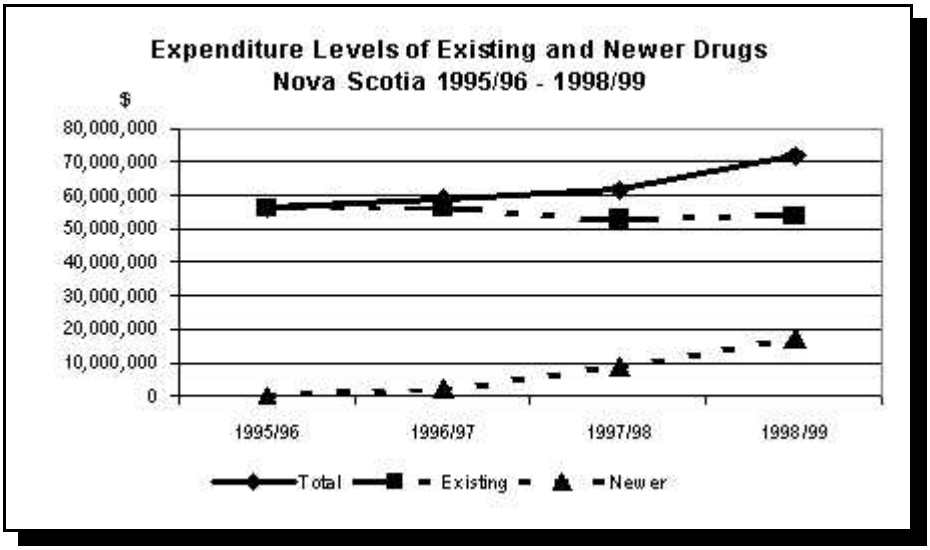
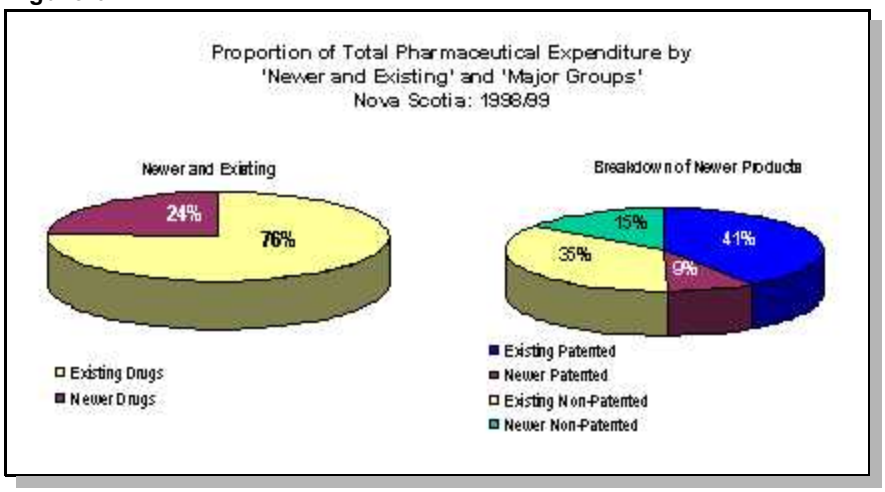


Figure 6 breaks out total pharmaceutical expenditures into expenditures on newer and existing drugs. Newer drugs accounted for 24.3% of expenditures in 1998/99. In 1995/96, the proportion of patented and non-patented expenditures in total drug costs were 36.3% and 63.7%, respectively. In 1998/99 the share of expenditures absorbed by patented drugs had increased to 49.8%. More than four-fifths of these expenditures on patented pharmaceuticals were for existing drugs. The growth in patented drug expenditures is consistent with the impact of increased patent protection resulting from the passing of Bills C-22 and C-91 in 1987 and in 1993[17].

[17] This is consistent with overall growth in the share of patented drugs as reported by the PMPRB (1998). See S-9811, Trends in Patented Drug Prices.

Figure 6



5.3 Breakdown of Pharmaceutical Expenditure: (By Patent Status and Category)

Figure 7 shows the share of patented and non-patented drug products in total pharmaceutical expenditures. The patented portion is broken out into category 1 (line extensions of an existing drug product); category 2 (a breakthrough drug or substantial improvement over an existing drug product); category 3 (moderate, little or no improvement over an existing drug product) and older non-categorized patented drug products. However, it should be noted that, while the expenditures for category 1, category 2 and category 3 drug products are reported separately, they are often different brands, strengths and dosage forms of a single medicine. Category 1 products are sometimes a line extension of a category 2 or category 3 product and a category 3 drug product is often a moderate, little or no improvement over a category 2 product.[18]

[18] For example, the Asthma medication Budesonide is available in many brands, strengths and dosage forms. Pulmicort Inhaler and Pulmicort Spacer, which are two different dosage forms of the brand Pulmicort, were introduced in 1988 as moderate improvements (category 3). Pulmicort Turbuhaler was introduced in 1990 as a line extension (category 1) and Pulmicort Nebuamp was introduced in 1992 as a breakthrough (category 2) product. Also, for example, Losec (20 mg/Cap) a brand of the medicine Omeprazole was introduced as a breakthrough (category 2) product in 1989. Losec (20 mg/Tab) was reintroduced in the same strength but different dosage form as a line extension (category 1) in 1996.

Figure 7

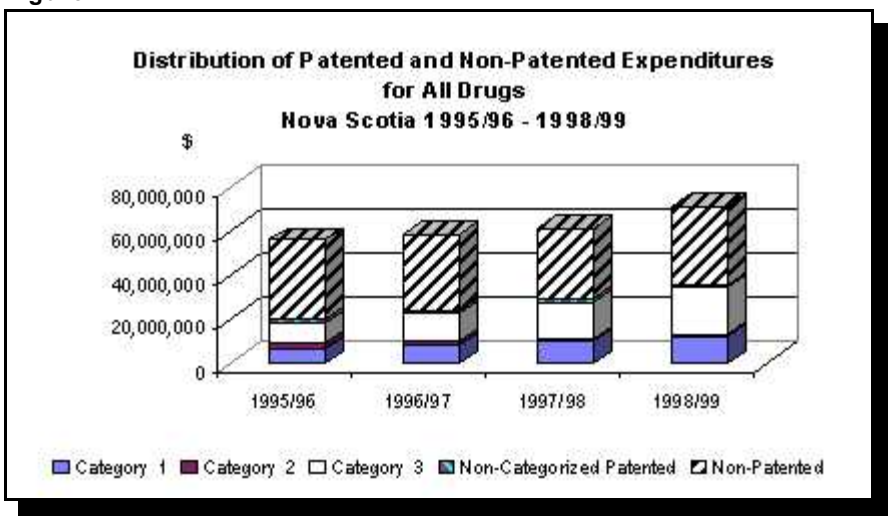


Figure 7 shows that in 1995/96 of the $20.3 million of expenditures accounted for by patented drugs, category 1 drugs made up 34.5% ($7.0 million) , category 2 drug products accounted for 10.6% ($2.2 million) , category 3 drug products accounted for 43.9% ($8.9 million) and older non categorized drug products accounted for 11.0% ($2.2 million) . In 1998/99 of the $35.5 million of expenditures accounted for by patented drugs category 1 drugs made up 35.6% ($12.7 million) , category 2 drugs accounted for 1.8% ($0.7 million), category 3 drugs accounted for 59.0% ($21.0 million), and older non-categorized patented products accounted for 3.5% ($1.3 million) of total patented expenditures.

5.4 Growth of Expenditures on Newer Drug Products

The information in Table 3 demonstrates how fast the market responds to new drugs. For example, expenditures on drugs introduced in 1995/96 were $2.5 million in that year, but had risen to $7.2 million in 1998/99. A similar increase in expenditures following the year of introduction can be observed for drugs that appeared in 1997/98. However, it should be noted that, depending on the month of introduction, expenditures during the year of introduction may represent expenditures of a "partial" year. For example, if a drug was introduced in July of any year, the data on expenditures would represent expenditures for six months only.[19]

[19] Expenditures on new drugs increased by an average of 36.8% between the second and first full year after their introduction.

Table 3

Expenditure on Newer Drug Products
Nova Scotia: 1995/96 - 1998/99
(millions of dollars)

Year of Introduction	1996/97	1997/98	1998/99
1996/97	2.49	5.29	7.24
1997/98	n/a	3.54	8.09
1998/99	n/a	n/a	2.00
Total	2.49	8.83	17.33

5.5 Therapeutic Class Analysis

In order to identify which disease groups are contributing proportionately more to increases in pharmaceutical expenditures, the analysis is broken down to the second level of their ATC classifications. The second level of the ATC classification groups drugs of different pharmacological classes that have the same main therapeutic use. Sixteen therapeutic classes were identified based on their level of expenditures relative to other therapeutic classes. Table 4 shows the percentage contribution of the top sixteen therapeutic classes in total expenditures and their contribution to the changes in expenditures between 1995/96 and 1998/99.

The top sixteen therapeutic classes, which were approximately 15% of the total number of therapeutic classes (at second level), accounted for 85.6% of total pharmaceutical expenditures in 1998/99.

Table 4 shows the percentage contribution of the top sixteen second-level therapeutic classes to total expenditures, as well as the contribution of each of the nine first-level ATC groups to which these sixteen therapeutic classes belong. (These nine ATC groups are: Cardiovascular Systems, Alimentary Tract and Metabolism, Nervous System, Respiratory System, Anti-neoplastic and Immunomodulating Agents, Sensory Organs, Musculo-skeletal System, General Anti-infectives for Systemic Use, and Blood and Blood-Forming Agents. Expenditures on these nine ATC groups were $67.3 million or 94.4% of total expenditures in 1998/99.

The second-to-last column in Table 4 shows the contribution of each of the eight ATC groups and top sixteen therapeutic classes to the total increase in expenditures between 1995/96 and 1998/99. Among the nine first-level ATC groups drugs related to the Cardiovascular System made by far the largest contribution to the increase in expenditures (46.9%), followed by drugs related to the Alimentary Tract and Metabolism (19.1%) and Respiratory System (7.9%).

Among the second-level therapeutic classes, Lipid Reducing Agents (Cardiovascular Systems) made the largest contribution to expenditure growth. The second largest contributor was Agents Acting on the Renin-Angiotensin System (Cardiovascular Systems), followed by Antacids (Alimentary Tract and Metabolism) . These disease groups contributed 31.4%, 20.8%, and 11.4%, respectively, to increases in pharmaceutical expenditures over the period 1995/96 to 1998/99. Anti-asthmatics (7.4%) and Psychoanaleptics (6.9%) also contributed significantly to expenditure growth.

