COST DRIVER ANALYSIS OF PROVINCIAL DRUG PLANS

ALBERTA

1993/94 - 1998/99

Federal/Provincial/Territorial

Working Group on Drug Prices

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EXECUTIVE SUMMARY

- The Federal Provincial Territorial (F/P/T) Task Force on Pharmaceutical Prices[1] 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 Alberta's Drug Benefit Plan over the period 1993/94 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, novelty and patent status.
- Between 1993/94 and 1998/99 total drug expenditures increased by $92.0 million (for plans under consideration). On average, between 1993/94 and 1998/99 per unit price changes seen by the province were responsible for -31.7% of the expenditure change, volume change or utilization was responsible for 78.2%, entry of new drugs were responsible for 62.8%, and both exiting drugs and other factors were responsible for -0.4% and -8.8% of expenditure change respectively.
- In 1998/99, drugs that existed in 1993/94 and newer drugs (drugs that were introduced after 1993/94) accounted for 50.0% and 50.0%, respectively, of total drug expenditures.
- In 1993/94 the proportion of total expenditures accounted for by patented drugs was 36.7%. By 1998/99, patented drugs accounted for 58.0% of total expenditures, and were responsible for approximately 88% of the total increase in expenditures for the period under consideration.
- 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 55.8% of total patented drug expenditures. The share of line extension (category 1) and break through or substantial improvement (category 2) drugs were 32.6% and 7.2%, respectively.

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

- In 1998/99 drugs in eight Anatomical Therapeutic Chemical (ATC) groups (Cardiovascular Systems, Central Nervous System, Alimentary Tract and Metabolism, Respiratory System, General Anti-infectives, Blood and Blood-Forming Organs, Musculo-Skeletal System and Genito Urinary System and Sex Hormones) accounted for $200.0 million or 95.0% of total expenditures.
- Over the period 1993/94 to 1998/99, drugs in the Cardiovascular System contributed to the largest share of the increase in drug expenditures, 37.9%, followed by Alimentary Tract and Metabolism category, 18.5%.
- 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 the ATC classification. The study revealed that Lipid Reducing Agents from the Cardiovascular Systems group had the highest contribution to percentage increases in expenditures over the period 1993/94 to 1998/99. The second largest contributor was Agents Acting on the Renin-Angiotensin System (also from the Cardiovascular Systems group), followed by Antacids (Alimentary Tract and Metabolism group). These disease groups contributed 18.0%, 14.7% and 11.8%, respectively, to increases in pharmaceutical expenditures over the period 1993/94 to 1998/99.

COST DRIVER ANALYSIS OF PROVINCIAL DRUG PLANS

ALBERTA 1993/94-1998/99

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 Alberta's Drug Benefit Plan program over the period 1995/96 to 1998/99[3]. Information on prices, quantities, total expenditures and market shares were obtained from the Alberta Drug Benefit Plan 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

[2] The Task Force, currently known as the Working Group on Drug Prices, 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 calendar 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 more fully capture the substitution within multi-source markets and refine the definition of a new drug.

products by their respective ATC classification. Finally, the Patented Medicine 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 pubic and private drug plans for Alberta over the period 1993/94 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 partially 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 Ontario 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 Alberta Drug Expenditures

4.1 General Information

The Alberta Government provides prescription drug coverage for Albertans through the Alberta Blue Cross Plans: Alberta Blue Cross 66, for seniors and dependants; Alberta Blue Cross 66A, for widowers and dependants; Alberta Blue Cross - Non-Group Plan, for all Albertans (including low-income residents) under 65 who enroll and pay premiums; and Human Resources and Employment[11] Prescription Drug Services, for Social Allowance and Child Welfare recipients. These plans were implemented on July 1, 1970. Funding is also provided for long term care or continuing care recipients, as well as for some disease specific drugs. For detailed information on the plan, please consult Appendix 2.

4.2 Major Changes since 1993

- July 1993, Interchangeability of bio-equivalent drug products approved.
- October 1993, Low Cost Alternative (LCA) price introduced. Government sponsored plans will pay Actual Acquisition Cost (AAC) to a maximum of the LCA where interchangeable products can be used. The dispensing fee formula was changed.
- November 1994, dispensing fees increased from a fee of $6.70 with an upcharge of $1.65 and 10% on AAC to a tiered fee based on AAC. Dispensing fees were based on the level of the AAC: $9.70 if AAC is between $0.00-$74.99; $14.70 if AAC is between $75.00-$149.99, and $19.70 if AAC is over $150.00.
- July 1994, seniors' co-payment increased to 30% to a maximum of $25 per prescription.[12] Elimination of the 7.5% up-charge calculation included in Alberta Health Drug Benefit List (AHDBL) drug prices for all products except those only available through a drug wholesale.
- April 1996, Maximum Allowable Cost (MAC) pricing introduced for selected modified release oral dosage forms where another oral dosage form or strength exists.
- November 1996, MAC pricing extended to: cholestyramine powder packets, potassium chloride 8mEq; sustained release oral tablets, and selected oral modified release dosage forms of nonsteroidal anti-inflammatory drugs (NSAIDs).

[11] Previously known as Family and Social Services. Human Resource and Employment information is not included in the analysis.

[12] Previously co-payment was 20% with no maximum.

- February 1, 1999, the Palliative Care Drug Program was introduced. This plan provides premium free coverage for needed medications for patients who have been diagnosed as palliative and treated at home. The program subsidizes the cost of eligible prescription medications, specific laxatives and solutions for hydration therapy. The patient is responsible for 30% of the cost of the drugs to a maximum of $25 per prescription. The maximum amount a patient pays out of pocket is $1,000.

4.3 Total Retail Private and Public Expenditures

Public and private spending on prescription drugs in Alberta grew substantially over the period 1995 to 1998. In 1998, total retail spending on prescription drugs was $852.6 million, up from $653.5 million in 1995. Spending in 1998 consisted of 419.9 in public spending and 432.7 in private spending. Total retail spending (i.e., public and private spending including OTC drugs) was $1,122.2 million in 1998. Total spending (public and private) on prescription drugs was 76.0% of total retail spending in 1998, a share that has remained largely unchanged since 1995 (75.5%).

Over the years the share of total public spending on prescription drugs as a part of total spending on prescription drugs has remained more or less constant. In 1995, public spending on prescription drugs accounted for 50.3% of total spending on prescription drugs, In 1998, public spending on prescription drugs accounted for 49.2%.

4.4 Factors Affecting Pharmaceutical Expenditures

Figure 2[13] summarizes some of the important factors described above in Figure 1 that may have contributed to growth in total pharmaceutical expenditures over the period 1994/95[14] to 1998/99. The figure shows that Alberta's population increased by 8.8% over this period. Prescriptions per beneficiary covered under public programs rose by 29.4%. The average cost per prescription rose by 25.7%, from $24.32 in 1994/95 to $30.57 in 1998/99. The average cost per beneficiary a rose even more significantly, by 56.4%, from $299.59 in 1994/95 to $468.67 in 1998/99.

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

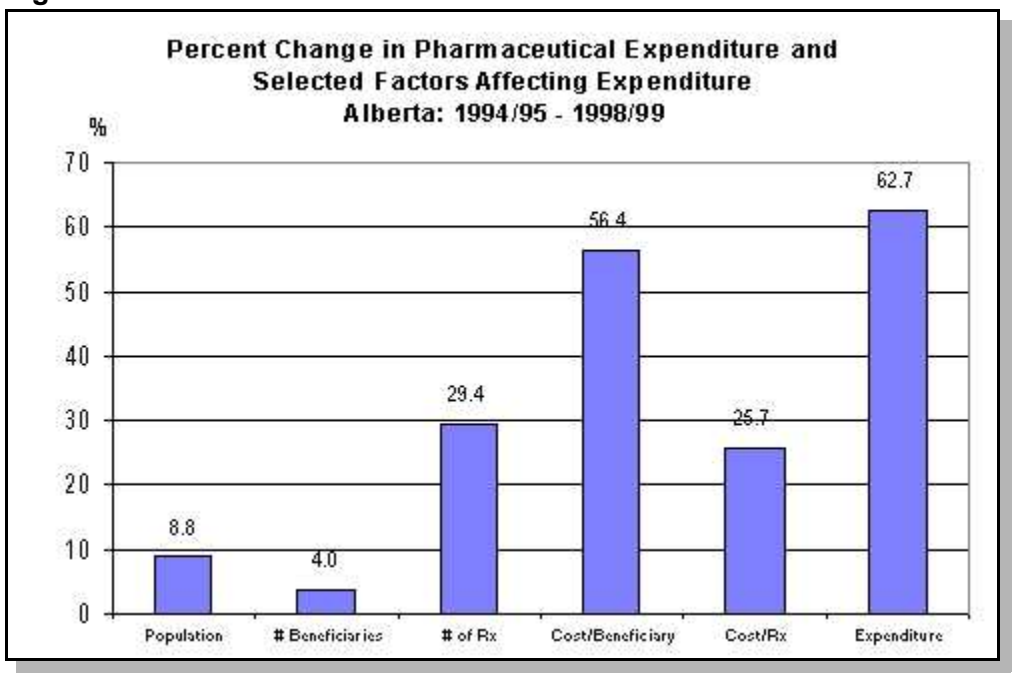
[13] In Figure 2, growth in cost/prescription, cost per beneficiary and growth in expenditures were calculated based on actual acquisition cost and up-charge cost which includes the patients' portion of the ingredient (drug) cost. Thus expenditures presented do not represent the net cost of the prescription to the drug plan.

[14] 1994/95 was the earliest year for which number of beneficiaries was available, the rest of the study spans period 1993/94 to 1998/99.

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.

Figure 2



5.0 Analysis

5.1 Drug Expenditures in Alberta's Drug Benefit Plan: 1993/94 to 1998/99

During the period 1993/94 to 1998/99, total Alberta Drug Benefit Plan expenditures on drug products considered in this analysis increased from $116.3 million to $208.3 million. These amounts differ from the total Drug Benefit Plan 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 are based on total accepted acquisition cost[15] and up-charge and includes the patients portion of the cost;

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[16], Exiting drugs and Others[17]. Table 1 summarizes the relative contribution each of the above components have on the total annual change in expenditures.

[15] Expenditures were based on total approved acquisition cost as this was the only available field which excluded dispensing fees and provided the best data for inter-jurisdictional comparison.

[16] Drugs are designated as new or exiting based on drug plan information not market information, thus a new drug is new to the formulary, not necessarily new on the Canadian market.

[17] Others represent the cross effect of price and volume. The cross effect is an interaction between changes in prices and changes in quantity. That is, it is a measure of the correlation between price changes and quantity changes. If a large change in price corresponds to 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, when a large increase in price is accompanied by a large decrease in quantity.

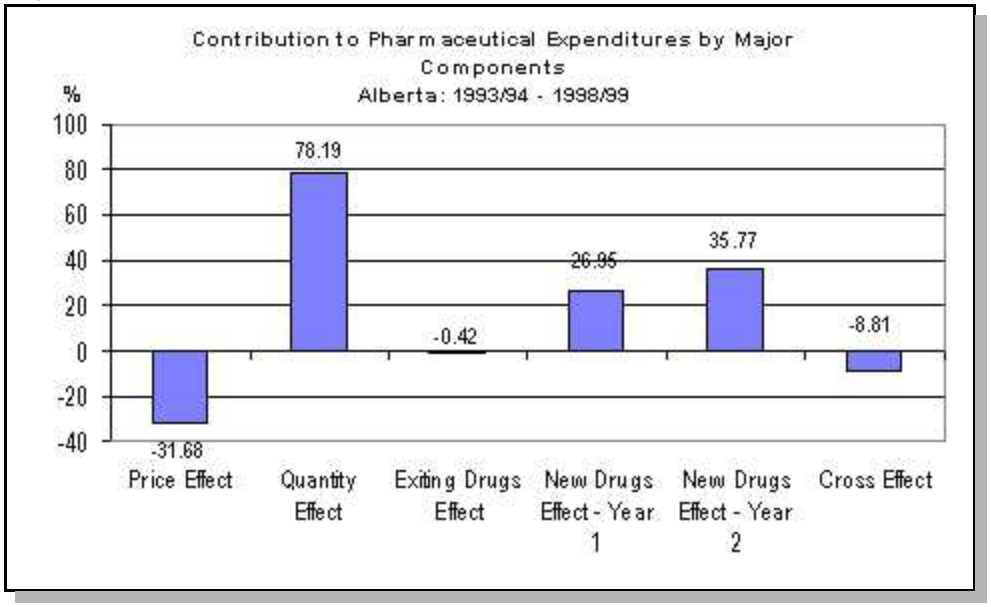
On average, between 1993/94 and 1998/99 per unit price changes seen by the province were responsible for -31.7% of the expenditure change[18], volume change or utilization was responsible for 78.2%, entry of new drugs was responsible for 62.7%, and both exiting drugs and other factors were responsible for -0.4% and -8.8% 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 the year of introduction on to the formulary (26.95%) and was even more significant the following year (35.77%).

Table 1

Average Contribution to Pharmaceutical Expenditures by Major Components
Alberta 1993/94 - 1998/99

Year	Price Effect (%)	Quantity Effect (%)	Exiting Effect (%)	New Drugs Effect Year 1 (%)	New Drugs Effect Year 2 (%)	Cross Effect (%)
1994/95	-168.90	261.00	-0.10	44.30	0.00	-36.30
1995/96	-60.80	76.50	-0.00	10.10	69.80	4.40
1996/97	37.40	-9.50	-0.20	66.20	16.70	-10.50
1997/98	-21.90	67.50	-0.30	17.10	49.70	-12.10
1998/99	-7.30	76.70	-1.20	10.40	26.20	-4.90
Average	**-31.68**	**78.19**	**-0.42**	**26.95**	**35.77**	**-8.81**

Figure 3



[18] It is important to note that this does not mean that prices declined by 31.7% over the time frame, a marginal decline in a popular drug may drive large negative price effects, as well, the introduction of LCA and 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 1993/94, i.e., drugs that were introduced in 1993/94 or before. Newer drugs are those drugs that were introduced in 1994/95 or during subsequent years. Expenditures on drugs that existed in 1993/94 fell by an average of 2.37% between 1993/94 and 1998/99, while expenditures on all drugs which includes both existing and newer drugs, increased by an average of 12.4% over this period. The average annual growth of newer drugs, on the other hand, was 71% throughout the period. In 1994/95 newer drugs accounted for 10% of overall expenditures, by 1998/99 the portion of expenditures on newer drugs rose to 51%.

