Demand and Price Dynamics within the Pharmaceutical Benefits Scheme

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1. Introduction

Around 75% of the ethical drugs consumed in Australia are provided through the Pharmaceutical Benefits Scheme (PBS).[1] Through the PBS, the Commonwealth Government subsidises the cost of pharmaceuticals to the final consumer and, in effect, acts as a single buyer, negotiating with pharmaceutical suppliers, the terms and conditions under which their drugs are made available to the general public.

In 2000-01 the cost of the PBS was $4.5 billion, of which 16% was met by consumers of drugs while the Commonwealth Government paid for 84% from general revenue. The cost of the PBS has grown at about 14% per year and this, combined with the fact that the PBS is an open-ended scheme, has caused concern within Government and elsewhere about its long-term sustainability.

In its annual budget brought down in May 2002, the Government announced measures to curb the increase in the cost of the PBS, principally through increasing the amount paid by the final consumer. It reiterated its commitment to the general principles of the PBS, but flagged an intention to look more closely at the operations of all aspects of the health care system in Australia with a view to their long-term impact of government expenditure. A paper released at the same time as the budget highlighted the ageing of the population over the next 40 years, and claimed that this would lead to an increase in the use of pharmaceuticals.[2]

A number of factors have been put forward to explain the increase in cost of the PBS, including:

- the listing of newer, more expensive drugs;
- the prescribing by doctors of these and other drugs for conditions outside the guidelines specified by the PBS; and
- more of the population being able to qualify to receive drugs at lower cost.

This paper aims to provide some insight into the operations of the PBS by examining the markets for 3 categories of popular drugs that make a significant contribution to the overall cost of the PBS. While there are around 600 unique entities listed on the PBS, 30 of these were responsible for over half the cost of the PBS in 2000-01.

Of these 30 top selling drugs, 10 are included in the case studies in Sections 3 to 6 which cover the following classes of drugs:

- Treatments for peptic ulcers;
- Antidepressants; and
- Drugs to reduce cholesterol (cholesterol and triglyceride reducers).

In 2000-01, these three classes collectively cost $1,437 million or 31% of the total cost of the PBS.

When a new drug enters the market, it is typically protected by a patent with a lifetime of 20 years. This patent is usually granted at a relatively early stage of a drug's development and well before it is actually available to be sold. The patent enables the developer of the drug to recoup the substantial R&D and other costs involved in bringing a drug to market, by giving it monopoly rights to supply the drug.

[1] Productivity Commission, "International Pharmaceutical Price Differences", Research Report, July 2001.
[2] Department of the Treasury, "Intergenerational Report 2002-03", Budget Paper No 5, 14 May 2002.

These monopoly rights usually cover about 10 years in the market and enable the supplier to charge substantially more than the unit cost of manufacture which is a relatively small percentage of cost for most drugs.

This low cost of manufacture means that when drugs are no longer covered by patent, other suppliers are willing to start manufacture of the identical chemical and enter the market as competitors to the original monopoly supplier. As the cost of manufacture and other barriers to entry are relatively low, the introduction of new suppliers can lead to rapid and significant reductions of price.

There is strong interest therefore from governments and other bodies concerned about meeting the cost of pharmaceuticals in encouraging the introduction of these so-called "generic" suppliers.[3] Companies providing insurance against pharmaceutical costs, such as the pharmacy benefit managers in the US, often specify the use of generic drugs either as a condition of coverage or in guidelines to participating doctors. The PBS enables the pharmacist to recommend a generic drug for the branded drug if allowed by the prescribing doctor.

While the impact of generic drugs can be significant, a drug is open to other sources of competition in the market, while still protected by patent. It will compete with older drugs that may be less efficacious but are already well established in the market, as well as with so-called "follower" or "me too" drugs. These are drugs that are similar but not identical in chemical composition to the patented drug and will have similar strategies to treating disease. They will also be protected by patent. Sometimes these drugs will have been developed to imitate the patented drug but are usually simply later to the market than the initial drug.

The time in which a new drug does not face these follower drugs seems to be shortening and can be as little as 2 years. A drug therefore will face significant pressure on sales and unit prices at 2 stages – firstly when one or more follower drugs are introduced and secondly when generics can enter the market after a patent expires.

The case studies in this report illustrate the varying degrees of success that the PBS has had in orchestrating a market in which these demand and price dynamics can occur.

This in one in a series of reports by the Centre for Strategic Economic Studies on the Australian pharmaceutical and health care system.[4] A companion report in this series provides a more detailed description of operation of the PBS and analyses a number of its characteristics not covered in the present report.[5]

The analysis undertaken in this paper is based on a database provided by the Pharmaceutical Access and Quality (PAQ) Branch of the Department of Health and Aged Care. The database covers the period 1991-92 to 2000-01 and consists of annual script and cost data for each brand of drug supplied under the PBS, as well as the conditions under which they are listed.[6]

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[3] See, for instance Congressional Budget Office, "How Increased Competition from Generic Drugs has Affected Prices and Returns in the Pharmaceutical Industry", July 1998.

[4] Reports in this series can be found at www.cses.edu.au.

[5] Sweeny, Kim, "Trends in the Pharmaceuticals Benefits Scheme", CSES, May 2002.

[6] The author would like to thank Peter Marlton of the PAQ Branch and John Abrams of the PBS Branch of the Department of Health and Aged Care for their assistance in providing this data and guidance in its use and interpretation.