Table 4

Percentage Contribution of Selected Therapeutic Classes to Total Drug Cost Expenditure
Nova Scotia: 1995/96 - 1998/99
(Seniors)

Therapeutic Class	ATC	Contribution in 1995/96		Contribution in 1998/99		% of Total Expenditure Change	Average Rate of Expenditure Growth
		Thousands of dollars	% of Total Expenditure	Thousands of dollars	% of Total Expenditure		
Alimentary Tract and Metabolism	A	8,853	15.80	11,777	16.50	19.05	10.00
Antacids and drugs used to treat peptic ulcer and flatulence	A02	4,712	8.40	6,460	9.00	11.39	11.00
Antispasmodics and anticholinergis agents and propulsives	A03	1,844	3.30	2,114	3.00	1.76	5.00
Drugs used for diabetes	A10	1,679	3.00	2,401	3.40	4.70	13.00
Others		618	1.10	803	1.10	1.21	9.00
Blood and blood forming agents	B	853	1.50	1,570	2.20	4.67	23.00
Antithrombotic agents	B01	779	1.40	1,510	2.10	4.76	25.00
Others		74	0.10	60	0.10	-0.09	-7.00
Cardiovascular system	C	24,820	44.30	32,019	44.90	46.89	9.00
Cardiac therapy	C01	3,268	5.80	2,649	3.70	-4.03	-7.00
Beta blocking agents	C07	3,048	5.40	3,676	5.10	4.09	6.00
Calcium channel blockers	C08	8,988	16.00	8,234	11.50	-4.91	-3.00
Agents acting on the renin-angiotensin system (ACEI)	C09	5,295	9.40	8,488	11.90	20.80	17.00
Serum lipid reducing agents	C10	3,039	5.40	7,856	11.00	31.38	37.00
Others		1,180	2.10	1,116	1.60	-0.42	-2.00
General anti-infectives for systemic use	J	2,296	4.10	1,897	2.70	-2.60	-6.00
Antibacterials for systemic use	J01	2,065	3.70	1,645	2.30	-2.74	-7.00
Others		231	0.40	252	0.40	0.14	3.00
Anti-neoplastic and immunomodulating agents	L	1,883	3.40	2,954	4.10	6.98	16.00
Anti-neoplastic agents	L02	1,564	2.80	2,578	3.60	6.61	18.00
Others		319	0.60	376	0.50	0.37	6.00
Musculo-skeletal system	M	2,235	4.00	2,143	3.00	-0.60	-1.00
Anti-inflammatory and anti-rheumatic products	M01	1,984	3.50	1,337	1.90	-4.21	-12.00
Others		250	0.40	806	1.10	3.62	48.00
Nervous system	N	5,482	9.80	6,481	9.10	6.51	6.00
Psycholeptics	N05	1,410	2.50	1,095	1.50	-2.05	-8.00
Psychoanaleptics	N06	1,747	3.10	2,812	3.90	6.94	17.00
Others		2,326	4.10	2,574	3.60	1.62	3.00
Respiratory system	R	4,955	8.80	6,165	8.60	7.88	8.00

Therapeutic Class	ATC	Contribution in 1995/96		Contribution in 1998/99		% of Total Expenditure Change	Average Rate of Expenditure Growth
		Thousands of dollars	% of Total Expenditure	Thousands of dollars	% of Total Expenditure		
Anti-asthmatics	R03	4,745	8.50	5,887	8.20	7.44	7.00
Others		209	0.40	278	0.40	0.45	10.00
Sensory Organs	S	1,449	2.60	2,339	3.30	5.80	17.00
Opthalmologicals	S01	1,408	2.50	2,304	3.20	5.84	18.00
Others		41	0.10	35	0.00	-0.04	-5.00
Subtotal ATC - Level 2		**47,578**	**85.0**	**61,045**	**85.6**	**87.72**	**3.62**
Subtotal ATC - Level 1		**52,826**	**94.3**	**67,345**	**94.4**	**94.58**	**3.53**
Grand Total		**56,038**	**100.0**	**71,389**	**100.0**	**100.00**	**8.41**

The share of Lipid Reducing Agents rose from 5.4% in 1995/96 to 11.0% of total expenditures in 1998/99. Agents Acting on the Renin-Angiotensin System accounted for 9.4% of total expenditures in 1995/96. This share rose to 11.9% of total expenditures by 1998/99. Antacids rose from 8.4% of total expenditures in 1995/96 to 9.0% in 1998/99.

Table 5 reports on the average component contribution to expenditure change for the top 16 second-level therapeutic classes. Generally speaking, the average trends reported in Table 1 are consistent with the average reported for the top 16 classes. There are, however, some interesting exceptions. For instance, although price change contributes a negative impact on average, in the case of Agents Acting on the Renin-Angiotensin System price change is responsible for 17.4% of the increase in expenditures. In the case of Calcium Channel Blockers, on the other hand, the negative price impact was much more pronounced than the average for all drugs. The variations reported below suggest that therapeutic markets are different, understanding these differences and the reasons behind them is one of the future research challenges.

Table 5

Average Contribution to Pharmaceutical Expenditures by Major Disease Groups for the Top 16 Therapeutic Classes Nova Scotia: 1995/96 - 1998/99

Therapeutic Class	ATC	Average Price Effect (%)	Average Quantity Effect (%)	Average New Drug Effect Year 1 (%)	Average New Drug Effect Year 2 (%)	Average Exiting Effect (%)	Average Cross Effect (%)
Antacids and drugs used to treat peptic ulcer and flatulence	A02	-3.10	96.20	1.40	6.70	-0.30	-0.90
Antispasmodics and anticholinergic agents and propulsives	A03	-15.60	114.60	0.50	0.50	0.00	0.00
Drugs used for diabetes	A10	-4.50	105.00	0.40	0.10	-0.20	-0.80
Anti-thrombotic agents	B01	0.40	92.40	4.90	2.20	-0.10	0.20
Cardiac therapy	C01	-167.40	84.30	0.30	0.50	-0.40	-17.30
Beta Blocking agents	C07	-57.40	153.50	0.40	11.90	0.00	-8.30
Calcium channel blockers	C08	-217.30	82.70	0.70	2.30	0.00	31.60
Agents acting on the renin-angiotensin system	C09	17.40	56.20	19.30	6.30	0.00	0.90
Serum lipid reducing agents	C10	-6.30	70.90	5.60	29.90	0.00	-0.20
Anti-bacterials for systemic use	J01	-16.20	-90.60	6.40	4.10	-1.80	-1.80
Endocrine therapy	L02	17.40	-6.00	19.20	72.90	-0.90	-2.50
Anti-inflammatory and anti-rheumatic agents	M01	-28.70	-91.00	1.50	23.90	-0.30	-5.40
Psycholeptics	N05	-5791.00	2157.20	1009.80	2819.30	-186.60	91.30
Psychoanaleptics	N06	-18.00	112.60	2.00	3.90	0.00	-0.40
Anti-asthmatics	R03	-18.60	86.20	12.90	26.30	-0.10	-6.60
Opthalmologicals	S01	-2.70	5.10	37.90	60.00	-0.20	0.00
Average		-25.40	87.70	12.40	25.80	-0.30	-0.20

Following is a detailed analysis of the impact of existing and newer drugs for Lipid Reducing Agents, Lipid Reducing Agents and Antacids. Refer to Appendix 4 for background details on ATC classification system and detailed analysis of the remaining therapeutic classes.

Serum Lipid Reducing Agents

Expenditures in this therapeutic class had the highest average annual growth (37.0%) among the top sixteen therapeutic classes. Table 4 shows that expenditures rose from $3.0 million in 1995/96 to $7.9 million in 1998/99.

In 1995/96 patented drugs accounted for 77.0% of total expenditures in this therapeutic class, increasing slightly to 79.6% in 1998/99. Category 3 drugs absorbed 30.0% of expenditure in 1995/96. This share had risen to 51.3% by 1998/99. Expenditures on Category 2 drugs, accounting for more than a third of expenditures in 1995/96, were negligible (0.3%) by 1998/99.

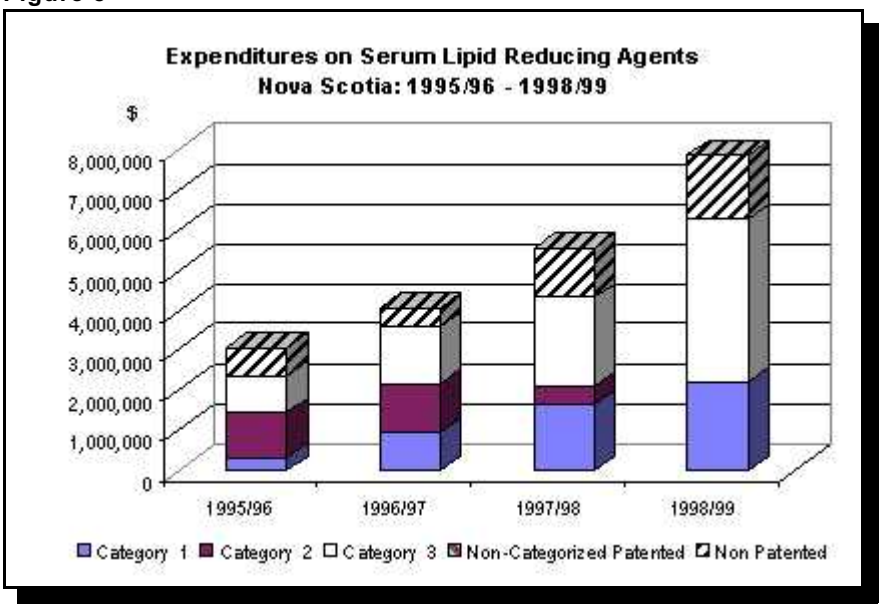
In 1998/99, the top three drug products in this class were Zocor (Tab 20 mg), Lipitor (Tab 10mg) and Pravachol (Tab 20 mg). These products accounted for $1.1 million, $1.1 million and $1.1 million in expenditures, respectively.

Table 6

Impact of Existing and Newer Drug Product by Major Disease Groups
Serum Lipid Reducing Agents
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96	-	281	264	230	191
1995/96	1	330	934	1,475	1,887
1995/96	2	1,099	1,231	457	26
1995/96	3	1,250	1,524	1,998	2,355
1995/96	NC	80	63	45	29
1996/97	-	0	10	19	11
1996/97	1	0	12	161	313
1997/98	-	0	0	953	1,369
1997/98	1	0	0	0	0
1997/98	3	0	0	219	1,619
1998/99	-	0	0	0	0
1998/99	3	0	0	0	55
1998/99	NC	0	0	0	0
Total Expenditures		3,038	4,040	5,559	7,853
Patented Expenditures		2,342	3,564	4,307	6,253
Non-Patented Expenditures		696	476	1,252	1,600

Figure 8



Agents Acting on the Renin-Angiotensin System (ACEI):

Expenditures in this therapeutic class grew at an average annual rate of 17.0%.

In 1995/96, patented drugs accounted for 44.5% of expenditures on this therapeutic class. Expenditures on patented products were heavily concentrated on category 3 drugs. By 1998/99, the patented drug share had risen to 80.3% of total expenditures, with almost all of this being category 3 drugs.

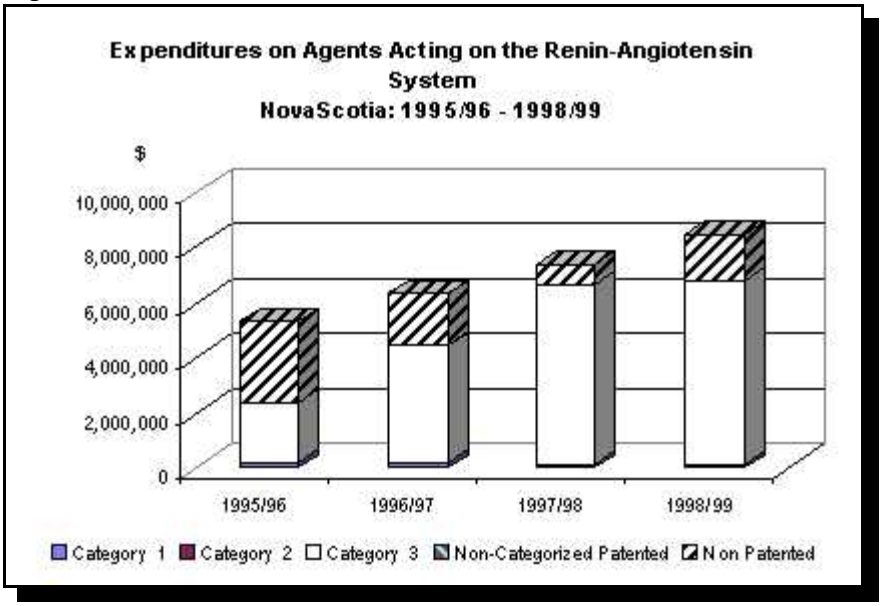
In 1998/99 the top three drug products in this class Vasotec (Tab 5 mg), Vasotec (Tab 10mg) and Cozaar (Tab 50mg). These products accounted for $1.4 million, $1.2 million and $0.7 million in expenditures, respectively.