Table 2

Pharmaceutical Expenditures
Alberta 1993/94 - 1998/99
(millions of dollars)

Year	All Drugs 1993/94 - 1998/99			Existing Drugs 1993/94 - 1998/99		
	Total Expenditure	Difference in Expenditure	% Growth Rate	Total Expenditure	Difference in Expenditure	% Growth Rate
1993/94	116.30			116.30		
1994/95	126.70	10.40	8.90	114.40	-1.90	-1.60
1995/96	148.00	21.30	16.80	113.80	-0.60	-0.50
1996/97	166.90	18.90	12.80	109.20	-4.60	-4.00
1997/98	184.30	17.40	10.40	109.20	0.00	0.00
1998/99	208.30	24.00	13.00	103.10	-6.10	-5.60

Figure 4 shows the contribution of each component in another way. As shown, pharmaceutical expenditures were increasing, on average, at a rate of 12.4% during the period 1993/94 to 1998/99. Figure 4 also shows that both utilization and new drugs were each responsible for roughly half of that growth, with utilization contributing 9.7% and new drugs contributing7.8%. (Their joint contribution was partially offset by the negative contributions from other factors.)

Figure 4

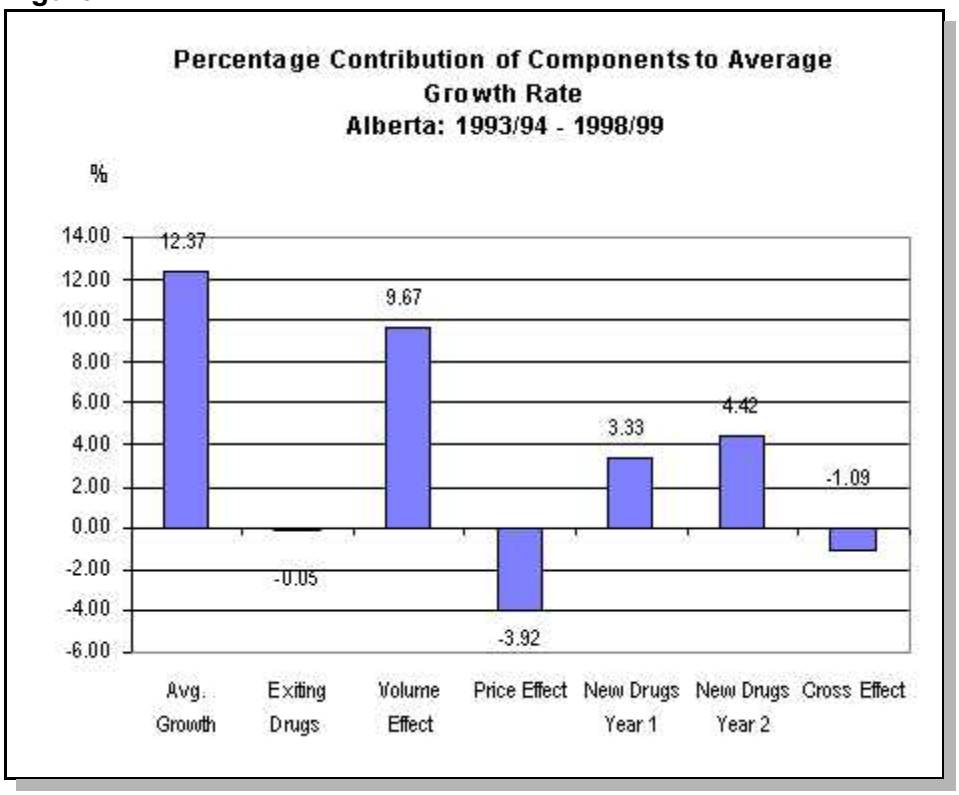


Figure 5 corresponds to Table 2, in that it shows the trends of expenditures on all, new and existing drug products. Figure 5 illustrates that as expenditures on existing drug products were falling over the years, expenditures on new drug products were increasing causing total expenditures to rise. Expenditures on existing drug products fell by 11.31% between 1993/94 and 1998/99. Expenditures on new drug products listed on the formulary increased by over 700% between 1994/95 and 1998/99 and total expenditures rose by approximately 79.2% over the entire period of analysis.

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 were falling; the average recognized per unit cost of an existing product fell from $0.38 in 1993/94 to $0.32 in 1998/99. The reverse is true for newer drugs, in 1994/95, the average per unit price of a newer prescription was $0.57, by 1998/99, the average per unit price rose to $0.77.[19]

Figure 5

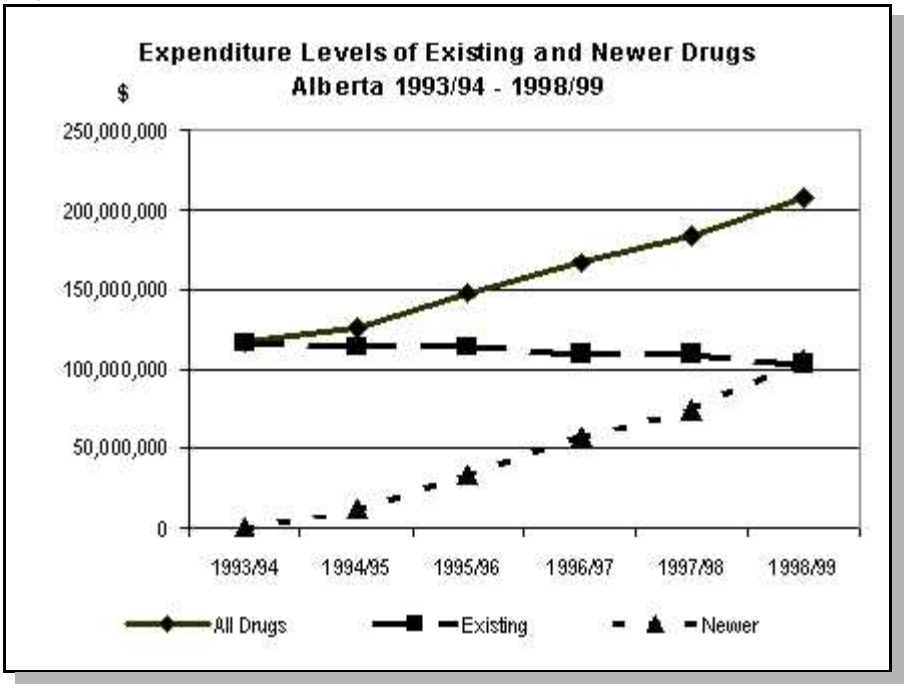
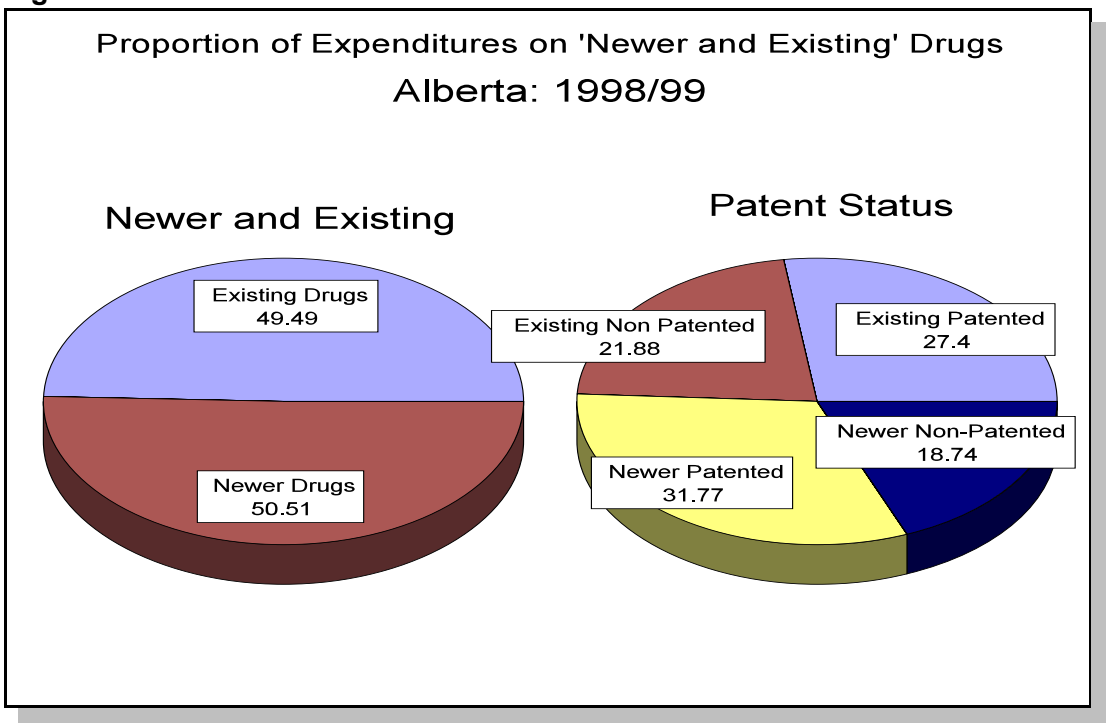


Figure 6 breaks out total pharmaceutical expenditures into patented and non patented expenditures on newer and existing drugs. Newer drugs accounted for 50.0% of expenditures in 1998/99. The figure also provides a more detailed breakdown out total pharmaceutical expenditures. In 1993/94, the proportion of patented and non-patented expenditures in total drug costs were 36.7% and 63.3%, respectively. In 1998/99 the share of expenditures absorbed by

[19] These numbers are not deflated by an inflation factor.

patented drugs had increased to 59.0%. About half of the 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[20].

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

[20] 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.

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.[21]

Figure 7

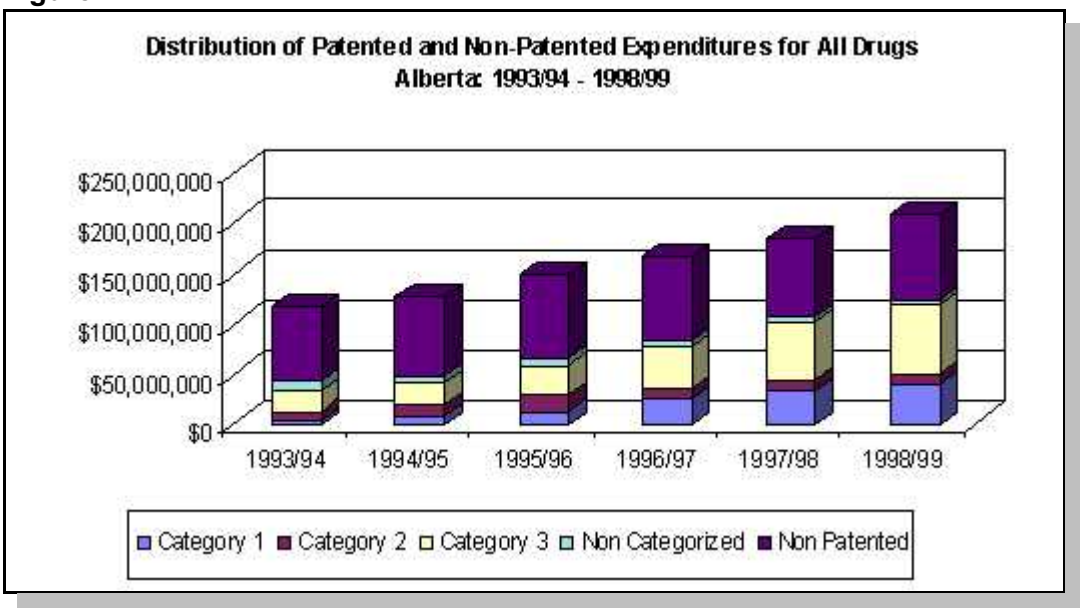


Figure 7 shows that in 1993/94 of the $42.6 million of expenditures accounted for by patented drugs, category 1 drugs made up 10.0% ($4.3 million) , category 2 drug products accounted for 20.0% ($8.7 million) , category 3 drug products accounted for 45% ($19.2 million) , and older non categorized drug products accounted for 25.0% ($10.5 million) . In 1998/99 of the $123.7 million of expenditures accounted for by patented drugs (59% of overall expenditures in that year) category 1 drugs made up 33.0% ($40.3 million) , category 2 drug products accounted for 7.0% ($9.0million) , category 3 drug products accounted for 56% ($69.1 million) , and older non categorized drug products accounted for 4.0% ($5.4 million).

[21] 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.

5.4 Growth of Expenditures on Newer Drug Products

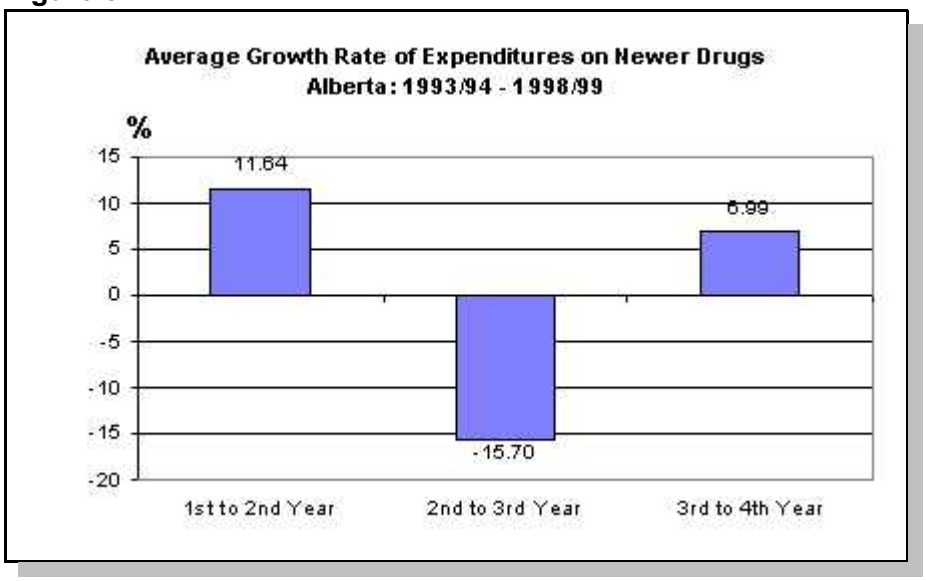
The information in Table 3 demonstrates how fast the market responds to new drugs. For example, expenditures on drugs introduced in 1994/95 were $12.4 million in that year, but had risen to $30.3 million in 1995/96. A similar increase in expenditures following the year of introduction can be observed for drugs that appeared in 1995/96. 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.