Table 7

Impact of Existing and Newer Drug Product by Major Disease Groups
Agents Acting on the Renin-Angiotensin System (ACEI)
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		2,938	1,889	636	728
1995/96	1	186	155	106	64
1995/96	3	2,160	4,274	6,491	6,486
1995/96	NC	12	12	22	64
1996/97		0	8	29	38
1996/97	3	0	0	0	5
1997/98		0	0	38	248
1997/98	1	0	0	6	82
1997/98	3	0	0	33	168
1998/99		0	0	0	530
1998/99	3	0	0	0	75
Total Expenditures		5,298	6,337	7,360	8,487
Patented Expenditures		2,359	4,441	6,659	6,816
Non-Patented Expenditures		2,939	1,896	701	1,671

Figure 9



Antacids and Drugs Used to Treat Peptic Ulcer and Flatulence:

Total expenditures in this therapeutic class rose from $4.7 million in 1995/95 to $6.5 million in 1998/99, with the share of patented drugs rising from 22.7% to 33.2%. This increase was largely driven by increased expenditures on category 1 drugs, whose share of total expenditures rose from 8.8% of total expenditures 27.4% over this period.

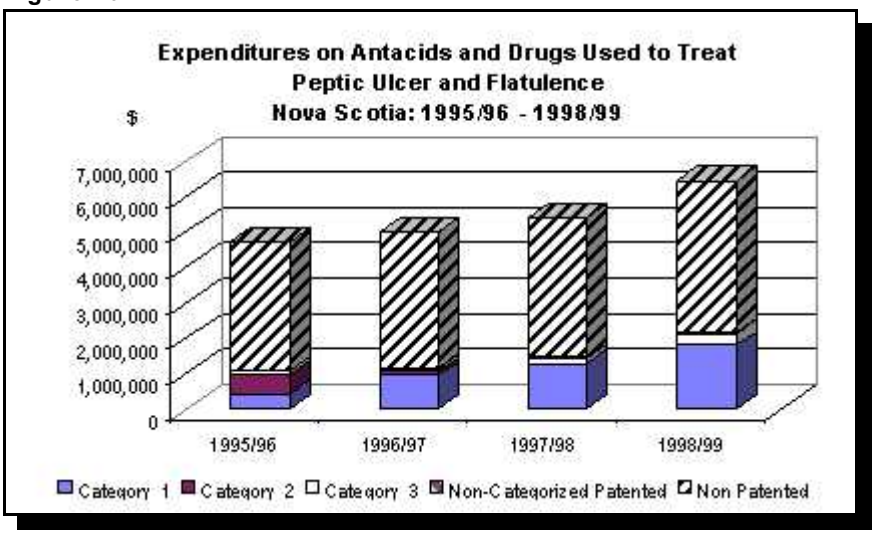
In 1998/99, the top three drug products in this class were Losec (Tab 20mg), Novo-Ranidine (Tab 150mg) and Gen-Ranitidine (Tab 150mg). These products accounted for $1.5 million, $1.4 million and $0.8 million in expenditures, respectively.

Table 8

Impact of Existing and Newer Drug Product by Major Disease Groups
Antacids and Drugs Used to Treat Peptic Ulcer and Flatulence
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		3,143	3,028	2,743	2,772
1995/96	1	458	977	1,319	1,812
1995/96	2	533	100	2	0
1995/96	3	101	113	145	226
1995/96	NC	477	503	472	500
1996/97		0	276	672	876
1996/97	3	0	5	17	19
1997/98		0	0	23	111
1997/98	1	0	0	1	7
1997/98	3	0	0	11	115
1998/99		0	0	0	15
1998/99	1	0	0	0	8
Total Expenditures		4,708	5,002	5,402	6,459
Patented Expenditures		1,069	1,168	1,463	2,145
Non-Patented Expenditures		3,639	3,834	3,939	4,314

Figure 10


Expenditures on Antacids and Drugs Used to Treat
Peptic Ulcer and Flatulence
Nova Scotia: 1995/96 - 1998/99
$
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

6.0 Conclusions

The study reports on the cost drivers of total pharmaceutical spending in Nova Scotia's Pharmacare Program over the period 1995/96 to 1998/99.

During the period under review, expenditures increased from $56.0 million to $71.4 million. Growth in spending was driven by higher utilization of existing drug products and by newer drug products introduced in 1995/96 or subsequent years.

On average, between 1995/96 and 1998/99, per unit price changes seen by the province were responsible for -19.1% of the expenditure change, volume change or utilization was responsible 89.1%, entry of new drugs were responsible for 30.3%, and exiting drugs and other factors were responsible for -0.5% and -0.2% of expenditures changes, respectively. The findings suggest that utilization and entry of new drugs accounted for the largest increase in expenditures over the period, with expenditures rising significantly despite a decrease in the average per unit price. The contribution of each of these factors change markedly from year to year, indicating that further work is required to understand the sensitivity of the model, the impact of cost containment policies and the entry and market penetration of new drug therapies.

The report also analyses the extent to which the top eight ATC groups are contributing to increases in pharmaceutical expenditures. In 1998/99, drugs in nine ATC groups (Cardiovascular Systems, Alimentary Tract and Metabolism, Nervous System, Respiratory System, Anti-neoplastic and Immunomodulating Agents, Sensory Organs, Musculo-skeletal System, General Anti-infectives for Systemic Use, and Blood and Blood-Forming Agents) accounted for $67.3 million or 94.6% of total expenditures.

The Nova Scotia Pharmacare Program underwent several changes since 1995/96 with a view to manage the growth in drug costs. Further analysis is necessary to fully understand the effect that those changes had on total pharmaceutical expenditures and utilization trends.

Appendix 1

Methodology

This study analyses the cost drivers in total pharmaceutical spending from 1995/96 to 1998/99 in Nova Scotia.

In order to conduct the analysis, information on prices, quantities and expenditures were obtained from the Nova Scotia Pharmacare database. Health Canada's Drug Product database was used to ensure that only those drugs defined by the Food and Drug Act were included. The Patented Medicine Prices Review Board data base was used to group drugs according to patent status.

Prices used in this study are based on recognized claimed cost; wholesale mark-ups are included, however, dispensing and/or compounding fees are excluded. For drugs part of the MAC program, claimed price was set at the manufacturers list price as provided by the Nova Scotia program. The expenditures presented in this analysis include the patients portion of the cost in order to capture the full ingredient cost of the drug products.

This study reports expenditures by year of introduction of drugs. Year of Introduction is defined as the year of first sales recorded in Nova Scotia Pharmacare Database. Drugs with sales in 1995/96 or before, are termed as "existing" drugs while drugs with sales in 1996/97 and subsequent years are termed as "newer" drugs.

The study focuses on two aspects of expenditures change:

- the influence from existing drugs in terms of growth in price and quantity and exit
- the impact of new drugs in terms of replacement of older drugs

For this purpose, the annual change in pharmaceutical expenditures is broken down into five components: price effect, volume effect, entry of new drugs, exiting drugs and others. The following model was used to obtain the results.

$TE_o = P_oQ_o$ o = base period.....(1)

$\Delta TE_1 = P_1Q_1 - P_oQ_o$ 1 = first period.....(2)

$= P_o(Q_1 - Q_o) + Q_o(P_1 - P_o) + (P_1 - P_o)(Q_1 - Q_o) + P_{1n}Q_{1n} - P_o^oQ_o^o$

Where:

TE = Total Expenditure

$P_o(Q_1 - Q_o) = VolumeEffect$

$Q_o(P_1 - P_o) = PriceEffect$

$(P_1 - P_o)(Q_1 - Q_o) = InteractionTerm$

$P_{1n}Q_{1n} = NewDrugExpenditureInfluence$

$P_o^oQ_o^o = ExitingDrugs$

$P_o(Q_1 - Q_o) + Q_o(P_1 - P_o) + (P_1 - P_o)(Q_1 - Q_o)$ = Existing Drug Influence, E_i

After the first period,1, New drugs can be separated into Volume and Price influence on annual change in total expenditures:

$\Delta TE = P_2Q_2 - P_1Q_1$ 2 = Second Period.....(3)

$= P_1(Q_2 - Q_1) + Q_1(P_2 - P_1) + (P_2 - P_1)(Q_2 - Q_1) + P_{1n}(Q_{2n} - Q_{1n}) + Q_{1n}(P_{2n} - P_{1n})$

$+(P_{2n} - P_{1n})(Q_{2n} - Q_{1n}) + P_{2n}^*Q_{2n}^*$

Where,

$P_{2n}^*Q_{2n}^*$ = New Drugs inPeriod 2 = N_i^*

$P_1(Q_2 - Q_1)$ = New Drug Volume Influence

$Q_1(P_2 - P_1)$ = New Drug Price Influence

$(P_2 - P_1)(Q_2 - Q_1)$ = Interaction Term

$P_1(Q_2 - Q_1) + Q_1(P_2 - P_1) + (P_2 - P_1)(Q_2 - Q_1) = M_i$, New Drug Influence

$\therefore \Delta TE_i = E_i + \sum M_i + N_i^*$.....(4)

Divide(4)*by*ΔTE_i

$\Delta TE_i / \Delta TE_i = 1 = E_i / \Delta TE_i + \sum M_i / \Delta TE_i + N_i^* / \Delta TE_i$

Estimates the influence of each component

The previous study was conducted on a calender basis and price was calculated at DIN level. This study is based on fiscal year data and price is calculated at the chemical level, i.e. price for a chemical with an identical ingredient, strength, route, schedule and form. This change in definition was adapted in order to better capture substitution within multi-source markets and better represent the contribution of each cost driver component in the model.[20]

The impact of new drugs is tracked not only during the year of introduction, but also in the subsequent year. After the two periods the effect of new drugs is recorded as part of the price, utilization and other effect.

The other major focus of the report was a breakdown of expenditures by therapeutic class and patent status over the period 1995/96 to 1998/99. This would enable us to:

- identify the extent to which each therapeutic class contributed to the increases in total Pharmacare expenditures over the period 1995/96 and 1998/99 (done by calculating the difference between the level of expenditures of each therapeutic class between 1995/96 and 1998/99, and dividing the difference by the difference between the level of total expenditures between 1995/96 and 1998/99);
- identify the extent of substitution between new drugs and exiting drugs in each therapeutic class; and
- identify the impact that category 1, 2 and 3 drugs have on the market.

[20] The previous version of cost drivers treated all new DIN's as new drugs, including generics.