Table 3

Expenditure on Newer Drug Products
Alberta 1993/94 - 1998/99
(millions of dollars)

Year of Introduction	1994/95	1995/96	1996/97	1997/98	1998/99
1994/95	12.35	30.26	30.34	22.31	23.87
1995/96	n/a	3.97	9.84	12.40	13.71
1996/97	n/a	n/a	17.54	34.47	40.52
1997/98	n/a	n/a	n/a	5.89	21.08
1998/99	n/a	n/a	n/a	n/a	6.03
Total	**12.35**	**34.23**	**57.73**	**75.08**	**105.22**

Figure 8



In Figure 8, 1st-2nd Year represented the average growth of expenditures of new drugs between their first and second full year on the market. On average, the growth of expenditures in Alberta between their first and second full year on the market was 11.64%, this is significantly lower

than what was recorded in British Columbia and Ontario where the average growth rate was 43% and 28% respectively.

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 Anatomical Therapeutic Chemical (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 1993/94 and 1998/99.

Table 4

Percentage Contribution of Selected Therapeutic Classes to Total Expenditure Alberta 1993/94 - 1998/99

Therapeutic Class	Code	Contribution in 1993/94		Contribution in 1998/99		% of Total Expenditure Change	Average Rate of Expenditure Growth
		Expenditure (thousands)	% of Total	Expenditure (thousands)	% of Total		
Alimentary tract and metabolism	A	19,052	16.40	36,126	17.30	18.50	13.70
Antacids	A02	11,937	10.30	22,755	10.90	11.80	13.80
Drugs used for diabetes	A10	3,581	3.10	6,864	3.30	3.60	13.90
Others		3,534	3.00	6,507	3.10	3.20	13.00
Blood and blood forming agents	B	2,627	2.30	8,089	3.90	5.90	25.20
Antithrombotic agents	B01	1,959	1.70	4,175	2.00	2.40	16.30
Antianemic preparations	B03	663	0.60	3,896	1.90	3.50	42.50
Others		5	0.00	18	0.00	0.00	26.90
Cardiovascular system	C	48,956	42.10	83,838	40.20	37.90	11.40
Cardiac therapy	C01	5,496	4.70	6,286	3.00	0.90	2.70
Beta blocking agents	C07	4,839	4.20	6,043	2.90	1.30	4.50
Calcium channel blockers	C08	15,959	13.70	19,608	9.40	4.00	4.20
Agents Acting on the Renin-Angiotensin System	C09	12,403	10.70	25,947	12.50	14.70	15.90
Serum lipid reducing agents	C10	5,955	5.10	22,484	10.80	18.00	30.40
Others		4,306	3.70	3,470	1.70	-0.90	-4.20
Genito urinary system and sex hormones	G	2,628	2.30	7,492	3.60	5.30	23.30
Sex hormones and modulators of the genital system	G03	1,607	1.40	4,105	2.00	2.70	20.60
Others		1,021	0.90	3,387	1.60	2.60	27.10
General anti-infectives for systemic use	J	5,376	4.60	9,252	4.40	4.20	11.50
Anti-bacterials for systemic use	J01	4,858	4.20	7,741	3.70	3.10	9.80

Therapeutic Class	Code	Contribution in 1993/94		Contribution in 1998/99		% of Total Expenditure Change	Average Rate of Expenditure Growth
		Expenditure (thousands)	% of Total	Expenditure (thousands)	% of Total		
Others		518	0.40	1,511	0.70	1.10	23.90
Musculo-skeletal system	M	10,470	9.00	12,145	5.80	1.80	3.00
Anti-inflammatory and anti-rheumatic products	M01	9,803	8.40	8,469	4.10	-1.40	-2.90
Others		667	0.60	3,675	1.80	3.30	40.70
Nervous system	N	11,846	10.20	27,855	13.40	17.40	18.70
Analgesics	N02	2,444	2.10	5,410	2.60	3.20	17.20
Psycholeptics	N05	2,829	2.40	5,373	2.60	2.80	13.70
Psychoanaleptics	N06	3,152	2.70	11,775	5.70	9.40	30.20
Others		3,421	2.90	5,297	2.50	2.00	9.10
Respiratory system	R	8,568	7.40	13,180	6.30	5.00	9.00
Anti-asthmatics	R03	6,942	6.00	12,128	5.80	5.60	11.80
Others		1,626	1.40	1,052	0.50	-0.60	-8.30
Subtotal: ATC Level 2		**94,426**	**81.20**	**173,060**	**83.10**	**85.40**	**12.90**
Subtotal: ATC Level 1		**109,524**	**94.20**	**197,976**	**95.00**	**96.10**	**12.60**
Total		**116,264**	**100.00**	**208,326**	**100.00**	**100.00**	**12.40**

The top sixteen therapeutic classes, which were approximately 20% of the total number of therapeutic classes (at second level), accounted for 83.1% of total pharmaceutical expenditures in 1998/99.

Table 4 shows the percentage contribution of the top sixteen second-level therapeutic classes in total expenditures, as well as the contribution of each of the eight first-level ATC groups to which these sixteen therapeutic classes belong. (These eight ATC groups are: Cardiovascular Systems, Alimentary Tract and Metabolism, Central Nervous System, Respiratory System, General Anti-Infectives, Blood and Blood-Forming Organs, Musculo-Skeletal System and Genito-Urinary System and Sex Hormones.) Expenditures on these eight ATC groups were $198 million or 95.0% 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 1993/94 and 1998/99. Among the eight first-level ATC groups, drugs related to the Cardiovascular System made by far the largest contribution to the increase in expenditures (37.9%), followed by drugs related to the Alimentary Tract and Metabolism (18.5%) and Central Nervous System (17.4%).

Among the second-level anatomical 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 therapeutic classes contributed 18.0%, 14.7%, and 11.8%, respectively, to increases in pharmaceutical expenditures over the period 1993/94 to 1998/99. Psychoanaleptics (9.4%) and Anti-asthmatics (5.6%) also contributed significantly to expenditure growth.

Agents Acting on the Renin-Angiotensin System accounted for 10.7% of total expenditures in 1993/94. This share rose to 12.5% of total expenditures by 1989/99. The share of Lipid Reducing Agents rose from 5.1% in 1993/94 to 10.8% of total expenditures in 1998/99. Antacids rose from 10.3% of total expenditures in 1993/94 to 10.9% in 1998/99.

Table 5 below, reports on the average contribution to expenditure change by major component for the top 16 second-level therapeutic classes. Significant differences among the classes are evident, nonetheless, overall, price changes at the chemical (bio-equivalent) level do not contribute to increases in expenditures, where as introduction and increased utilization of newer, often more expensive, drugs increased expenditures. The average trends reported in Table 1 are consistent with the average reported for the top 16 classes.

Table 5 indicates that price adjustments tended to reduce expenditures for each of the top 16 therapeutic classes. Although volume effects were mostly positive there were notable exceptions, expenditure changes in Calcium Channel Blockers were mainly driven by introduction of newer drugs. The impact of new drugs was also pronounced in Antacids and Anti-inflammatory and Anti-rheumatic. The volume effect recorded for Calcium Channel Blockers, Anti-inflammatory and Anti-rheumatic drugs was significantly negative[22], and contrary to the general trends recorded overall and in the top 16 ATC's.

None of the major components for the top 16 level two ATC's diverge significantly from the overall average price effect presented in Figure 3.

[22] This result may be driven by therapeutic substitution within the category.

Table 5

Average Contribution to Pharmaceutical Expenditures by Major Components for the Top 16 Therapeutic Classes Alberta 1994/95 - 1998/99

Therapeutic Class	Code	Price Effect (%)	Quantity Effect (%)	New Drugs Effect Year 1 (%)	New Drugs Effect Year 2 (%)	Exiting Drugs Effect (%)	Cross Effect (%)
Antacids, drugs for treatment of peptic ulcer and flatulence	A02	-16.90	-10.40	94.80	41.40	-0.00	-8.90
Drugs used for diabetes	A10	-33.00	137.80	1.60	4.70	-0.00	-11.20
Anti-thrombotic agents	B01	-6.30	99.60	1.30	6.60	0.00	-1.10
Anti-anemic preparations	B03	14.90	82.90	0.80	1.50	0.00	-0.10
Cardiac therapy	C01	-242.10	371.80	8.20	11.00	-0.10	-48.80
Beta blocking agents	C07	-154.20	252.30	0.60	24.70	-0.40	-22.90
Calcium channel blockers	C08	-227.40	-173.10	63.10	327.80	0.00	109.50
Agents Acting on the Renin-Angiotensin System	C09	-5.60	83.80	12.90	13.20	0.00	-4.20
Serum lipid reducing agents	C10	-5.50	58.30	11.90	36.20	-0.00	-0.90
Sex hormones and modulators of the genital system	G03	-18.40	108.70	11.40	10.00	-0.70	-11.00
Anti-bacterials for systemic use	J01	25.30	159.20	7.80	8.80	-1.00	-100.00
Anti-inflammatory and anti-rheumatic products	M01	-281.80	-95.60	142.60	115.30	-0.00	19.50
Analgesics	N02	-11.60	97.30	20.40	25.80	-0.10	-31.90
Psycholeptics	N05	-57.90	131.90	12.70	22.60	-0.10	-9.30
Psychoanaleptics	N06	-22.10	111.20	6.30	8.30	0.00	-3.70
Anti-asthmatics	R03	-24.00	109.70	8.70	14.70	-0.10	-9.00
Average		**-31.50**	**71.80**	**26.40**	**37.90**	**-0.10**	**-4.60**

Following is a detailed analysis of the impact of existing and newer drugs for Lipid Reducing Agents, Agents Acting on the Renin-angiotensin System and Antacids. Appendix 4 provides background on the ATC classification system and a detailed analysis of the remaining therapeutic classes.

Serum Lipid Reducing Agents

Expenditures in this therapeutic class had the highest average growth (30.4%) among the top sixteen therapeutic classes. Table 7 shows that expenditures rose from $6.0 million in 1993/94 to $22.5 million in 1998/99.

In 1993/94 patented drugs accounted for 76.7% of total expenditures in this therapeutic class, and increased to 87.0% in 1998/99. Category 3 drugs absorbed 34.2% of expenditure in

1993/94. This share had risen to 61.0% by 1998/99. Expenditures on Category 2 drugs, accounting for 38.9% of expenditures in 1993/94, were a negligible 0.4% by 1998/99.

In 1998/99 the top drug products in this class were Pravachol Tab 20mg, Zocor Tab 10 & 20mg, Lipitor 10mg and Lipidil Micro Cap 200 mg. These drugs accounted for expenditures of $15.9 million (71%).

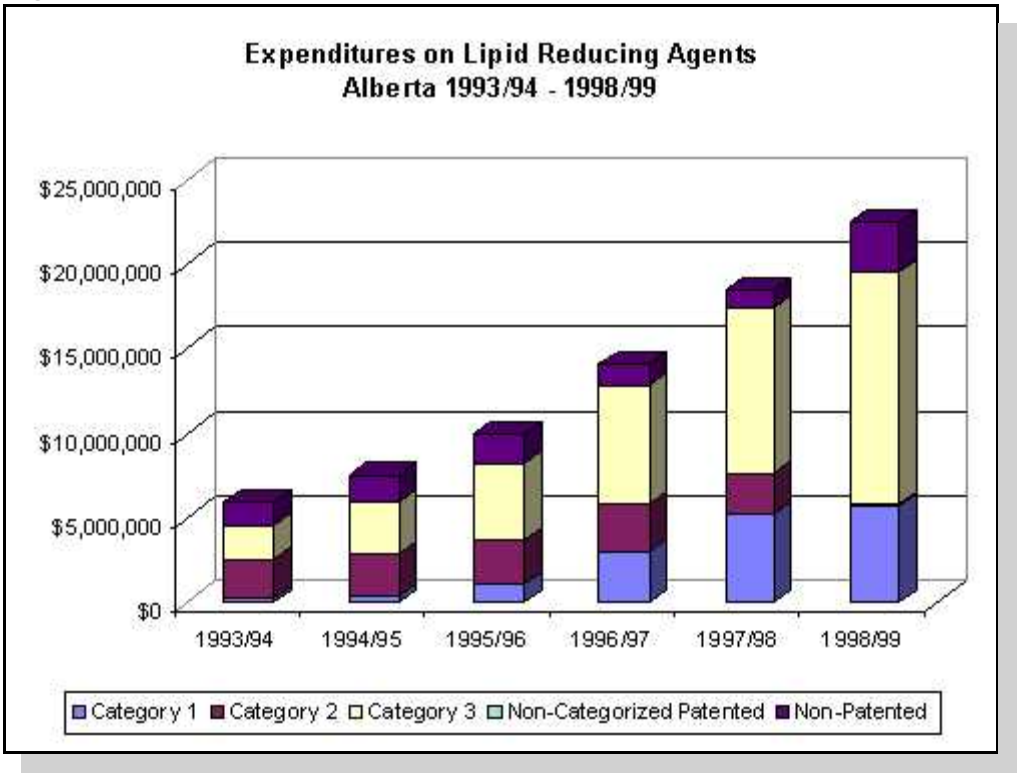
Table 6

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Serum Lipid Reducing Agents
(thousands of dollars)

Year of Introduction[23]	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		560	740	551	436	398	331
1993/94	1	218	323	405	515	588	92
1993/94	2	2,314	2,541	2,682	2,788	2,468	100
1993/94	3	2,355	3,491	4,924	6,793	8,283	9,001
1993/94	NC	508	301	293	203	117	76
1994/95		0	72	163	122	64	46
1994/95	3	0	93	307	491	634	595
1995/96		0	0	72	195	224	166
1995/96	1	0	0	624	2,522	4,063	4,679
1996/97		0	0	0	6	15	14
1996/97	1	0	0	0	7	160	237
1997/98		0	0	0	0	249	2,271
1997/98	1	0	0	0	0	403	750
1997/98	3	0	0	0	0	810	4,127
Total Expenditure		**5,955**	**7,561**	**10,023**	**14,077**	**18,478**	**22,484**
Patented Expenditure		**4,568**	**5,923**	**8,278**	**12,845**	**17,394**	**19,566**
Non-Patented Expenditure		**1,386**	**1,638**	**1,745**	**1,232**	**1,084**	**2,918**

[23] Year of introduction presented as 1993/94 represents drugs introduced prior to or in 1993/94.

Figure 9


Expenditures on Lipid Reducing Agents
Alberta 1993/94 - 1998/99
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Agents Acting on the Renin-angiotensin System

Expenditures in this therapeutic class had the second highest average growth (15.9%) among the top sixteen therapeutic classes.

In 1993/94, patented drugs accounted for 90.2% of expenditures on this therapeutic class. Expenditures on patented products were heavily concentrated on category 3 drugs (77% of total expenditures). By 1998/99, the patented drug share had dropped slightly to 86.8% of total expenditures, with all of this being on category 3 drugs.

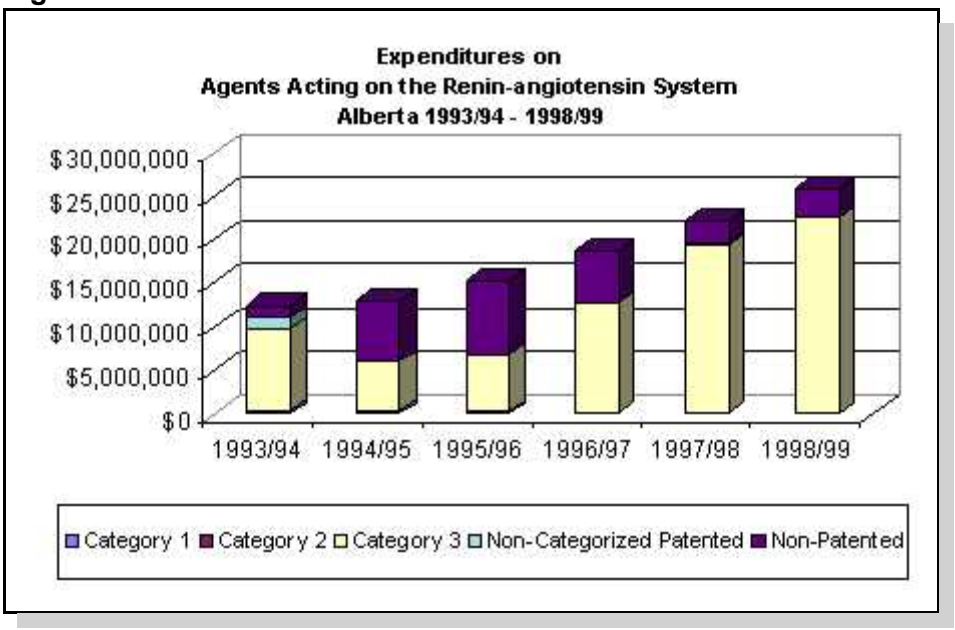
In 1998/99 the top drug products in this class in 1998/99 were Vasotec 5;10;20mg Tab, Cozaar 50mg Tab, and Monopril 10mg Tab, which accounted for expenditures of $12.8 million (49.2%).

Table 7

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Agents Acting on the Renin-angiotensin System
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,214	1,669	1,469	1,160	788	564
1993/94	1	347	297	260	173	72	45
1993/94	3	9,589	5,689	6,540	11,693	17,328	18,651
1993/94	NC	1,253	63	40	43	112	133
1994/95		0	5,252	6,721	4,297	813	850
1994/95	3	0	40	88	135	151	154
1995/96		0	0	75	413	753	951
1996/97	3	0	0	0	783	1,780	2,796
1997/98		0	0	0	0	328	832
1997/98	3	0	0	0	0	54	321
1998/99	1	0	0	0	0	0	40
1998/99	3	0	0	0	0	0	610
Total Expenditure		**12,403**	**13,008**	**15,193**	**18,697**	**22,178**	**25,947**
Patented Expenditure		**11,189**	**6,088**	**6,928**	**12,828**	**19,496**	**22,571**
Non-Patented Expenditure		**1,214**	**6,920**	**8,266**	**5,869**	**2,682**	**3,375**

Figure 10


Expenditures on
Agents Acting on the Renin-angiotensin System
Alberta 1993/94 - 1998/99
$30,000,000
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Antacids, Drugs for Treatment of Peptic Ulcer and Flatulence

Total expenditures in this therapeutic class rose from $11.9 million in 1993/94 to $22.8 million in 1998/99, with the share of patented drugs rising from 64.5% to 82.6%. This increase was largely driven by increased expenditures on category 1 drugs, which rose by $14.6 million over this period and represented 67.1% of all expenditures and 81% of all patented expenditures.

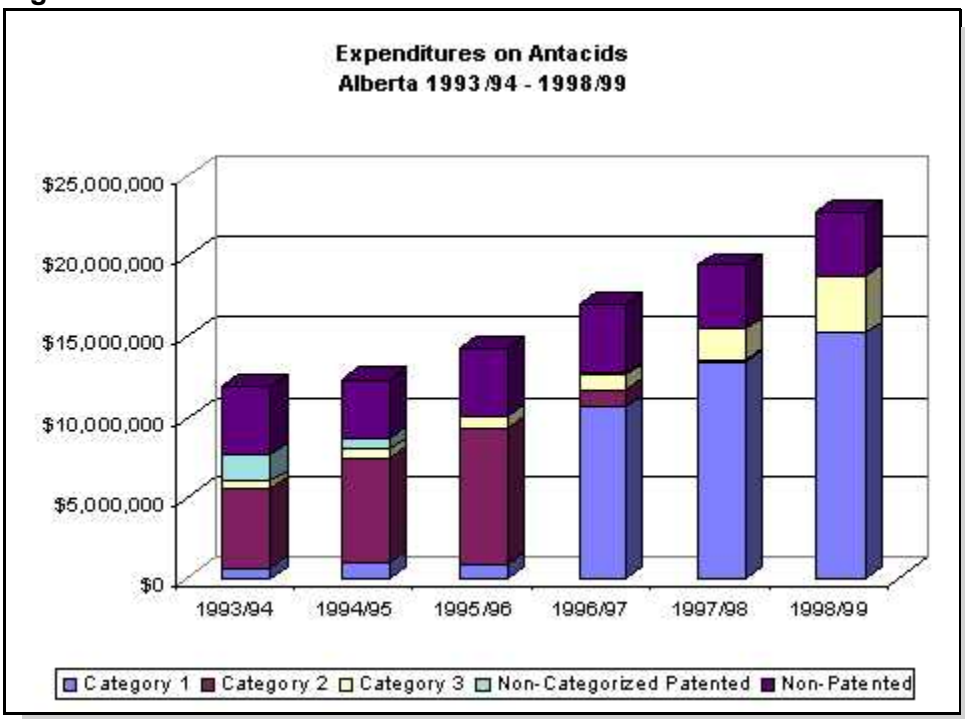
In 1998/99, the top drug product in this class were Losec 20mg, Prevacid SRC 30mg, Pantoloc, and Apo-Ranitidine Tab 150mg. Expenditures on these drugs represented 80% of overall expenditures in the category, $18.3 million. Losec alone represented $14.9 million or 65% of total expenditures.

Table 8

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Antacids
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		4,202	3,393	3,358	3,296	2,494	2,083
1993/94	1	635	946	894	686	557	388
1993/94	2	4,856	6,501	8,471	1,135	108	0
1993/94	3	496	588	667	804	852	858
1993/94	NC	1,747	685	603	560	496	445
1994/95		0	214	222	154	116	85
1994/95	NC	0	0	0	0	0	0
1995/96		0	0	25	43	38	42
1995/96	NC	0	0	1	0	0	0
1996/97		0	0	0	181	823	1,124
1996/97	1	0	0	0	9,934	12,957	14,921
1996/97	3	0	0	0	145	826	1,693
1997/98		0	0	0	0	49	161
1997/98	3	0	0	0	0	174	952
1998/99		0	0	0	0	0	3
1998/99	3	0	0	0	0	0	2
Total Expenditure		**11,937**	**12,326**	**14,242**	**16,938**	**19,491**	**22,755**
Patented Expenditure		**7,698**	**8,704**	**10,028**	**12,688**	**15,454**	**18,791**
Non-Patented Expenditure		**4,239**	**3,622**	**4,214**	**4,250**	**4,037**	**3,964**

Figure 11


Expenditures on Antacids
Alberta 1993/94 - 1998/99
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
1993/94
1994/95
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 Alberta's Drug Benefit Plan over the period 1993/94 to 1998/99.

During the period under review, expenditures increased from $116.3 million to $208.3 million. Growth in spending was driven by higher utilization and introduction and market penetration of newer drug products; ie. drugs introduced in 1994/95 or subsequent years.

On average, between 1993/94 and 1998/99, per unit price changes seen by the province were responsible for -31.7% of the expenditure change, volume change or utilization was responsible 78.2%, entry of new drugs were responsible for 62.8%, and both exiting drugs and other factors were responsible for -0.4% and -8.8% 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 some decrease in the average per unit price. The contribution of each of these factors change markedly in 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 eight ATC groups (Cardiovascular Systems, Central Nervous System, Alimentary Tract and Metabolism, Respiratory System, General Anti-infectives, Blood and Blood-Forming Organs, and Genito Urinary System and Sex Hormones) accounted for $200.0 million or 95.0% of total expenditures.

The Alberta Drug Benefit Plan underwent several changes since 1993/94 with a view to manage the growth in drug costs. Further analysis is necessary to fully understand the effect that these changes had on total pharmaceutical expenditures and utilization trends.

Appendix 1

Methodology

This study analyses the cost drivers in total pharmaceutical spending from 1993/94 to 1998/99 in Alberta.

In order to conduct the analysis, information on prices, quantities and expenditures were obtained from the Alberta Drug Benefit Plan 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 actual acquisition cost; wholesale mark-ups are included, however, dispensing and/or compounding fees are excluded. 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 Alberta Drug Benefit Plan database. Drugs with sales in 1993/94 or before, are termed as "existing" drugs while drugs with sales in 1994/95 and subsequent years are termed as "newer" drugs. If a drug is defined as being introduced in the first year of the data, ie. 1993/94, the drug was actually introduced prior to or in 1993/94.

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 period 1, New drugs can be separated into Volume and Price influences 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 in Period 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

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

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

Divide (4) *by* ΔTE_i

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

Estimates the influence of each component

The previous study was conducted on a calender basis and price was calculated at the din level, this study is based on a fiscal year 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 the substitution within multi-source markets and better represent the contribution of each cost driver component in the model.[24]

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 1993/94 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 1993/94 and 1998/99; This was done by calculating the difference between the level of expenditures of each therapeutic class between 1993/94 and 1998/99, and dividing the difference by the difference between the level of total expenditures between 1993/94 and 1998/99.
- identify the extent of substitution between new drugs and exiting drugs in each therapeutic class;
- identify the impact that category 1, 2 and 3 drugs have on the market.

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

Appendix 2

General Plan Information

ALBERTA

Provincial Drug Plans: Alberta

Beneficiaries Covered

The Alberta Government provides prescription drug coverage for Albertans through The Alberta Blue Cross Plans. All residents of Alberta are able to access prescription drug coverage through one of the non-group plans sponsored by Alberta Health and Wellness and administered by Alberta Blue Cross.

Alberta Blue Cross Group 66: provides premium free coverage for seniors (65 or older) and all eligible dependents.

Alberta Blue Cross Group 66A: provides premium free coverage for residents 55-64 years of age who qualify for the Alberta Widows' Pension Plan and all eligible dependants.

Alberta Blue Cross - Group 1 Plan: is available to all residents under the age of 65 who enroll and pay premiums.

Palliative Care Drug Program provides premium free coverage to palliative patients.

Other provincial ministries provide coverage for prescription drugs. Alberta Human Resource and Employment provides coverage for clients under programs such as (1) Support for Independence, (2) Children in Need, and (3) Assured Income for the Severely Handicapped. (Data from these plans are not included in the analysis.)

Also, funding is provided for long term and continuing care recipients and some specific disease states.

Deductibles, Co-payments and Professional Fees

There is no deductible for drug benefits while there is a 30 percent co-payment, up to a maximum of $25 per eligible drug per prescription.

Appendix 3

Population Changes and Top Selling Drugs

The following table reports on population growth in Alberta between 1993 and 1998 by age group. In 1993, the 30-39 age group represented the highest proportion of the total population, at 18.8%. This was followed by the 0-9 age group (15.2%), the 20-29 age group (14.9%) and the 10-19 age group (14.7%). In 1998, the 30-39 age group remained the largest group at 17.5% of the total population. The 40-49 age group increased to 15.7%. The 0-9 age group decreased to 14.3%.

Between 1993 and 1998, the highest growth rate was achieved by the 80-90+ (11.0%) age group. This group was followed by 50-59 (17.5 %) and 40-49 (13.9%) age groups.