Appendix 2

Provincial Drug Plans: Nova Scotia

General Plan Information

Beneficiaries Covered

Seniors' Pharmacare Program is available to all Nova Scotia Seniors' 65 years of age or older and who are registered under the Medical Services Insurance Program.

Special Drug Programs cover disease specific drugs and are designed to assist Nova Scotia residents with drug cost associated with cystic fibrosis, diabetes insipidus, human growth hormone deficiency, multiple sclerosis, HIV/AIDS and cancer patients. Eligibility requirements vary for each program.

Deductibles, Co-payments and Professional Fees

Seniors' Pharmacare has a premium of $215 per individual per year, although a rebate of up to $300 is available for low income seniors. Seniors also have a 20% co-payment (minimum of $3.00) to an annual maximum of $200. Family Benefit recipients have a 20% co-payment (minimum of $3.00) to an annual maximum of $150 per year, and Income Assistance co-pay is $3 per prescription with no yearly limit. The Community Services Disabled Persons Plan does not require any co-payments.

Cost Reimbursements

Pharmacies are reimbursed their "actual acquisition cost" on all products except those that are subject to a Maximum Allowable Cost (MAC). For any drug grouping deemed "interchangeable" a MAC price is set and all drugs in the group are reimbursed at this level, regardless of their actual cost. Beneficiaries can choose any product they wish, within a MAC group, but they must pick up any incremental costs above the MAC reimbursement level.

Appendix 3

Population Change and Top Selling Drugs

The following table reports on population growth in Nova Scotia between 1995 and 1998 by age group. In 1995, the 30-39 age group represented the highest proportion of the total population, at 17.3%. This was followed by the 40-49 age group (14.9%) and the 20-29 age group (14.3%). In 1998 the 30-39 age group remained the largest group at 16.4% of the total population. The 40-49 age group increased to 15.6%. The 20-29 age group decreased to 13.6%.

Between 1995 and 1998, the highest growth rate was achieved by the 50-59+ (15.9%) age group (15.9%). This group was followed by 80-90+ (7.8 %) and 40-49+ (5.6%) age groups.

Population Growth
Nova Scotia: 1995 - 1998

	1995		1998		Change % of Total	% Growth
Age Groups	Population (thousands)	% of Total	Population (thousands)	% of Total		
0-9	120,578	13.0	114,634	12.2	-5,944	-4.9
10-19	126,203	13.6	126,314	13.5	111	0.1
20-29	132,960	14.3	126,878	13.6	-6,082	-4.6
30-39	160,391	17.3	153,669	16.4	-6,722	-4.2
40-49	138,067	14.9	145,854	15.6	7,787	5.6
50-59	92,246	9.9	106,956	11.4	14,710	15.9
60-69	72,442	7.8	74,083	7.9	1,641	2.3
70-79	55,779	6.0	56,381	6.0	602	1.1
80-90+	29,044	3.1	31,320	3.3	2,276	7.8
Seniors(65+)	119,169	12.8	122,926	13.1	3,757	3.2
All Ages	927,710	100.0	936,089	100.0	8,379	0.9

Source: Statistics Canada, Annual Demographic Statistics, Catalogue Number 91-213-XPB, 1998.

Top 25 Patented and Non-Patented Drug Products
Nova Scotia: 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year of Introduction	1997/98	1998/99
878928	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 5MG	C	1995/96	$1,293,184	$1,729,519
2190915	OMEPRAZOLE (OMEPRAZOLE MAGNESIUM)	LOSEC 20 MG	A	1995/96	$1,012,416	$1,535,889
828564	RANITIDINE (RANITIDINE HYDROCHLORIDE)	NOVO-RANIDINE TAB 150MG	A	1995/96	$1,413,347	$1,447,472
708879	ENALAPRIL MALEATE	VASOTEC TAB 5MG	C	1995/96	$1,714,318	$1,414,967
2155907	NIFEDIPINE	ADALAT XL - SRT 30MG	C	1995/96	$1,398,727	$1,296,435
670901	ENALAPRIL MALEATE	VASOTEC TAB 10MG	C	1995/96	$1,361,334	$1,176,223
884340	SIMVASTATIN	ZOCOR TAB 20MG	C	1995/96	$699,324	$1,098,567
878936	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 10MG	C	1995/96	$704,008	$1,078,445
2230711	ATORVASTATIN (ATORVASTATIN CALCIUM)	LIPITOR 10MG	C	1997/98	$149,990	$1,051,705
893757	PRAVASTATIN SODIUM	PRAVACHOL TAB 20MG	C	1995/96	$890,418	$1,050,115
2220172	LOVASTATIN	APO-LOVASTATIN - TAB 20MG	C	1997/98	$710,395	$993,320
884332	SIMVASTATIN	ZOCOR TAB 10MG	C	1995/96	$759,122	$942,890
836338	CISAPRIDE (CISAPRIDE MONOHYDRATE)	PREPULSID TAB 10MG	A	1995/96	$873,420	$854,641
2155990	NIFEDIPINE	ADALAT XL - SRT 60MG	C	1995/96	$824,028	$853,973
2054817	CISAPRIDE (CISAPRIDE MONOHYDRATE)	PREPULSID TAB 20MG	A	1995/96	$728,188	$840,434
2207761	RANITIDINE (RANITIDINE HYDROCHLORIDE)	GEN-RANITIDINE - TAB 150MG	A	1996/97	$609,173	$774,443
2146959	FENOFIBRATE	LIPIDIL MICRO - CAP 200MG	C	1995/96	$635,613	$755,604
851752	BUDESONIDE	PULMICORT TURBUHALER 200 MCG/DOSE	R	1995/96	$740,735	$747,158
1940481	PAROXETINE (PAROXETINE HYDROCHLORIDE)	PAXIL TAB 20MG	N	1995/96	$522,712	$730,695
2162776	TICLOPIDINE HYDROCHLORIDE	TICLID 250MG TABLETS	B	1995/96	$624,121	$714,580
733059	RANITIDINE (RANITIDINE HYDROCHLORIDE)	APO-RANITIDINE TAB 150MG	A	1995/96	$666,408	$711,998
2225905	GOSERELIN (GOSERELIN ACETATE)	ZOLADEX LA INJ DEPOT 10.8MG	L	1996/97	$497,442	$683,324
2182874	LOSARTAN POTASSIUM	COZAAR - TAB 50MG	C	1995/96	$437,063	$669,192
2215055	BECLOMETHASONE DIPROPIONATE	BECLOFORTE INHALER - AEM INH 250MCG/AEM	R	1995/96	$612,799	$605,274
851795	ENALAPRIL MALEATE	VASOTEC TAB 2.5MG	C	1995/96	$537,895	$541,623

Top 10 Category 1 Patented Drug Products
Nova Scotia: 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year of Introduction	1997/98	1998/99
2190915	OMEPRAZOLE (OMEPRAZOLE MAGNESIUM)	LOSEC 20 MG	A	1995/96	$1,012,416	$1,535,889
2155907	NIFEDIPINE	ADALAT XL - SRT 30MG	C	1995/96	$1,398,727	$1,296,435
884340	SIMVASTATIN	ZOCOR TAB 20MG	C	1995/96	$699,324	$1,098,567
2155990	NIFEDIPINE	ADALAT XL - SRT 60MG	C	1995/96	$824,028	$853,973
2054817	CISAPRIDE (CISAPRIDE MONOHYDRATE)	PREPULSID TAB 20MG	A	1995/96	$728,188	$840,434
2146959	FENOFIBRATE	LIPIDIL MICRO - CAP 200MG	C	1995/96	$635,613	$755,604
851752	BUDESONIDE	PULMICORT TURBUHALER 200 MCG/DOSE	R	1995/96	$740,735	$747,158
2225905	GOSERELIN (GOSERELIN ACETATE)	ZOLADEX LA INJ DEPOT 10.8MG	L	1996/97	$497,442	$683,324
1911902	NITROGLYCERIN	NITRO-DUR 0.4MG/H DISC	C	1995/96	$296,595	$367,762
1908448	BETAXOLOL (BETAXOLOL HYDROCHLORIDE)	BETOPTIC S OPH SUS 0.25%	S	1995/96	$264,626	$345,028

Top 10 Category 2 Patented Drug Products
Nova Scotia: 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year of Introduction	1997/98	1998/99
2155966	CIPROFLOXACIN (CIPROFLOXACIN HYDROCHLORIDE)	CIPRO 500 - TAB 500MG	J	1995/96	$94,731	$167,748
1978926	BUDESONIDE	PULMICORT NEBUAMP 0.5 MG/ML	R	1995/96	$74,782	$108,617
2010909	FINASTERIDE	PROSCAR TAB 5MG	G	1995/96	$18,069	$75,446
2155958	CIPROFLOXACIN (CIPROFLOXACIN HYDROCHLORIDE)	CIPRO 250 - TAB 250MG	J	1995/96	$37,020	$64,824
2213575	ONDANSETRON (ONDANSETRON HYDROCHLORIDE DIHYDRATE)	ZOFRAN - TAB 8MG	A	1995/96	$39,490	$48,126
1978918	BUDESONIDE	PULMICORT NEBUAMP 0.25 MG/ML	R	1995/96	$26,475	$33,327
2031116	TERBINAFINE (TERBINAFINE HYDROCHLORIDE)	LAMISIL TAB 250MG	D	1996/97	$23,300	$31,003
795860	LOVASTATIN	MEVACOR TAB 20MG	C	1995/96	$456,971	$26,265
2025299	RISPERIDONE	RISPERDAL TAB 2MG	N	1995/96	$9,892	$23,891
2031094	TERBINAFINE HYDROCHLORIDE	LAMISIL CRM 1%	D	1995/96	$12,948	$15,181

Top 10 Category 3 Patented Drug Products
Nova Scotia: 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year of Introduction	1997/98	1998/99
878928	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 5MG	C	1995/96	$1,293,184	$1,729,519
708879	ENALAPRIL MALEATE	VASOTEC TAB 5MG	C	1995/96	$1,714,318	$1,414,967
670901	ENALAPRIL MALEATE	VASOTEC TAB 10MG	C	1995/96	$1,361,334	$1,176,223
878936	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 10MG	C	1995/96	$704,008	$1,078,445
2230711	ATORVASTATIN (ATORVASTATIN CALCIUM)	LIPITOR 10MG	C	1997/98	$149,990	$1,051,705
893757	PRAVASTATIN SODIUM	PRAVACHOL TAB 20MG	C	1995/96	$890,418	$1,050,115
884332	SIMVASTATIN	ZOCOR TAB 10MG	C	1995/96	$759,122	$942,890
836338	CISAPRIDE (CISAPRIDE MONOHYDRATE)	PREPULSID TAB 10MG	A	1995/96	$873,420	$854,641
1940481	PAROXETINE (PAROXETINE HYDROCHLORIDE)	PAXIL TAB 20MG	N	1995/96	$522,712	$730,695
2162776	TICLOPIDINE HYDROCHLORIDE	TICLID 250MG TABLETS	B	1995/96	$624,121	$714,580

Appendix 4

Therapeutic Class Analysis

Percentage Contribution of Selected Therapeutic Classes to Total Expenditure
Nova Scotia: 1995/96 - 1998/99

Therapeutic Class	ATC	Contribution in 1995/96 ($ millions)	Contribution in 1998/99 ($ millions)	% of Total Expenditure Change
Cardiovascular system	C	24.82	32.02	46.89
Alimentary tract and metabolism	A	8.85	11.78	19.05
Nervous system	N	5.48	6.48	6.51
Respiratory system	R	4.95	6.16	7.88
Anti-neoplastic and immunomodulating agents	L	1.88	2.95	6.98
Sensory organs	S	1.45	2.34	5.79
Musculo-skeletal system	M	2.23	2.14	-0.60
General anti-infectives for systemic use	J	2.30	1.90	-2.60
Blood and blood forming agents	B	0.85	1.57	4.67
Genito-urinary system and sex hormones	G	1.52	1.56	0.25
Dermatologicals	D	0.92	1.00	0.53
Systemic hormonal preparations, exc. Sex hormones	H	0.37	0.51	0.90
Anti-parasitic products, insecticides and repellents	P	0.11	0.16	0.35
Unclassified		0.26	0.75	3.16
Various		0.03	0.07	0.25
Total		56.04	71.39	100.00

Anatomical Therapeutic Chemical (ATC)

The Anatomical Therapeutic Chemical (ATC) classification system [and the Defined Daily Dose (DDD)] as a measuring unit are recommended by the WHO for drug utilization studies.