Population Growth
Alberta 1993 - 1998

Age Group	1993		1998		Change 1993-1998	%Growth 1993-1998
	Population (thousands)	% of Total	Population (thousands)	% of Total		
0-9	424.49	15.89	414.21	14.25	-10.28	-2.42
10-19	385.75	14.44	429.87	14.79	44.12	11.44
20-29	422.47	15.82	432.77	14.89	10.30	2.44
30-39	510.57	19.12	507.35	17.45	-3.22	-0.63
40-49	361.30	13.53	455.39	15.67	94.09	26.04
50-59	222.84	8.34	280.20	9.64	57.37	25.74
60-69	176.02	6.59	190.99	6.57	14.97	8.50
70-79	113.54	4.25	131.24	4.51	17.70	15.59
80-90+	53.75	2.01	64.85	2.23	11.10	20.64
Seniors(65+)	248.29	9.30	287.14	9.88	38.84	15.64
All Ages	**2,670.73**	**100.00**	**2,906.87**	**100.00**	**236.14**	**8.84**

Source: Statistics Canada Catalogue Number 91-213

Top 25 Patented and Non Patented Drug Products Alberta 1997/98 - 1998/99						
DIN	**Ingredient**	**Brand**	**ATC**	**Year Of Introduction**	**1997/98**	**1998/99**
2190915	OMEPRAZOLE (OMEPRAZOLE MAGNESIUM)	LOSEC 20 MG	A	1996	12,957,293	14,920,640
893757	PRAVASTATIN SODIUM	PRAVACHOL TAB 20MG	C	1993	4,851,570	5,475,135
878928	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 5MG	C	1994	3,938,010	4,911,776
670901	ENALAPRIL MALEATE	VASOTEC TAB 10MG	C	1993	3,492,424	3,631,035
708879	ENALAPRIL MALEATE	VASOTEC TAB 5MG	C	1993	3,656,305	3,592,757
884332	SIMVASTATIN	ZOCOR TAB 10MG	C	1993	2,928,709	2,949,632
2230711	ATORVASTATIN (ATORVASTATIN CALCIUM)	LIPITOR 10MG	C	1997	595,220	2,854,999
1940481	PAROXETINE (PAROXETINE HYDROCHLORIDE)	PAXIL TAB 20MG	N	1993	2,272,290	2,809,323
2155907	NIFEDIPINE	ADALAT XL - SRT 30MG	C	1994	2,839,809	2,710,355
2182874	LOSARTAN POTASSIUM	COZAAR - TAB 50MG	C	1996	1,589,198	2,466,986
878936	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 10MG	C	1994	1,755,570	2,420,048
884340	SIMVASTATIN	ZOCOR TAB 20MG	C	1995	2,001,437	2,338,967
2146959	FENOFIBRATE	LIPIDIL MICRO - CAP 200MG	C	1995	2,047,498	2,325,006
2176017	CALCIUM CARBONATE	DIDROCAL -400MG TAB AND 1250MG TAB(500MG CA)	M	1996	812,762	2,230,179
2215055	BECLOMETHASONE DIPROPIONATE	BECLOFORTE INHALER - AEM INH 250MCG/AEM	R	1993	2,182,658	1,940,691
2220172	LOVASTATIN	APO-LOVASTATIN - TAB 20MG	C	1997	194,648	1,776,515
670928	ENALAPRIL MALEATE	VASOTEC TAB 20MG	C	1993	1,505,420	1,679,707
2231586	EPOETIN ALFA	EPREX STERILE SOLUTION 4000IU/0.4ML	B	1997	3,508	1,644,171
1962817	SERTRALINE (SERTRALINE HYDROCHLORIDE)	ZOLOFT CAP 50MG	N	1993	1,358,419	1,626,095
2165511	LANSOPRAZOLE	PREVACID - SRC 30MG	A	1996	716,941	1,539,390
2126591	EPOETIN ALFA	EPREX STERILE SOLUTION	B	1993	810,674	1,506,246
1917056	MISOPROSTOL	ARTHROTEC 50 TAB	M	1994	1,603,207	1,493,714
1984853	CLARITHROMYCIN	BIAXIN TAB 250MG	J	1993	1,229,286	1,414,135
1907107	FOSINOPRIL SODIUM	MONOPRIL TAB 10MG	C	1993	1,124,963	1,382,658
2049376	LISINOPRIL	ZESTRIL TAB 10MG	C	1993	1,219,416	1,316,998
Total					57,689,233	72,959,157

Top 10 Category 1 Patented Drug Products
Alberta 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year Of Introduction	1997/98	1998/99
2190915	OMEPRAZOLE (OMEPRAZOLE MAGNESIUM)	LOSEC 20 MG	A	1996	12,957,293	14,920,640
2155907	NIFEDIPINE	ADALAT XL - SRT 30MG	C	1994	2,839,809	2,710,355
884340	SIMVASTATIN	ZOCOR TAB 20MG	C	1995	2,001,437	2,338,967
2146959	FENOFIBRATE	LIPIDIL MICRO - CAP 200MG	C	1995	2,047,498	2,325,006
2176017	CALCIUM CARBONATE	DIDROCAL -400MG TAB AND 1250MG TAB(500MG CA)	M	1996	812,762	2,230,179
2231586	EPOETIN ALFA	EPREX STERILE SOLUTION 4000IU/0.4ML	B	1997	3,508	1,644,171
851752	BUDESONIDE	PULMICORT TURBUHALER 200 MCG/DOSE	R	1993	1,268,137	1,302,204
2155990	NIFEDIPINE	ADALAT XL - SRT 60MG	C	1994	1,227,088	1,292,413
2054817	CISAPRIDE (CISAPRIDE MONOHYDRATE)	PREPULSID TAB 20MG	A	1994	963,240	1,195,313
870935	LEVODOPA	SINEMET CR 200/50	N	1993	1,016,107	1,147,121

Top 10 Category 2 Patented Drug Products
Alberta 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year Of Introduction	1997/98	1998/99
2126591	EPOETIN ALFA	EPREX STERILE SOLUTION	B	1993	810,674	1,506,246
2155966	CIPROFLOXACIN (CIPROFLOXACIN HYDROCHLORIDE)	CIPRO 500 - TAB 500MG	J	1993	1,179,978	1,294,877
2212161	SUMATRIPTAN (SUMATRIPTAN SUCCINATE)	IMITREX - TAB 100MG	N	1994	913,264	977,668
2010909	FINASTERIDE	PROSCAR TAB 5MG	G	1995	934,487	976,500
2031116	TERBINAFINE (TERBINAFINE HYDROCHLORIDE)	LAMISIL TAB 250MG	D	1994	867,766	852,269
1978926	BUDESONIDE	PULMICORT NEBUAMP 0.5 MG/ML	R	1993	592,172	713,007
2155958	CIPROFLOXACIN (CIPROFLOXACIN HYDROCHLORIDE)	CIPRO 250 - TAB 250MG	J	1993	464,981	512,758
2213575	ONDANSETRON (ONDANSETRON HYDROCHLORIDE DIHYDRATE)	ZOFRAN - TAB 8MG	A	1993	371,640	456,831
2126583	EPOETIN ALFA	EPREX STERILE SOLUTION	B	1993	1,842,834	270,847
1968017	FILGRASTIM (R-METHUG-CSF)	NEUPOGEN INJ LIQ 0.3MG/ML	L	1993	200,709	246,738

Top 10 Category 3 Patented Drug Products
Alberta 1997/98 - 1998/99

DIN	Ingredient	Brand	ATC	Year Of Introduction	1997/98	1998/99
893757	PRAVASTATIN SODIUM	PRAVACHOL TAB 20MG	C	1993	4,851,570	5,475,135
878928	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 5MG	C	1994	3,938,010	4,911,776
670901	ENALAPRIL MALEATE	VASOTEC TAB 10MG	C	1993	3,492,424	3,631,035
708879	ENALAPRIL MALEATE	VASOTEC TAB 5MG	C	1993	3,656,305	3,592,757
884332	SIMVASTATIN	ZOCOR TAB 10MG	C	1993	2,928,709	2,949,632
2230711	ATORVASTATIN (ATORVASTATIN CALCIUM)	LIPITOR 10MG	C	1997	595,220	2,854,999
1940481	PAROXETINE (PAROXETINE HYDROCHLORIDE)	PAXIL TAB 20MG	N	1993	2,272,290	2,809,323
2182874	LOSARTAN POTASSIUM	COZAAR - TAB 50MG	C	1996	1,589,198	2,466,986
878936	AMLODIPINE (AMLODIPINE BESYLATE)	NORVASC TAB 10MG	C	1994	1,755,570	2,420,048
670928	ENALAPRIL MALEATE	VASOTEC TAB 20MG	C	1993	1,505,420	1,679,707

Appendix 4

Therapeutic Class Analysis

Percentage Contribution to Total Expenditure by Therapeutic Class Alberta 1993/94 - 1998/99						
Therapeutic Class	Code	1993/94		1998/99		% of Total Expenditure Change
		$ (millions)	% of Total	$ (millions)	% of Total	
Cardiovascular system	C	49.00	42.10	83.80	40.20	37.90
Alimentary tract and metabolism	A	19.10	16.40	36.10	17.30	18.50
Nervous system	N	11.80	10.20	27.90	13.40	17.40
Respiratory system	R	8.60	7.40	13.20	6.30	5.00
Musculo-skeletal system	M	10.50	9.00	12.10	5.80	1.80
Anti-infectives for systemic use	J	5.40	4.60	9.30	4.40	4.20
Blood and blood forming agents	B	2.60	2.30	8.10	3.90	5.90
Genito-urinary system and sex hormones	G	2.60	2.30	7.50	3.60	5.30
Dermatologicals	D	1.80	1.50	3.50	1.70	1.90
Sensory organs	S	2.20	1.90	3.20	1.50	1.00
Hormone therapy exc. sex hormones	H	0.90	0.80	1.50	0.70	0.60
Anti-neoplastic and immunomodulating agents	L	0.30	0.30	1.40	0.70	1.20
Anti-parasitic products, insecticides and repellents	P	0.20	0.20	0.40	0.20	0.30
Unclassified		1.10	1.00	0.10	0.10	-1.00
Various		0.10	0.10	0.20	0.10	0.00
Total		116.30	100.00	208.30	100.00	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
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)
B03	Antianemic preparations	Iron preparations; Vitamin B_{12} and Folic acid & Others (erythropoietin)
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

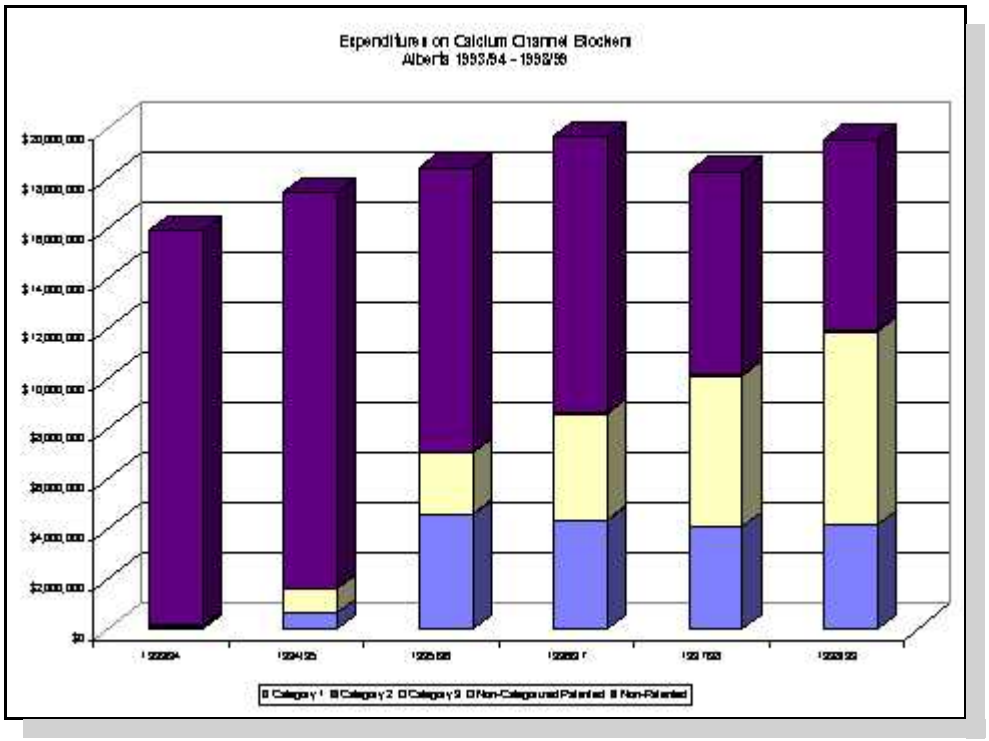
ATC	Therapeutic Class	Subgroups*
G03	Sex hormones and modulators of the genital system	Hormonal contraceptives for systemic use (including progestogens); Androgens; Estrogens; Progestogens; Androgens and female sex hormones in combination; Progestogens and Estrogens in combination; Gonadotropins and other ovulation stimulants; Antiandrogens & Others [Antigonadotropins and similar agents; antiprogestogens & selective estrogen receptor modulators (raloxifene)]
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
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)
N02	Analgesics	Opioids (natural opium alkaloids such as morphine, codeine..; phenylpiperidines derivatives such as pethidine, fentanyl..; diphenylpropylamine derivatives such as methadone; pentazocine; morphinan derivative such as butorphanol and nalbuphine; opioids in combination with antispasmodics); Other analgesics and antipyretics (salicylic acid and derivatives, pyrazolones, anilides such as paracetamol); Antimigraine preparations (ergot alkaloids, selective $5HT_1$-receptor agonists & other antimigraine preparations such as pizotifen, clonidine)
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)

ATC	Therapeutic Class	Subgroups*
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)

* main one listed

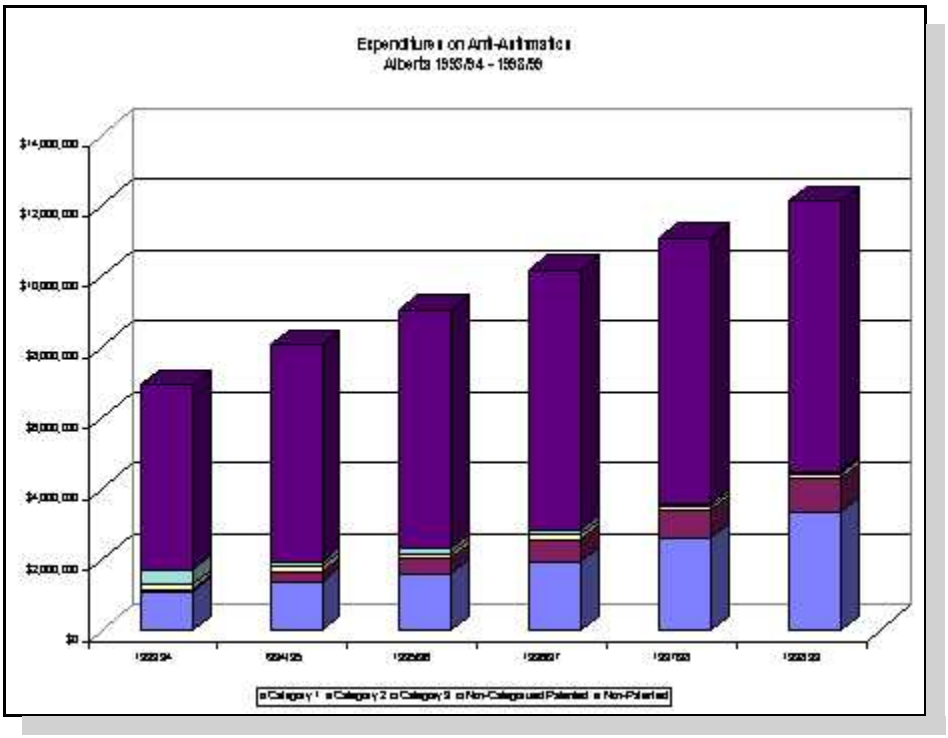
Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Calcium Channel Blockers
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		15,808	14,974	3,982	2,990	1,103	1,004
1993/94	2	19	6	17	16	13	3
1993/94	3	67	260	314	340	360	401
1993/94	NC	65	57	50	41	34	27
1994/95		0	831	7,363	7,617	717	154
1994/95	1	0	630	4,579	4,343	4,086	4,026
1994/95	3	0	704	2,144	3,903	5,694	7,332
1995/96		0	0	1	40	52	46
1996/97		0	0	0	426	6,045	4,425
1997/98		0	0	0	0	173	1,675
1997/98	1	0	0	0	0	36	377
1998/99		0	0	0	0	0	2
1998/99	1	0	0	0	0	0	135
Total Expenditure		**15,959**	**17,461**	**18,450**	**19,716**	**18,311**	**19,608**
Patented Expenditure		**151**	**1,657**	**7,104**	**8,643**	**10,185**	**11,924**
Non-Patented Expenditure		**15,808**	**15,804**	**11,346**	**11,073**	**8,126**	**7,683**


Expenditure on Calcium Channel Blockers
Alberta 1993/94 - 1998/99
$20,000,000
$18,000,000
$16,000,000
$14,000,000
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$0
Category 1 Category 2 Category 3 Non-Categorized Patented Non-Patented

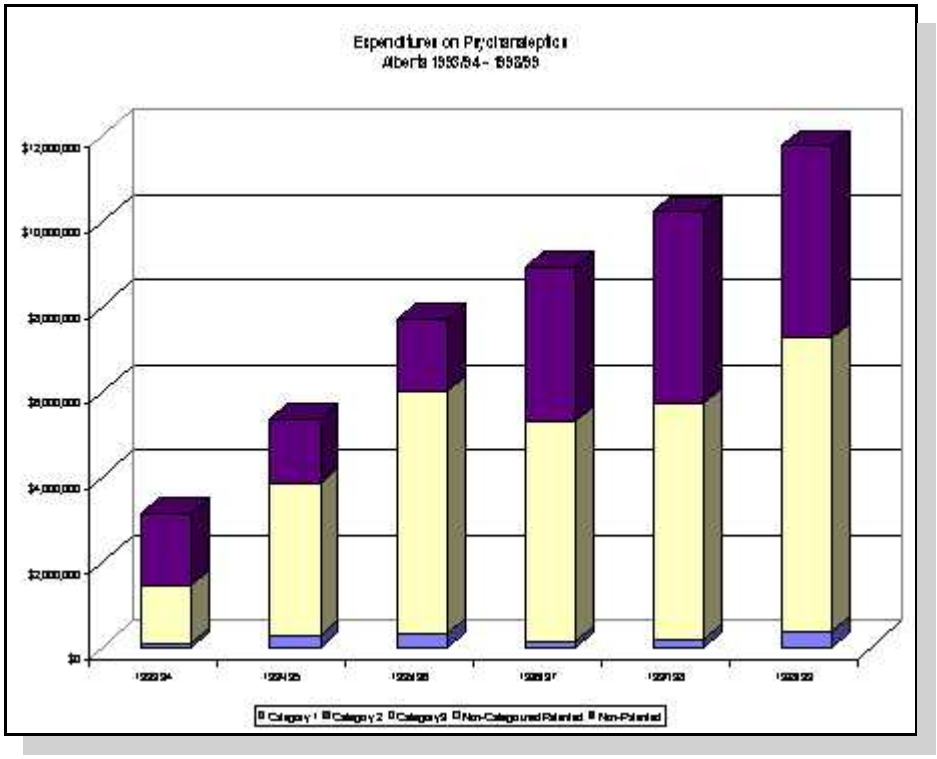
Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Anti-Asthmatics
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		4,317	4,353	4,062	4,287	4,077	3,665
1993/94	1	1,464	2,045	2,296	2,504	2,542	2,576
1993/94	2	49	252	429	632	775	935
1993/94	3	138	150	171	147	109	86
1993/94	NC	974	1,101	1,184	1,281	1,417	1,462
1994/95		0	152	206	196	162	149
1994/95	NC	0	0	0	0	0	0
1995/96		0	0	698	932	984	1,059
1996/97		0	0	0	103	300	456
1996/97	1	0	0	0	102	688	1,286
1997/98		0	0	0	0	7	11
1997/98	3	0	0	0	0	8	62
1998/99		0	0	0	0	0	334
1998/99	1	0	0	0	0	0	46
Total Expenditure		**6,942**	**8,053**	**9,045**	**10,184**	**11,068**	**12,128**
Patented Expenditure		**1,720**	**1,938**	**2,311**	**2,845**	**3,595**	**4,499**
Non-Patented Expenditure		**5,222**	**6,115**	**6,734**	**7,339**	**7,474**	**7,629**


Expenditures on Anti-Asthmatics
Alberta 1993/94 - 1998/99
$14,000,000
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$0
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

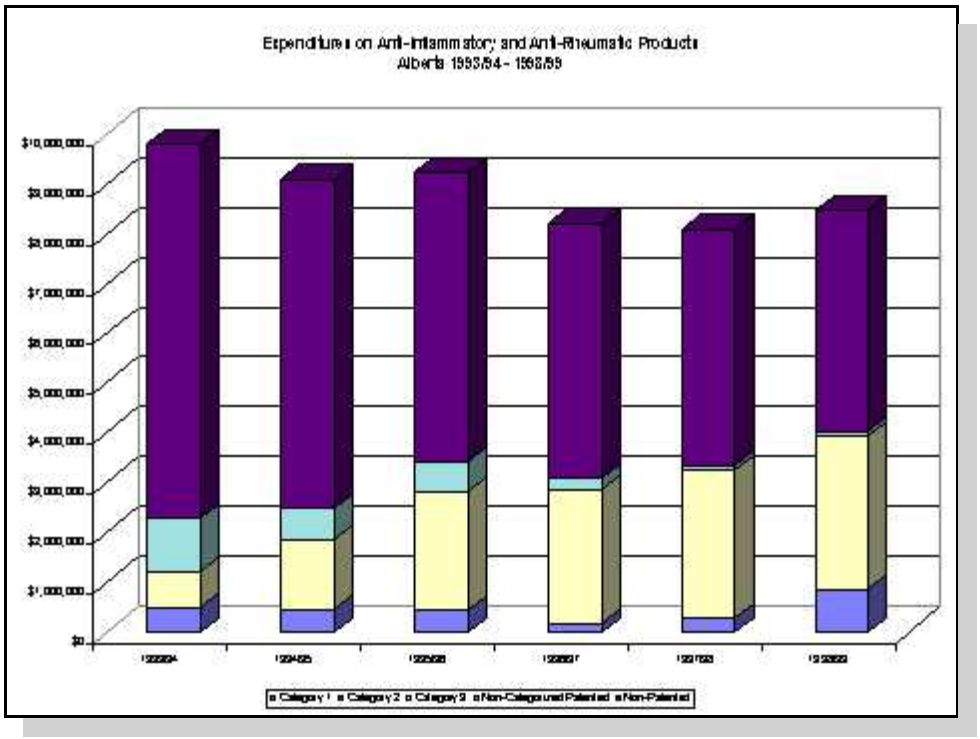
Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Psychoanaleptica
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,583	1,389	1,389	1,449	1,226	926
1993/94	1	90	276	348	72	15	19
1993/94	3	1,361	3,505	5,435	4,617	5,079	5,404
1993/94	NC	117	17	15	11	10	31
1994/95		0	101	220	231	230	239
1994/95	3	0	67	237	383	536	662
1995/96		0	0	77	185	222	222
1996/97		0	0	0	175	769	1,013
1996/97	1	0	0	0	1,628	1,353	1,227
1996/97	3	0	0	0	185	459	647
1997/98		0	0	0	0	334	780
1998/99		0	0	0	0	0	373
1998/99	1	0	0	0	0	0	69
1998/99	3	0	0	0	0	0	162
1998/99	NC	0	0	0	0	0	1
Total Expenditure		**3,152**	**5,355**	**7,721**	**8,935**	**10,234**	**11,775**
Patented Expenditure		**1,452**	**3,848**	**6,020**	**5,314**	**5,733**	**7,261**
Non-Patented Expenditure		**1,700**	**1,507**	**1,701**	**3,621**	**4,501**	**4,514**


Expenditures on Psycholeptics
Alberta 1993/94 - 1998/99
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$0
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

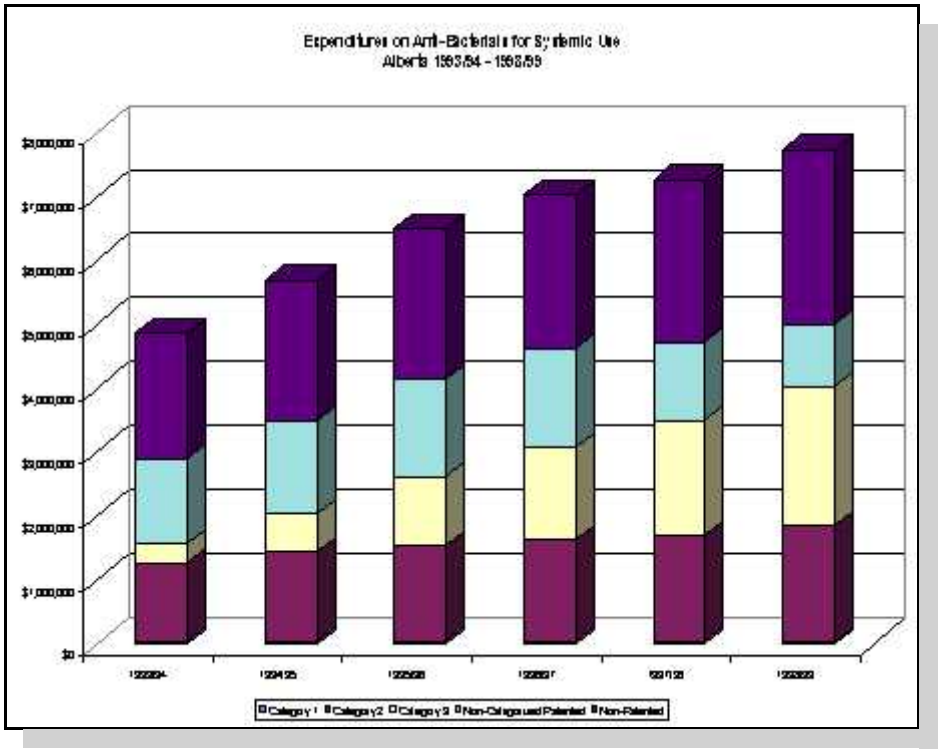
Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Anti-Inflammatory and Anti-Rheumatic Products
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		3,788	3,564	3,308	2,118	1,627	1,488
1993/94	1	496	477	443	143	68	62
1993/94	3	732	737	658	607	524	377
1993/94	NC	4,788	3,319	2,018	583	624	732
1994/95		0	310	606	494	363	319
1994/95	1	0	12	12	9	9	9
1994/95	3	0	670	1,136	1,462	1,603	1,494
1995/96		0	0	443	945	741	681
1995/96	3	0	0	611	888	1,033	1,223
1996/97		0	0	0	918	1,205	623
1996/97	1	0	0	0	43	42	44
1997/98		0	0	0	0	89	201
1997/98	1	0	0	0	0	160	746
1998/99		0	0	0	0	0	471
Total Expenditure		**9,803**	**9,089**	**9,235**	**8,212**	**8,088**	**8,469**
Patented Expenditure		**2,288**	**2,494**	**3,420**	**3,075**	**3,358**	**4,033**
Non-Patented Expenditure		**7,516**	**6,595**	**5,814**	**5,136**	**4,730**	**4,437**


Expenditures on Anti-Inflammatory and Anti-Rheumatic Products
Alberta 1993/94 - 1998/99
$10,000,000
$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
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