In the ATC classification system, the drugs are divided into different groups according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties. Drugs are classified in groups at five different levels. The drugs are divided into fourteen main groups (1st level), with two therapeutic/pharmacological subgroups (2nd and 3rd levels). The 4th level is a therapeutic/pharmacological/chemical subgroup and the 5th level is the chemical substance.

Medicinal products are classified according to the main therapeutic use of the main active ingredient, on the basic principle of only one ATC code for each pharmaceutical formulation (i.e. similar ingredients, strength and pharmaceutical form). A medicinal product can be given more than one ATC code if it is available in two or more strengths or formulations with clearly different therapeutic uses. The second level of the ATC classification system is used to

represent a general disease grouping within the study.

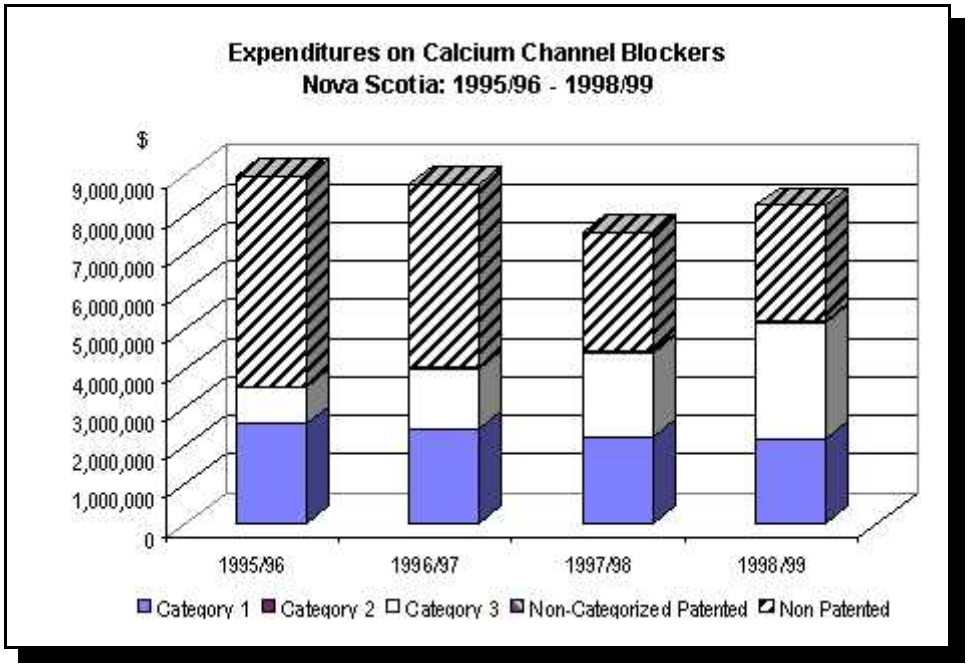
ATC	Therapeutic Class	Subgroups*
A02	Antacids, drugs for treatment of peptic ulcer and flatulence	Antacids; H_2-receptor antagonists; Prostaglandins; Proton pump inhibitors; Combinations for eradication of *Helicobacter pylori* & Others such as sucralfate
A03	Antispasmodic and anticholinergic agents and propulsives	Synthetic antispasmodic and anticholinergic agents; Belladonna and derivatives, plain; Antispasmodics in combination with Psycholeptics; Antispasmodics in combination with analgesics; Antispasmodics and anticholinergics in combination with other drugs & Propulsives (metoclopramide, domperidone)
A10	Drugs used in diabetes	Insulins and analogues; Biguanides; Sulfonamides; Alpha glucosidase inhibitors; Thiazolidinediones & Others such as repaglinide
B01	Antithrombotic agents	Vitamin K antagonists (warfarin); Heparin group (includes LMWH); Platelet aggregation inhibitors (clopidogrel, ticlopidine..,abciximab..); Enzymes (streptokinase, alteplase..) & Others (lepirudin)
C01	Cardiac Therapy	Cardiac glycosides (digoxin); Antiarrhythmics; Cardiac stimulants (adrenergic and dopaminergic agents, phosphodiesterase inhibitors); Vasodilators (organic nitrates) & Others such prostaglandins
C07	Beta blocking agents	Beta blocking agents; Beta blocking agents and Thiazides; Beta blocking agents and other diuretics; Beta blocking agents and Vasodilators & Beta blocking agents and Other antihypertensives
C08	Calcium channel blockers	Selective Calcium channel blockers with mainly vascular effects; Selective Calcium channel blockers with direct cardiac effects; Non-selective Calcium channel blockers & Calcium channel blockers and diuretics
C09	Agents acting on the renin-angiotensin system	ACEIs, plain; ACEIs, combinations; Angiotensin II antagonists, plain; Angiotensin II antagonists, combinations & Others
C10	Serum lipid reducing agents	HMG CoA reductase inhibitors; Fibrates; Bile acid sequestrants; Nicotinic acid and derivatives
J01	Antibacterials for systemic use	Tetracyclines; Amphenicols (chloramphenicol); Penicillins; Beta-lactamase inhibitors; Cephalosporins; Monobactams; Carbapenems; Sulfonamides and Trimethoprim; Macrolides and Lincosamides (clindamycin); Aminoglycosides; Quinolones & Others such as vancomycin, fusidic acid, metronidazole

ATC	Therapeutic Class	Subgroups*
L02	Endocrine Therapy	Estrogens; Progestens; Gonadotropin releasing hormone analogues; Anti-estrogens (tamoxifen); Anti-androgens & Enzyme inhibitors such as anastrozole
M01	Anti-inflammatory and anti-rheumatic products	Anti-inflammatory and anti-rheumatic products, Non-steroids (butylpyrazolidines, acetic acid derivatives and related substances, oxicams, propionic acid derivatives, fenamates, coxibs & others such as nabumetone & glucosamine); Anti-inflammatory/anti-rheumatic agents in combination; Specific anti-rheumatic agents (gold preparations, penicillamine)
N05	Psycholeptics	Antipsychotics (phenothiazines; butyrophenone derivatives; indole derivatives; thioxanthene derivatives; diphenylbutylpiperidine derivatives such as pimozide; diazepines, oxazepines and thiazepines such as clozapine, olanzepine & quetiapine; neuroleptics in tardive dyskinesia such as tetrabenazine; benzamides; lithium); Anxiolytics (benzodiazepine derivatives, carbamates, buspirone); Hypnotics and sedatives (barbiturates-plain, barbiturates-combinations,aldehydes and derivatives, benzodiazepine derivatives, piperidinedione derivatives, benzodiazepine related drugs such as zopiclone)
N06	Psychoanaleptics	Antidepressants; Psychostimulants and nootropics (centrally acting sympathomimetics, xanthine derivatives); Psycholeptics and psychoanaleptics in combination (antidepressants in combination with psycholeptics); Anti-dementia drugs
R03	Anti-asthmatics	Adrenergics, inhalants; Other anti-asthmatics, inhalants (glucocorticoids, anticholinergics, antiallergic agents); Adrenergics for systemic use; Other anti-asthmatics for systemic use (xanthines, xanthines and adrenergics, leukotriene receptor antagonists)
S01	Ophthalmologicals	Anti-infectives (antibiotics, sulfonamides, antivirals, other anti-infectives); Anti-inflammatory agents (corticosteroids, plain; corticosteroids and mydriatics in combination; anti-inflammatory agents, non-steroids); Anti-inflammatory agents and anti-infectives in combination; Anti-glaucoma preparations and miotics; Mydriatics and cycloplegics; Decongestants and antiallergics; Local anesthetics; Diagnostic agents; Surgical aids; Others such as artificial tears

* main one listed

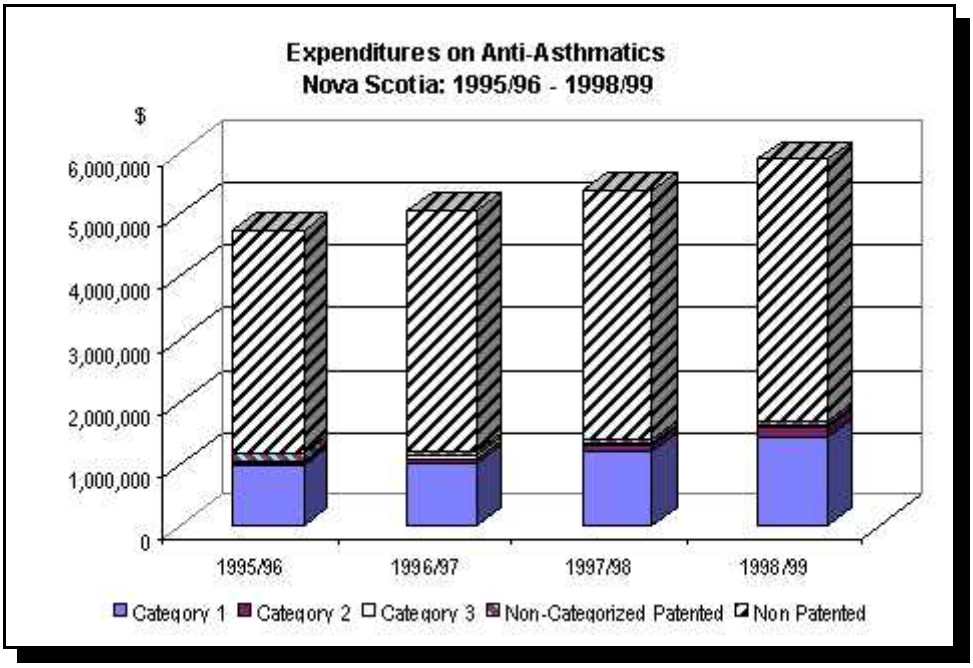
Impact of Existing and Newer Drug Product by Major Disease Groups
Calcium Channel Blockers
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		5,453	3,846	1,049	739
1995/96	1	2,577	2,465	2,230	2,163
1995/96	2	3	3	4	4
1995/96	3	947	1,559	2,200	3,023
1995/96	NC	7	22	20	18
1996/97		0	908	1,090	939
1997/98		0	0	909	1,156
1997/98	1	0	0	16	162
1998/99		0	0	0	1
1998/99	1	0	0	0	29
Total Expenditures		8,988	8,805	7,515	8,236
Patented Expenditures		3,534	4,050	4,453	5,239
Non-Patented Expenditures		5,454	4,755	3,062	2,997


Expenditures on Calcium Channel Blockers
Nova Scotia: 1995/96 - 1998/99
$
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