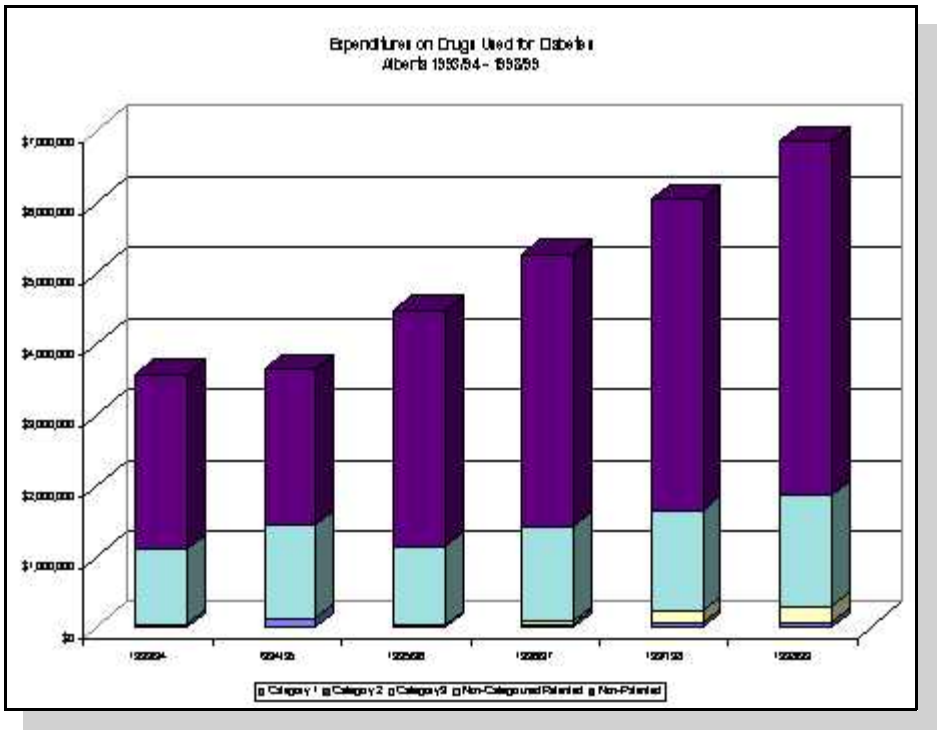
Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Anti-Bacterials for Systemic Use
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,866	2,016	1,943	1,951	1,908	1,919
1993/94	1	54	53	45	40	26	17
1993/94	2	1,217	1,391	1,482	1,574	1,645	1,808
1993/94	3	300	593	1,074	1,386	1,516	1,652
1993/94	NC	1,421	1,562	1,682	1,696	1,356	1,046
1994/95		0	40	106	119	145	126
1994/95	1	0	38	93	85	75	77
1994/95	3	0	0	0	0	0	0
1994/95	NC	0	1	1	3	4	5
1995/96		0	0	48	75	68	84
1995/96	1	0	0	8	9	18	20
1995/96	3	0	0	3	9	14	15
1995/96	NC	0	0	2	11	18	5
1996/97		0	0	0	22	61	123
1996/97	1	0	0	0	1	0	0
1996/97	3	0	0	0	47	272	386
1996/97	NC	0	0	0	0	1	1
1997/98		0	0	0	0	144	265
1997/98	3	0	0	0	0	2	1
1998/99		0	0	0	0	0	51
1998/99	1	0	0	0	0	0	0
1998/99	3	0	0	0	0	0	141
1998/99	NC	0	0	0	0	0	0
Total Expenditure		**4,858**	**5,694**	**6,487**	**7,028**	**7,271**	**7,741**
Patented Expenditure		**2,895**	**3,493**	**4,143**	**4,634**	**4,726**	**5,002**
Non-Patented Expenditure		**1,964**	**2,201**	**2,344**	**2,394**	**2,546**	**2,739**


Expenditures on Anti-Bacterials for Systemic Use
Alberta 1993/94 - 1998/99
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Drugs Used for Diabetes
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		2,476	1,497	1,507	1,739	1,975	1,766
1993/94	1	54	135	193	249	307	404
1993/94	NC	1,051	1,303	1,801	2,066	2,164	2,307
1994/95		0	715	920	635	622	622
1994/95	1	0	5	11	14	16	21
1995/96		0	0	49	421	583	746
1996/97		0	0	0	99	161	219
1996/97	3	0	0	0	45	170	229
1997/98		0	0	0	0	46	136
1998/99		0	0	0	0	0	351
1998/99	NC	0	0	0	0	0	62
Total Expenditure		**3,581**	**3,653**	**4,481**	**5,267**	**6,043**	**6,864**
Patented Expenditure		**1,105**	**1,442**	**1,157**	**1,435**	**1,663**	**1,865**
Non-Patented Expenditure		**2,476**	**2,212**	**3,324**	**3,832**	**4,380**	**4,999**


Expenditures on Drugs Used for Diabetes
Alberta 1993/94 - 1998/99
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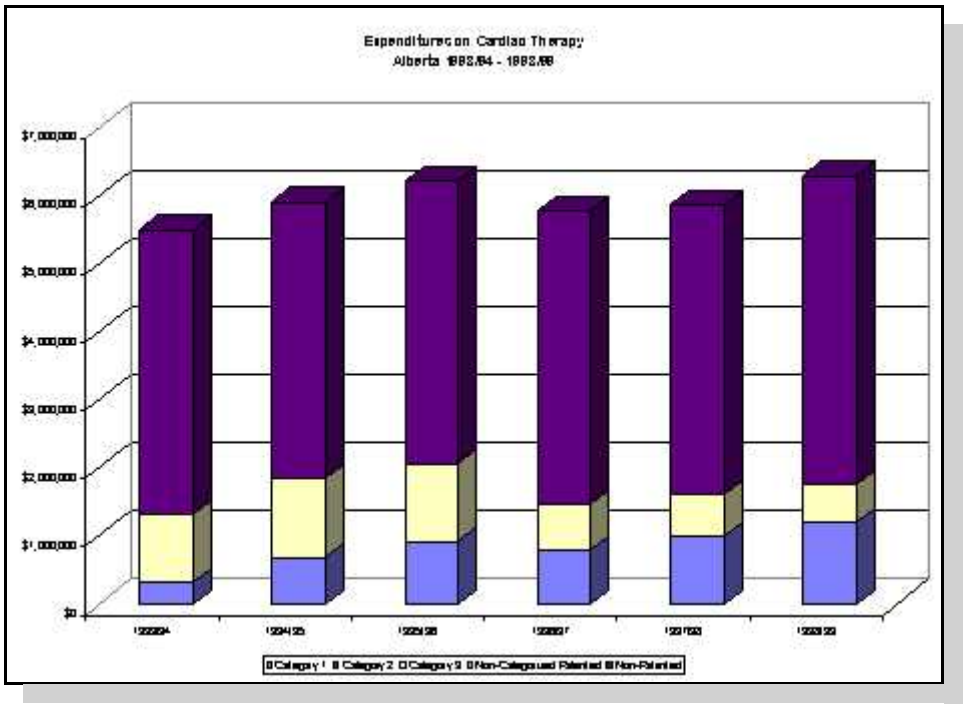
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Cardiac Therapy
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		3,737	3,673	3,783	3,975	3,894	4,157
1993/94	1	451	725	866	693	798	947
1993/94	3	984	1,164	1,148	676	624	558
1993/94	NC	323	279	266	240	220	192
1994/95		0	0	0	0	0	0
1994/95	1	0	63	142	145	165	179
1996/97		0	0	0	35	81	110
1996/97	1	0	0	0	10	70	108
1997/98		0	0	0	0	1	11
1998/99		0	0	0	0	0	22
1998/99	1	0	0	0	0	0	2
Total Expenditure		**5,496**	**5,905**	**6,205**	**5,775**	**5,853**	**6,286**
Patented Expenditure		**1,325**	**1,854**	**2,070**	**1,469**	**1,614**	**1,759**
Non-Patented Expenditure		**4,171**	**4,051**	**4,135**	**4,306**	**4,240**	**4,527**


Expenditures on Cardiac Therapy
Alberta 1992/94 - 1997/98
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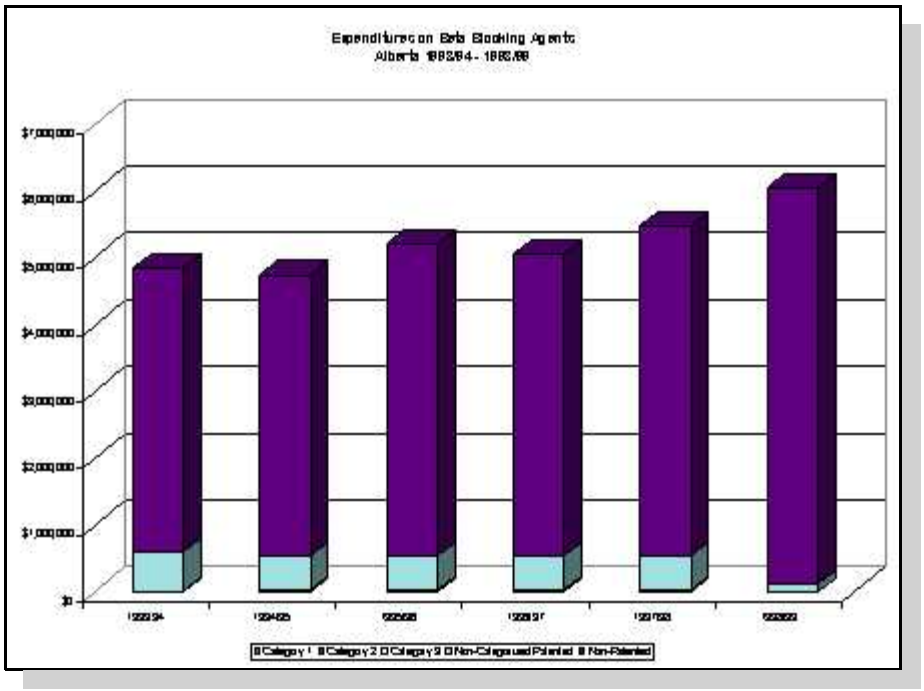
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
1992/94
1994/95
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Beta Blocking Agents
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		3,708	4,018	4,301	2,772	2,366	2,342
1993/94	1	33	63	68	63	55	52
1993/94	NC	1,098	662	665	633	620	625
1994/95		0	1	4	7	16	20
1995/96		0	0	167	791	988	1,048
1996/97		0	0	0	799	1,211	1,393
1997/98		0	0	0	0	233	487
1998/99		0	0	0	0	0	76
Total Expenditure		**4,839**	**4,744**	**5,205**	**5,066**	**5,489**	**6,043**
Patented Expenditure		**586**	**543**	**545**	**547**	**534**	**124**
Non-Patented Expenditure		**4,253**	**4,201**	**4,660**	**4,518**	**4,955**	**5,919**


Expenditures on Beta Blocking Agents
Alberta 1993/94 - 1998/99
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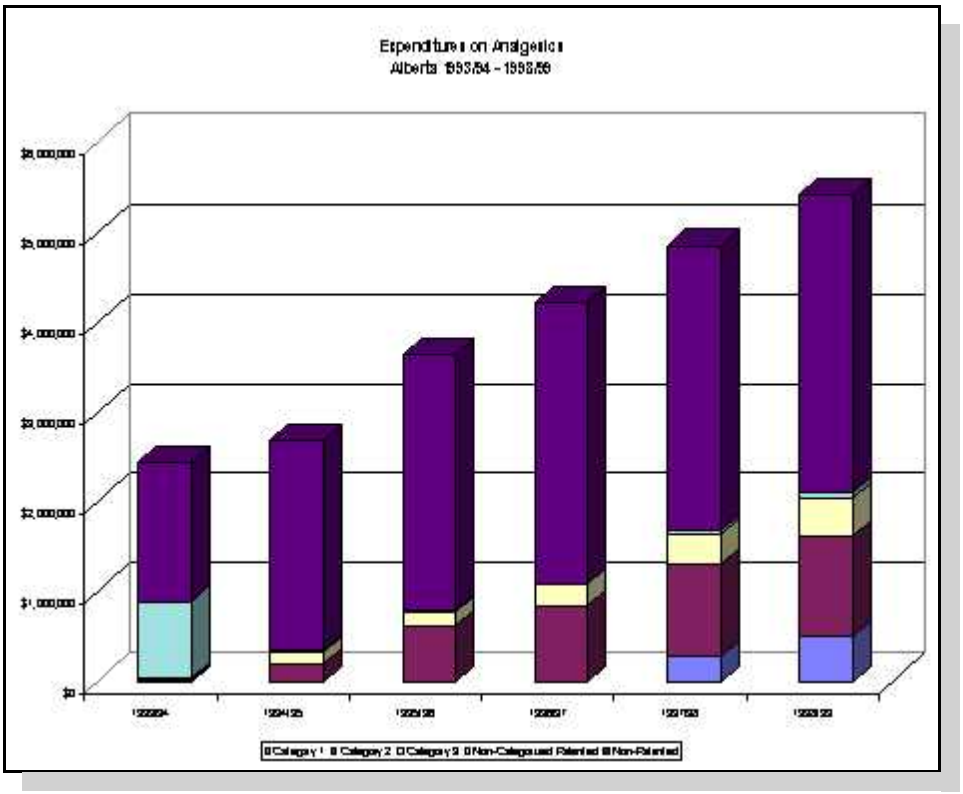
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Analgesics
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,550	1,280	1,442	1,551	1,510	1,625
1993/94	1	15	51	101	101	111	129
1993/94	3	19	147	169	234	331	374
1993/94	NC	859	877	1,104	1,257	1,340	1,344
1994/95		0	61	80	87	87	123
1994/95	2	0	184	610	842	1,011	1,104
1994/95	3	0	75	100	83	54	45
1995/96		0	0	25	48	43	33
1996/97		0	0	0	6	8	9
1996/97	1	0	0	0	0	42	62
1997/98		0	0	0	0	3	3
1997/98	1	0	0	0	0	251	441
1997/98	3	0	0	0	0	11	52
1997/98	NC	0	0	0	0	50	63
1998/99		0	0	0	0	0	0
1998/99	1	0	0	0	0	0	4
Total Expenditure		**2,444**	**2,676**	**3,632**	**4,210**	**4,851**	**5,410**
Patented Expenditure		**894**	**354**	**785**	**1,081**	**1,689**	**2,100**
Non-Patented Expenditure		**1,550**	**2,322**	**2,846**	**3,129**	**3,162**	**3,311**