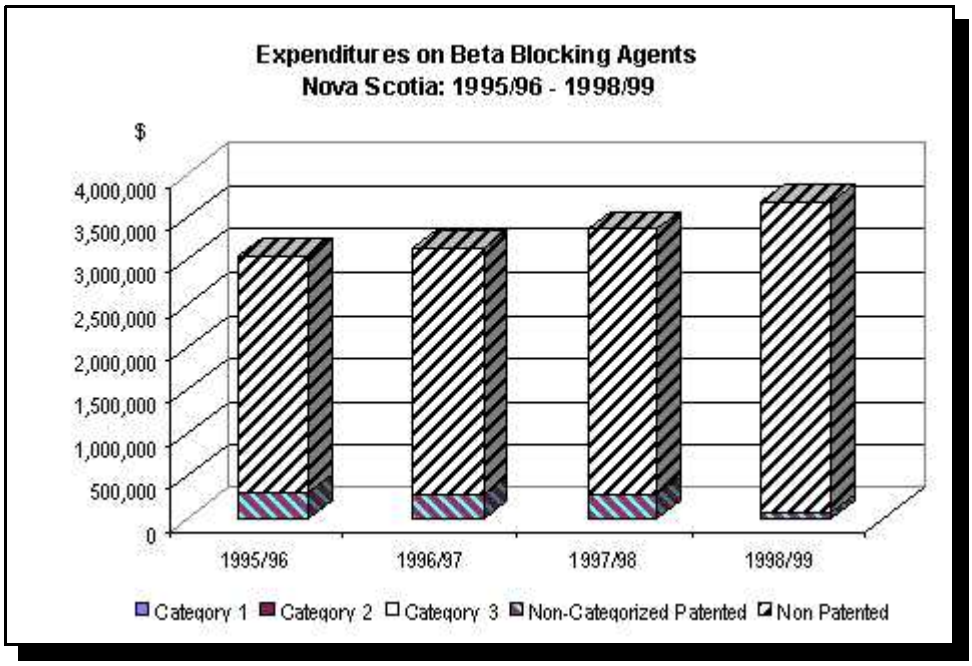
Impact of Existing and Newer Drug Product by Major Disease Groups
Anti-Asthmatics
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		2,949	3,165	3,034	2,843
1995/96	1	1,234	1,207	1,215	1,198
1995/96	2	27	65	101	142
1995/96	3	53	46	34	29
1995/96	NC	482	500	511	561
1996/97		0	77	296	536
1996/97	1	0	10	170	318
1997/98		0	0	35	118
1997/98	1	0	0	0	0
1997/98	3	0	0	0	5
1998/99		0	0	0	50
1998/99	1	0	0	0	77
1998/99	3	0	0	0	10
Total Expenditures		4,746	5,068	5,393	5,889
Patented Expenditures		1,158	1,212	1,405	1,676
Non-Patented Expenditures		3,588	3,856	3,988	4,213


Expenditures on Anti-Asthmatics
Nova Scotia: 1995/96 - 1998/99
$
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

Impact of Existing and Newer Drug Product by Major Disease Groups
Beta Blocking Agents
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		2,567	2,623	2,565	2,462
1995/96	1	35	30	32	30
1995/96	NC	447	397	380	377
1996/97		0	78	327	478
1997/98		0	0	52	322
1998/99		0	0	0	6
Total Expenditures		3,046	3,123	3,353	3,670
Patented Expenditures		300	286	269	75
Non-Patented Expenditures		2,746	2,837	3,084	3,595


Expenditures on Beta Blocking Agents
Nova Scotia: 1995/96 - 1998/99
$
4,000,000
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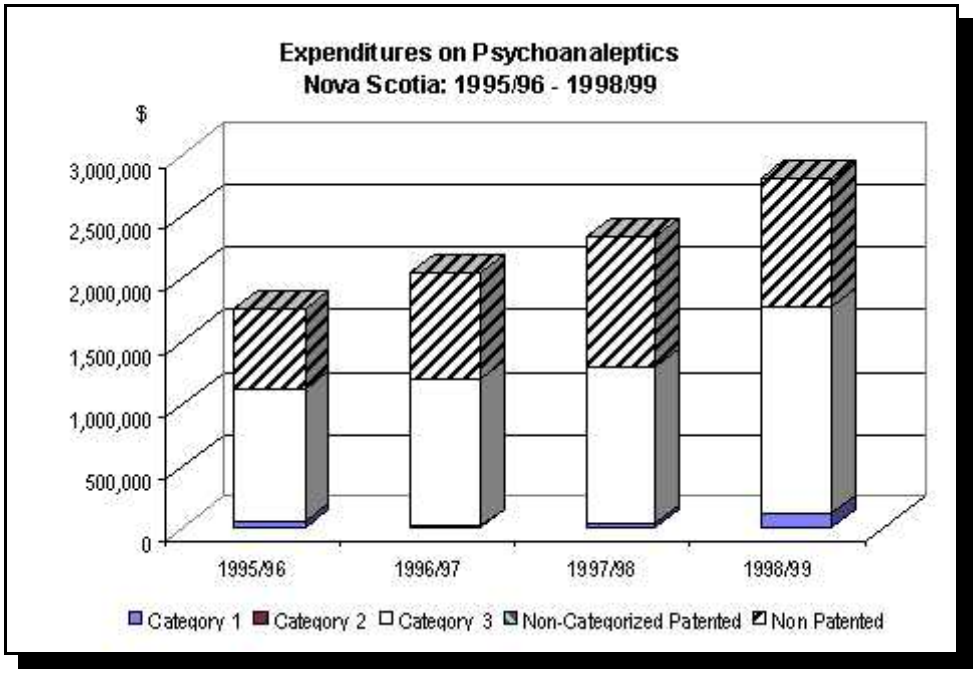
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

Impact of Existing and Newer Drug Product by Major Disease Groups
Psychoanaleptics
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		617	589	533	511
1995/96	1	50	185	104	108
1995/96	3	1,076	1,185	1,418	1,657
1995/96	NC	4	3	3	2
1996/97		0	70	157	164
1996/97	1	0	7	37	87
1997/98		0	0	86	241
1997/98	2	0	0	0	2
1998/99		0	0	0	16
1998/99	1	0	0	0	18
1998/99	3	0	0	0	6
Total Expenditures		1,739	2,036	2,337	2,805
Patented Expenditures		1,126	1,195	1,291	1,761
Non-Patented Expenditures		613	841	1,046	1,044


Expenditures on Psychoanaleptics
Nova Scotia: 1995/96 - 1998/99
$
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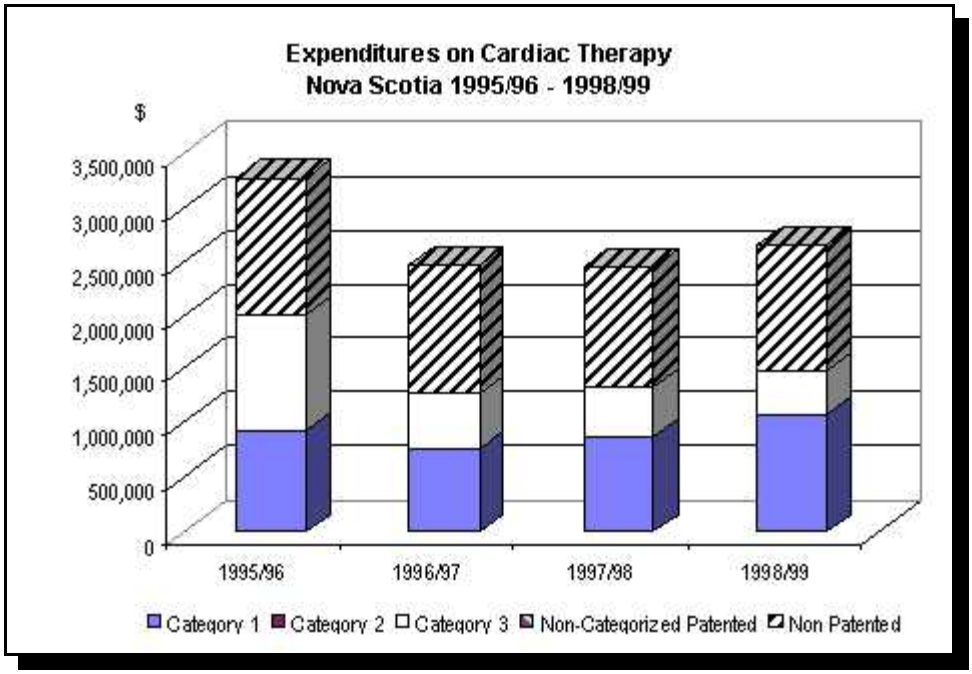
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

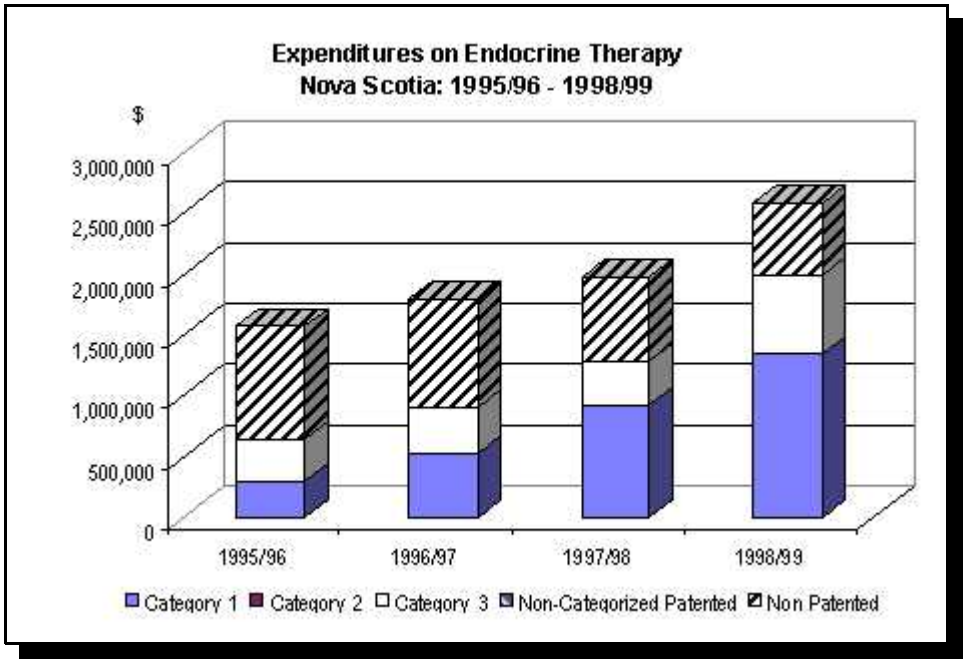
Impact of Existing and Newer Drug Product by Major Disease Groups
Cardiac Therapy
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		1,187	1,139	1,055	1,080
1995/96	1	933	732	821	1,009
1995/96	3	1,078	518	465	408
1995/96	NC	70	57	44	38
1996/97		0	1	1	1
1996/97	1	0	22	55	70
1996/97	NC	0	0	0	1
1997/98		0	0	4	10
1998/99		0	0	0	32
Total Expenditures		3,269	2,467	2,440	2,645
Patented Expenditures		1,998	1,264	1,335	1,483
Non-Patented Expenditures		1,271	1,203	1,105	1,162


Expenditures on Cardiac Therapy
Nova Scotia 1995/96 - 1998/99
$
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

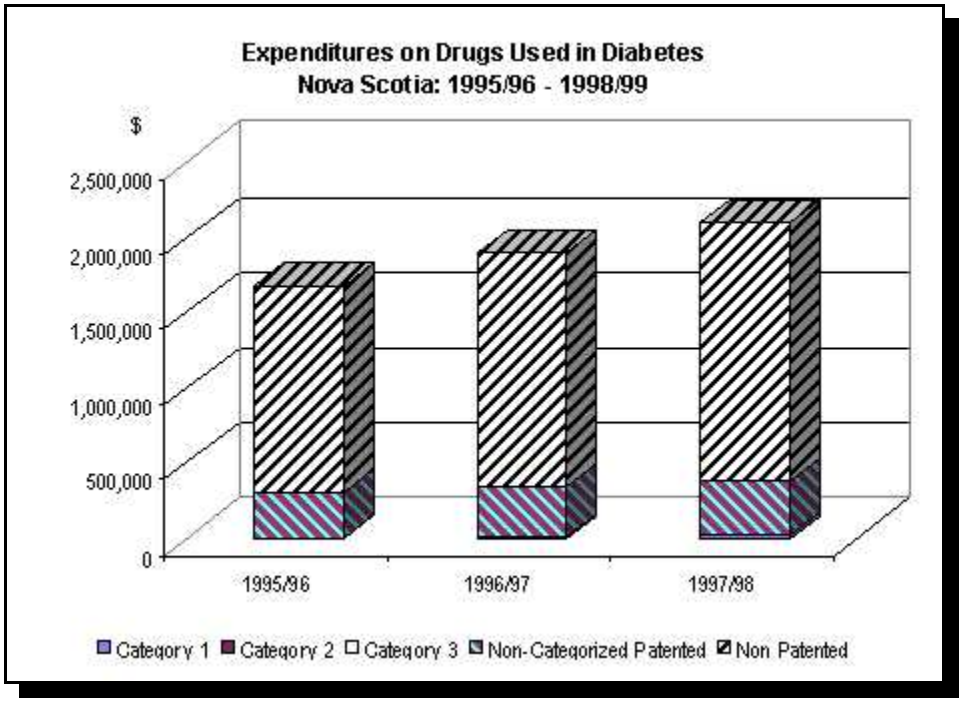
Impact of Existing and Newer Drug Product by Major Disease Groups
Endocrine Therapy
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		246	261	216	234
1995/96	1	295	369	331	334
1995/96	3	341	350	155	137
1995/96	NC	682	538	271	20
1996/97		0	84	107	110
1996/97	1	0	149	582	868
1996/97	3	0	38	202	486
1997/98		0	0	102	233
1997/98	1	0	0	5	135
1997/98	3	0	0	3	21
1998/99		0	0	0	1
Total Expenditures		1,562	1,788	1,974	2,578
Patented Expenditures		635	906	1,278	1,980
Non-Patented Expenditures		927	882	696	598


Expenditures on Endocrine Therapy
Nova Scotia: 1995/96 - 1998/99
$
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

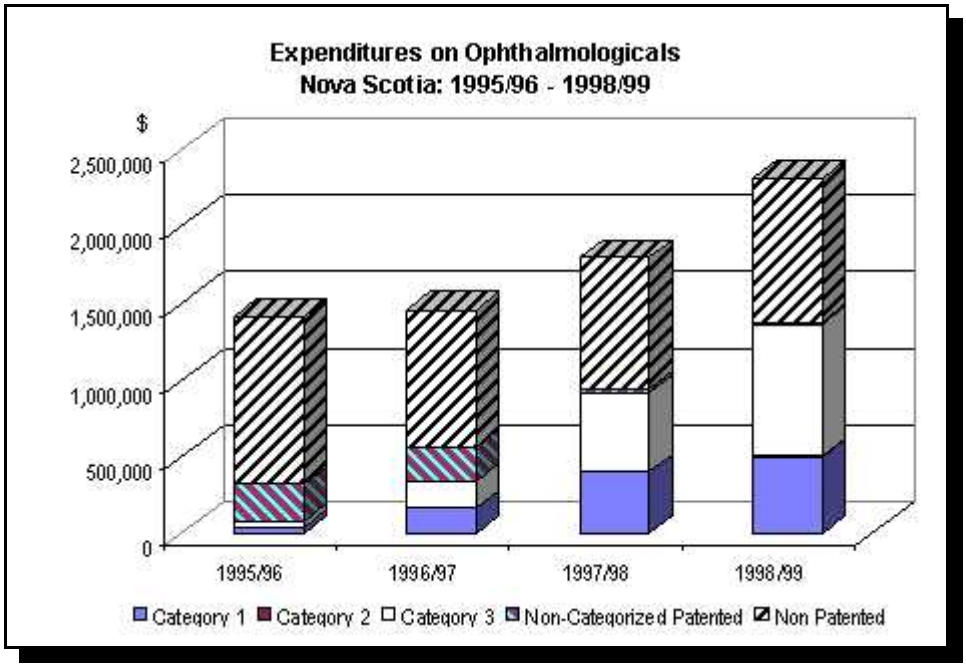
Impact of Existing and Newer Drug Product by Major Disease Groups
Drugs Used for Diabetes
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		839	978	1,101	1,172
1995/96	1	86	109	143	200
1995/96	NC	754	812	838	884
1996/97	1	0	0	0	2
1996/97	3	0	0	1	10
1996/97	NC	0	0	0	1
1997/98		0	0	12	41
1997/98	NC	0	0	1	3
1998/99		0	0	0	88
Total Expenditures		1,673	1,902	2,095	2,406
Patented Expenditures		299	336	376	436
Non-Patented Expenditures		1,374	1,566	1,719	1,970


Expenditures on Drugs Used in Diabetes
Nova Scotia: 1995/96 - 1998/99
$
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

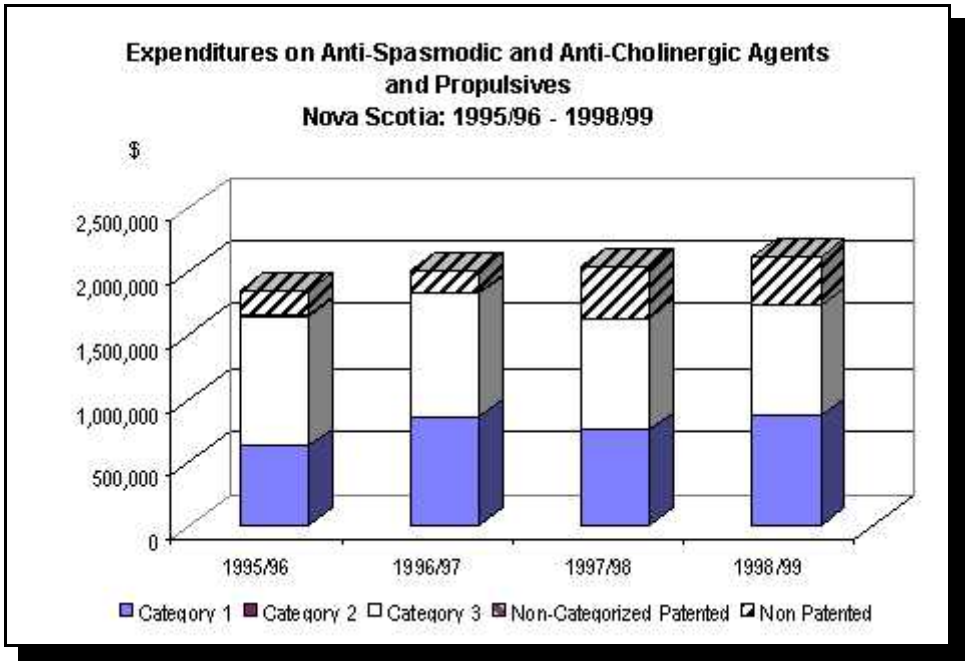
Impact of Existing and Newer Drug Product by Major Disease Groups
Ophthalmologicals
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		624	537	449	399
1995/96	1	37	137	316	372
1995/96	3	110	123	151	179
1995/96	NC	637	508	311	233
1996/97		0	77	111	97
1996/97	1	0	23	79	128
1996/97	2	0	0	0	1
1996/97	3	0	50	283	286
1997/98		0	0	1	5
1997/98	3	0	0	86	396
1998/99		0	0	0	208
1998/99	3	0	0	0	1
1998/99	NC	0	0	0	0
Total Expenditures		1,407	1,454	1,781	2,295
Patented Expenditures		318	564	943	1,378
Non-Patented Expenditures		1,089	890	838	917


Expenditures on Ophthalmologicals
Nova Scotia: 1995/96 - 1998/99
$
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

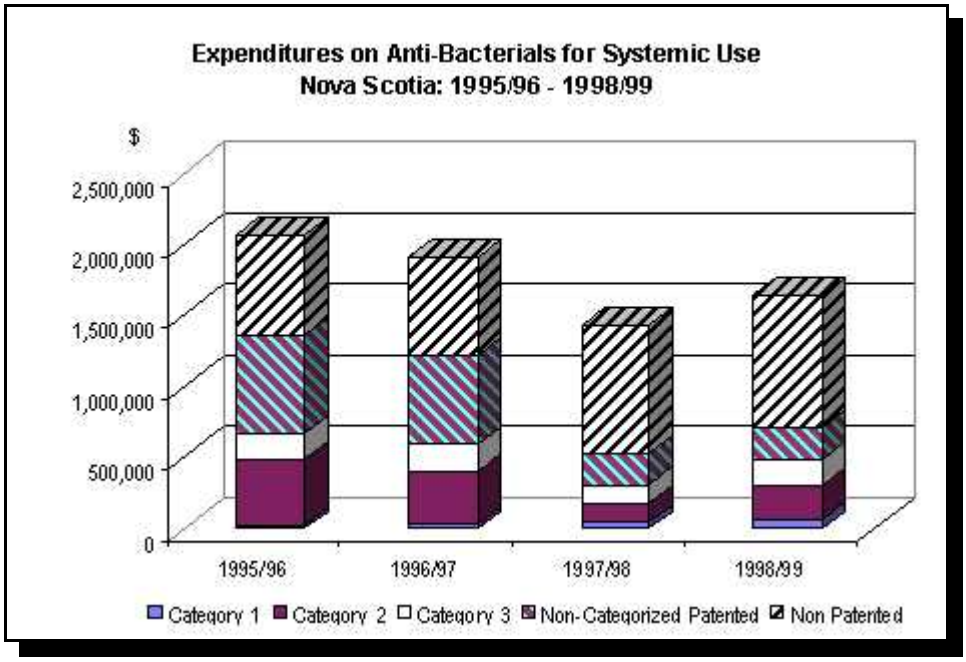
Impact of Existing and Newer Drug Product by Major Disease Groups
Anti-Spasmodic and Anti-Cholinergic Agents and Propulsives
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		84	78	72	74
1995/96	1	691	926	1,063	1,084
1995/96	3	1,019	960	873	855
1995/96	NC	49	42	22	30
1996/97		0	1	1	0
1996/97	3	0	1	2	4
1997/98		0	0	3	37
1998/99		0	0	0	30
Total Expenditures		1,842	2,004	2,036	2,110
Patented Expenditures		1,660	1,828	1,634	1,727
Non-Patented Expenditures		182	176	402	383