Expenditures on Analgesics
Alberta 1993/94 - 1998/99
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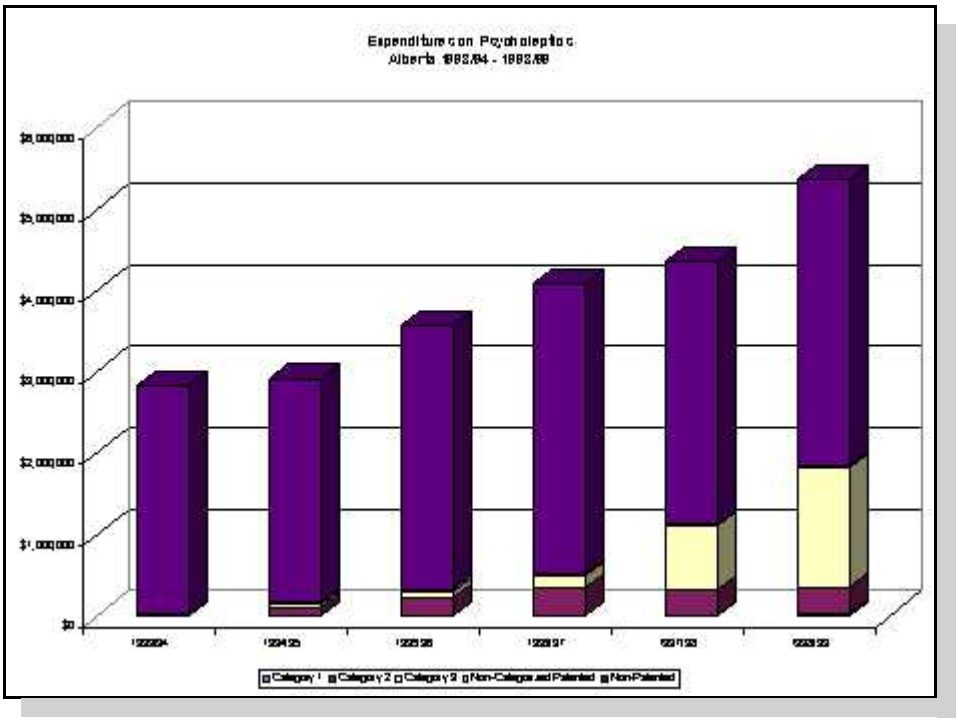
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Psycholeptics
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,273	1,143	1,265	1,239	970	923
1993/94	1	42	56	53	40	29	19
1993/94	2	18	114	223	342	328	330
1993/94	3	826	1,119	1,462	1,344	284	370
1993/94	NC	670	483	569	605	334	297
1994/95		0	1	1	3	2	1
1995/96		0	0	4	34	45	48
1996/97		0	0	0	474	1,259	1,181
1996/97	3	0	0	0	1	288	577
1997/98		0	0	0	0	553	981
1997/98	3	0	0	0	0	270	550
1998/99		0	0	0	0	0	52
1998/99	1	0	0	0	0	0	30
1998/99	3	0	0	0	0	0	14
Total Expenditure		**2,829**	**2,915**	**3,579**	**4,082**	**4,363**	**5,373**
Patented Expenditure		**33**	**167**	**334**	**524**	**1,137**	**1,851**
Non-Patented Expenditure		**2,796**	**2,748**	**3,244**	**3,558**	**3,226**	**3,522**


Expenditures on Psycholeptics
Alberta 1992/94 - 1997/98
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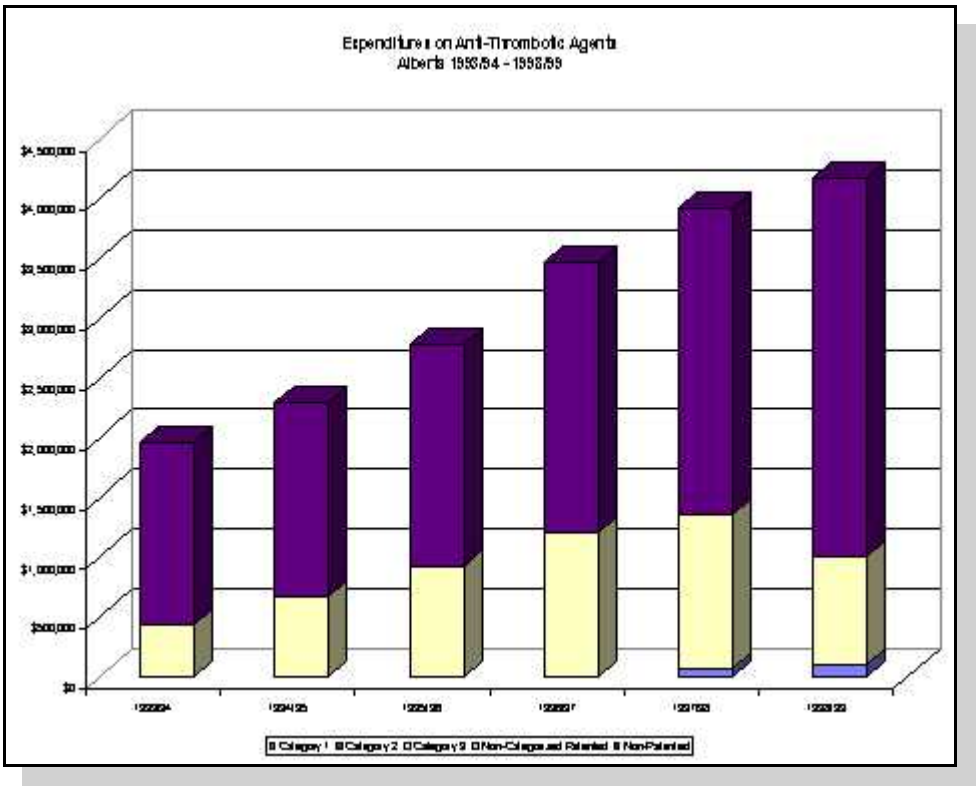
$3,000,000
$2,000,000
$1,000,000
$0
Category 1
Category 2
Category 3
Non-Category and Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Anti-Thrombotic Agents
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,529	1,617	1,831	2,230	2,536	2,901
1993/94	3	429	665	911	1,115	1,210	830
1994/95		0	7	20	34	22	17
1995/96		0	0	3	1	4	2
1995/96	3	0	0	16	89	95	78
1996/97	1	0	0	0	5	37	37
1996/97	3	0	0	0	0	0	0
1997/98		0	0	0	0	0	1
1997/98	1	0	0	0	0	22	40
1998/99		0	0	0	0	0	242
1998/99	1	0	0	0	0	0	26
Total Expenditure		**1,959**	**2,289**	**2,781**	**3,473**	**3,926**	**4,175**
Patented Expenditure		**429**	**665**	**928**	**1,209**	**1,364**	**1,011**
Non-Patented Expenditure		**1,529**	**1,624**	**1,854**	**2,264**	**2,562**	**3,164**


Expenditures on Anti-Thrombotic Agents
Alberta 1993/94 - 1998/99
$4,500,000
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$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
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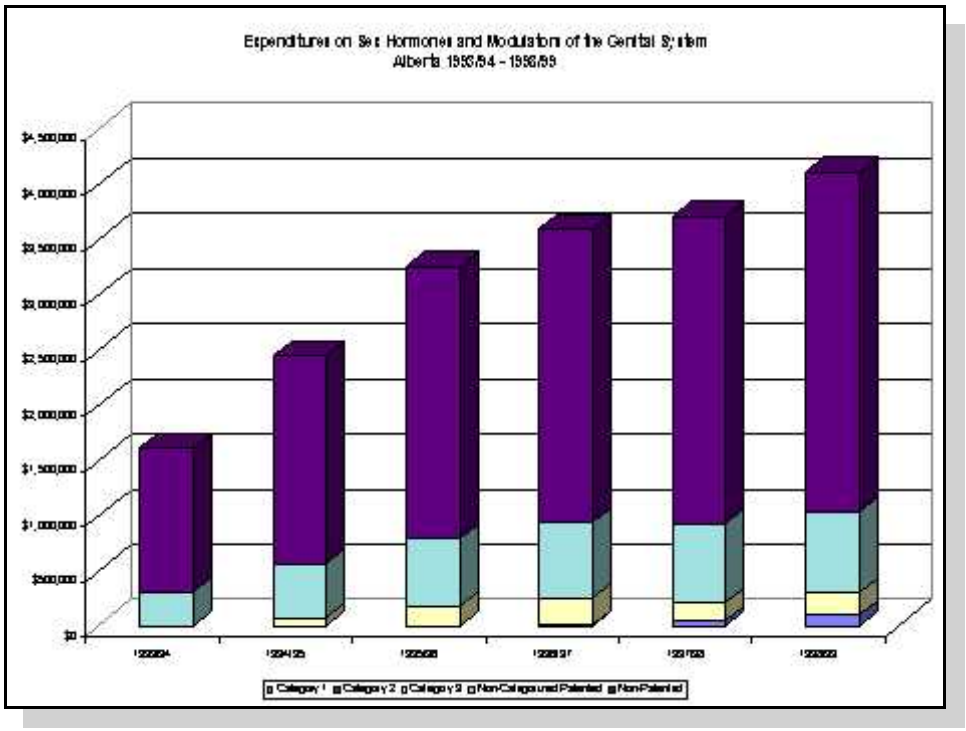
$500,000
$0
Category 1 Category 2 Category 3 Non-Categorized Patented Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Sex Hormones and Modulators of the Genital System
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		1,304	1,790	2,253	2,537	2,275	2,320
1993/94	3	2	29	46	48	46	41
1993/94	NC	301	488	609	682	723	734
1994/95		0	95	214	123	181	240
1994/95	3	0	41	95	123	144	162
1995/96		0	0	0	0	0	0
1995/96	3	0	0	35	59	77	84
1996/97		0	0	0	4	13	25
1996/97	1	0	0	0	7	41	60
1996/97	3	0	0	0	13	33	49
1997/98		0	0	0	0	179	292
1998/99		0	0	0	0	0	64
1998/99	1	0	0	0	0	0	35
Total Expenditure		**1,607**	**2,444**	**3,252**	**3,597**	**3,714**	**4,105**
Patented Expenditure		**303**	**558**	**785**	**932**	**927**	**1,033**
Non-Patented Expenditure		**1,304**	**1,885**	**2,467**	**2,664**	**2,787**	**3,072**


Expenditures on Sex Hormones and Modulators of the Genital System
Alberta 1993/94 - 1998/99
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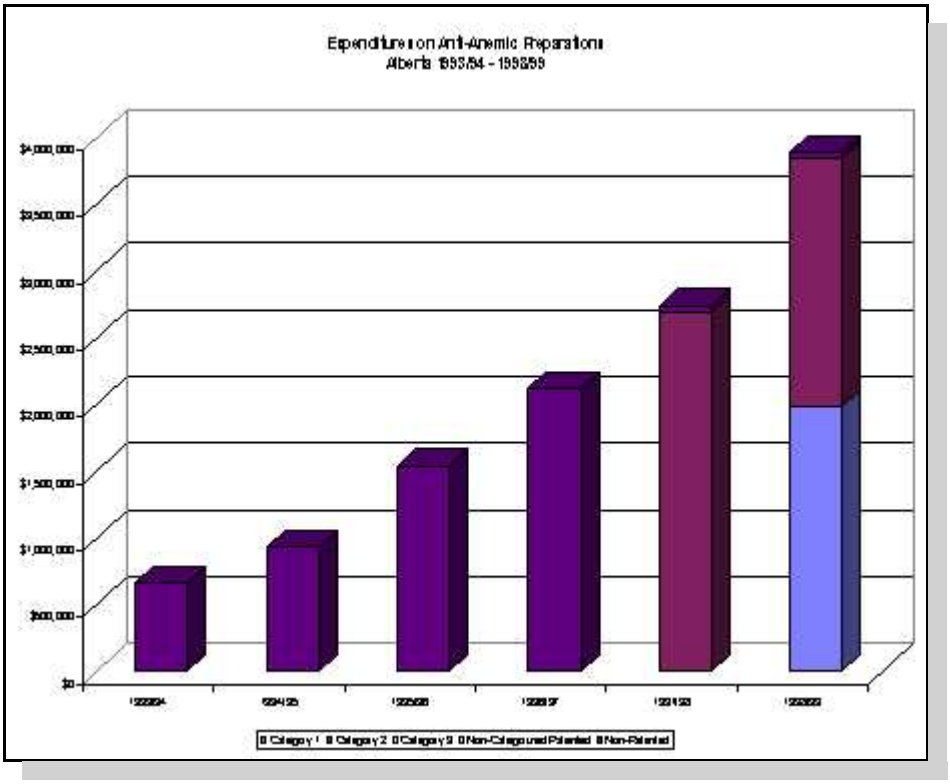
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
Category 1
Category 2
Category 3
Non-Categorized Patented
Non-Patented

Impact of Existing and Newer Drugs by Major Disease Groups
Alberta 1993/94 - 1998/99
Anti-Anemic Preparations
(thousands of dollars)

Year of Introduction	Category	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1993/94		67	35	36	41	44	51
1993/94	2	596	906	1,508	2,083	2,662	1,784
1994/95		0	0	0	0	0	0
1995/96		0	0	0	0	0	0
1996/97		0	0	0	0	0	0
1997/98		0	0	0	0	1	3
1997/98	1	0	0	0	0	11	1,977
1997/98	2	0	0	0	0	26	74
1998/99	1	0	0	0	0	0	7
Total Expenditure		**663**	**940**	**1,544**	**2,125**	**2,744**	**3,896**
Patented Expenditure		**0**	**0**	**0**	**0**	**2,699**	**3,843**
Non-Patented Expenditure		**663**	**940**	**1,544**	**2,125**	**45**	**54**


Expenditures on Anti-Anemic Preparations
Alberta 1993/94 - 1998/99
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
1993/94
1994/95
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 Alberta Drug Benefit Plan.

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 Drug Benefit 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 already listed in the Alberta Drug Benefit Formulary on or before 1993/94.

New Drug Effect
New Drug Effect shows the amount by which expenditures increase as a result of listing new drugs in the Drug Benefit Formulary.

Newer Drug Products
In this Study, new drug products are defined as drug products that were listed in the Alberta Drug Benefit Formulary in 1994/95 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 Alberta Drug Benefit Program and any deductibles and co-payments made by its beneficiaries. Expenditures also 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.