Expenditures on Anti-Spasmodic and Anti-Cholinergic Agents and Propulsives
Nova Scotia: 1995/96 - 1998/99
$
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

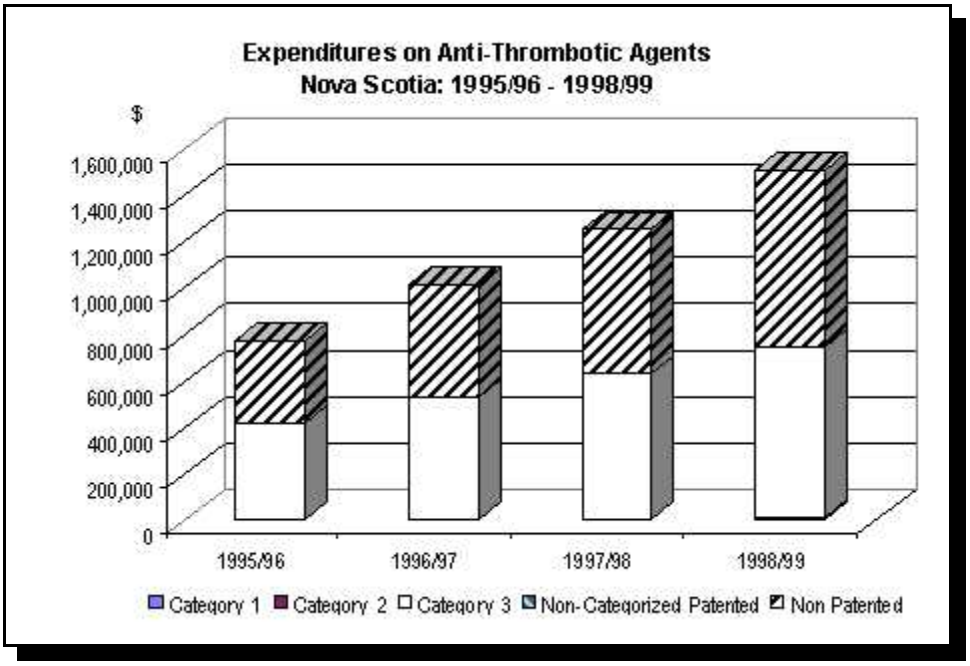
Impact of Existing and Newer Drug Product by Major Disease Groups
Anti-Bacterials for Systemic Use
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		659	666	760	746
1995/96	1	36	35	51	69
1995/96	2	452	362	132	233
1995/96	3	181	190	120	132
1995/96	NC	737	656	239	253
1996/97		0	3	13	27
1996/97	1	0	0	2	0
1996/97	3	0	4	11	29
1997/98		0	0	97	86
1997/98	1	0	0	2	3
1997/98	3	0	0	1	2
1998/99		0	0	0	47
1998/99	1	0	0	0	1
1998/99	3	0	0	0	18
Total Expenditures		2,055	1,909	1,424	1,641
Patented Expenditures		1,359	1,209	519	702
Non-Patented Expenditures		696	700	905	939


Expenditures on Anti-Bacterials for Systemic Use
Nova Scotia: 1995/96 - 1998/99
$
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

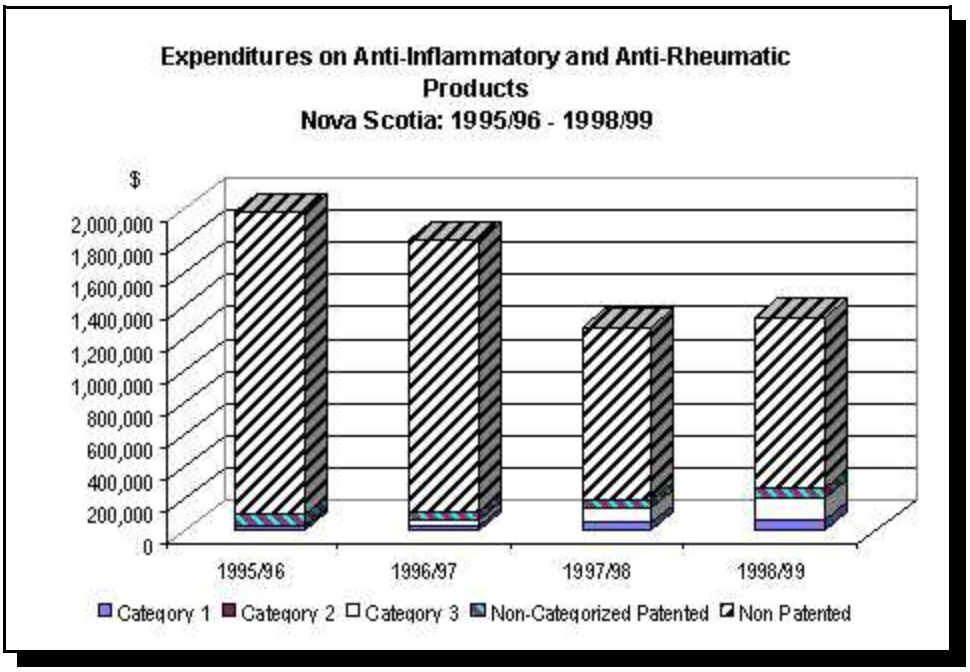
Impact of Existing and Newer Drug Product by Major Disease Groups
Anti-Thrombotic Agents
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		359	484	616	742
1995/96	3	419	527	624	715
1995/96	NC	0	0	0	0
1996/97		0	0	0	0
1996/97	1	0	6	0	0
1997/98		0	0	3	1
1997/98	1	0	0	0	13
1997/98	3	0	0	10	15
1998/99		0	0	0	15
1998/99	3	0	0	0	8
Total Expenditures		774	1,013	1,252	1,510
Patented Expenditures		419	533	634	751
Non-Patented Expenditures		355	480	618	759


Expenditures on Anti-Thrombotic Agents
Nova Scotia: 1995/96 - 1998/99
$
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

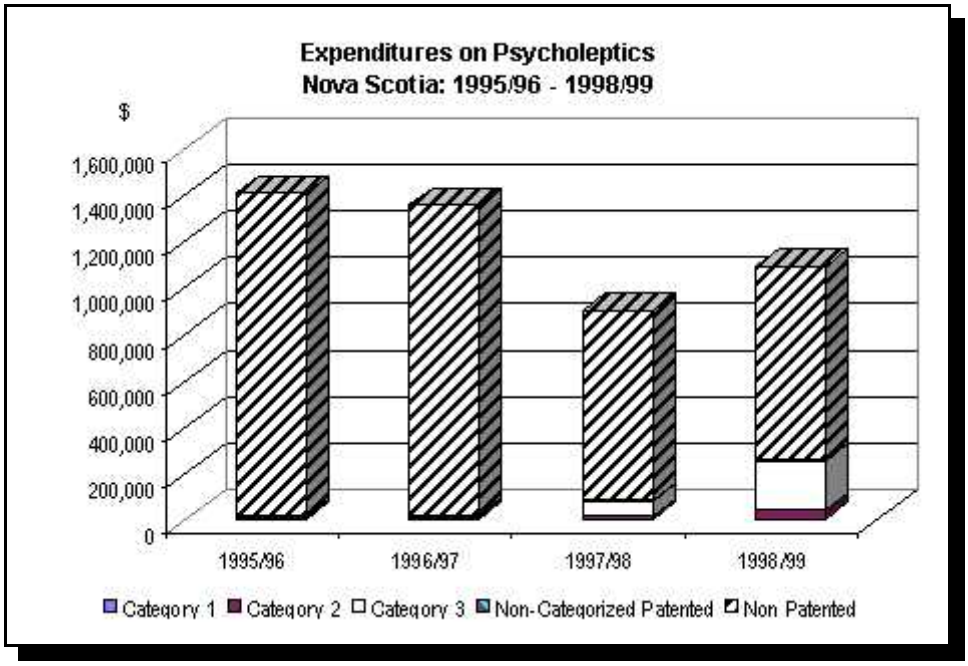
Impact of Existing and Newer Drug Product by Major Disease Groups
Anti-Inflammatory and Anti-Rheumatic Products
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		1,605	1,489	892	838
1995/96	1	36	38	38	41
1995/96	3	6	39	95	137
1995/96	NC	337	212	118	111
1996/97		0	33	99	105
1996/97	1	0	0	16	34
1996/97	3	0	1	3	1
1997/98		0	0	9	34
1997/98	3	0	0	1	1
1998/99		0	0	0	35
1998/99	1	0	0	0	0
Total Expenditures		1,985	1,807	1,269	1,336
Patented Expenditures		99	120	197	262
Non-Patented Expenditures		1,886	1,687	1,072	1,074


Expenditures on Anti-Inflammatory and Anti-Rheumatic Products
Nova Scotia: 1995/96 - 1998/99
$
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

Impact of Existing and Newer Drug Product by Major Disease Groups
Psycholeptics
Nova Scotia: 1995/96 - 1998/99
(thousands of dollars)

Year of Introduction	Category	1995/96	1996/97	1997/98	1998/99
1995/96		719	707	601	561
1995/96	1	47	37	30	22
1995/96	2	9	8	15	33
1995/96	3	426	176	49	107
1995/96	NC	209	119	16	16
1996/97		0	311	139	133
1996/97	1	0	0	0	0
1996/97	3	0	0	1	1
1997/98		0	0	33	87
1997/98	1	0	0	0	5
1997/98	3	0	0	20	109
1998/99		0	0	0	14
1998/99	2	0	0	0	5
1998/99	3	0	0	0	3
Total Expenditures		1,405	1,342	892	1,084
Patented Expenditures		17	21	86	262
Non-Patented Expenditures		1,388	1,321	806	822


Expenditures on Psycholeptics
Nova Scotia: 1995/96 - 1998/99
$
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non Patented

Appendix 5

Glossary

Beneficiary

Someone who has made a claim to the Nova Scotia Pharmacare Program.

Category 1 Drugs

PMPRB din categorization - a new DIN of an existing or comparable dosage form of an existing medicines, usually a new strength of an existing drug (line extension).

Category 2 Drugs

PMPRB DIN categorization - the first drug product to treat effectively a particular illness or which provides a substantial improvement over existing drug products, often referred to as "breakthrough" or "substantial improvement".

Category 3 Drugs

PMPRB DIN categorization - a new drug or new dosage form of an existing medicine that provides moderate, little or no improvement over existing medicines.

Exiting Drug Effect

Exiting Drug Effect shows the amount by which expenditures decrease as a result of de-listing drugs from the formulary, discontinuation of the products by the manufacturer, or lack of claims during follow-up periods.

Existing Drug Products

In this Study, Existing Drug Products are defined as drug products that were reimbursed in or before 1995/96.

New Drug Effect

New Drug Effect shows the amount by which expenditures increase as a result of listing new drugs on the formulary.

Newer Drug Products

In this Study, new drug products are defined as drug products that were listed on the formulary in 1996/97 or during subsequent years.

Price Effect

Price effect shows the impact of prices on expenditures by holding volume consumed constant. In other words, it is the amount by which expenditures would change if volume consumed did not change from the previous year.

Total Pharmaceutical Expenditures

Total Pharmaceutical Expenditures in this study include expenditures made by the Nova Scotia Pharmacare Program. Expenditures include wholesale mark ups but do not include dispensing fees.

Volume Effect

Volume effect shows the impact of volume consumed on expenditures by holding prices constant. In other words, it is the amount by which expenditures would change if prices did not change from the previous year.