2. Drug Pricing within the PBS

The PBS uses a number of methods for determining the price of new drugs entering the scheme as well as for drugs already listed. The prices of all drugs listed on the PBS are reviewed at least once per year.[7] Drugs are divided into therapeutic groups with drugs used for the same purpose being reviewed together.

Where the drug is unique in its class, or when a benchmark price is being calculated for a therapeutic group, a **cost plus method** is used, i.e. the price is equal to the cost of manufacture plus a margin. This method relies on cost information provided by the supplier.

For drugs in the same therapeutic category, the lowest priced brand sets the benchmark price for either the other brands of the same drug, or the other drugs within the same therapeutic group. This is known as **therapeutic group pricing** or reference pricing.

The prices of a selected group of drugs are determined by a method called **weighted average monthly treatment cost (WAMTC)**. The drugs in this category include H_2 receptor antagonists, ACE inhibitors, HMG CoA reductase inhibitors, proton pump inhibitors and selective serotonin reuptake inhibitors. The benchmark price among these classes is calculated as the lowest weighted treatment cost per month ie total cost of the drug provided over a period divided by the total number of months treatment provided.

Where a benchmark price has been set by reference to the lowest cost brand, other suppliers may charge a **brand premium** above this price. The level is determined by the supplier but must be approved by PBPA.

For four classes of drugs, namely the H_2 receptor antagonists, calcium channel blockers, ACE inhibitors, and HMG CoA reductase inhibitors, the base price is set by reference to other drugs in the same therapeutic group. Some suppliers, usually of patented drugs, can then charge a **therapeutic premium** above the benchmark price.

In addition to these pricing methods, the Pharmaceutical Benefits Pricing Authority sometimes negotiates price/volume arrangements for new drugs when unit prices are relatively high and there is potential for high demand or demand is uncertain. This may also occur when restrictions on drugs already listed are relaxed or the indications for the drug are widened. Under this arrangement, unit prices fall as volume increases

These various methods are used to determine the wholesale price of a drug, i.e. the maximum price of the drug supplied to the pharmacist. The maximum retail price that the pharmacist can charge for PBS drugs is determined by adding a profit margin and a dispensing fee to the wholesale price. The dispensing fee is adjusted regularly and has risen by about 2% per annum over recent years.[8]

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[7] The methods used by the PBS to determine drug prices are described in PBPA, "Pharmaceutical Benefits Pricing Authority Procedures and Methods", August 2001, and HIC, "Pharmaceutical Benefits Scheme Explanation of Current Pricing – 2000",

[8] Most of the price data in this paper is obtained by dividing the total cost of a drug by the number of scripts written. This is therefore a proxy for the average annual retail price of the drug.

A drug is listed on the PBS for treatment of specific conditions (indications) and use for other indications requires a further submission to PBS for approval. In addition some drugs carry further restrictions – for instance they can only be used to treat an indication if other conditions apply. For other drugs, a doctor needs approval from the Health Insurance Commission before being able to prescribe the drug.

At February 2002, there were 2630 items listed on PBS (primary reference), of which 504 were in the "authority required" category, 683 were "restricted benefit", and 1443 had no restrictions. Despite the necessity for the doctor to receive specific authority before being prescribed, "authority required" drugs were responsible for 24.5% of PBS cost in 2000-01.

Table 2.1 Restriction Levels for Items in PBS

	Number of items	Cost in 2000-01 ($m)	%
Authority required	504	1,092.4	24.5
Restricted benefit	683	1,913.0	42.9
No restriction	1,443	1,449.0	32.5
Total	2,630	4,454.5	100.0

3. Treatments of Peptic Ulcers[9]

3.1 Overview

Drugs to treat peptic ulcers cost the PBS $374.6 million in 2000-01 – an amount that has remained reasonably steady over the past 5 years.

Although this represents only about 8.2% of the overall cost of PBS, two of the most popular treatments for peptic ulcers – omeprazole and ranitidine – are among the top 8 selling drugs.

The PBS lists 5 different categories of drug for peptic ulcer, although only 3 of these – the H_2-receptor antagonists, the proton pump inhibitors, and combinations of these with antibiotics are of any significance in terms of use and cost. Table A3.1 at the end of the paper, sets out, for each of the various treatments for peptic ulcer, the annual cost, number of prescriptions written, and cost per script over the period 1991-92 to 2000-01.

Historically, the H_2-receptor antagonists were introduced earlier than the proton pump inhibitors, although both have been available for over 10 years. Combination therapies are more recent, the first appearing on the PBS in 1996-97.

The H_2-receptor antagonists were originally dominant in the market, but were overtaken by the proton pump inhibitors in 1997-98 and these are now the more important drug in terms of cost (Figure 1a) and about equal in terms of scripts (Figure 1b).

Figure 1.a Treatments for Peptic Ulcer Total Cost ($m)

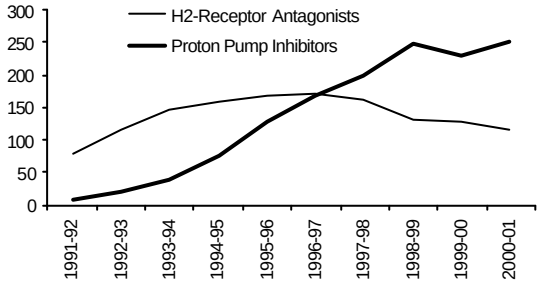
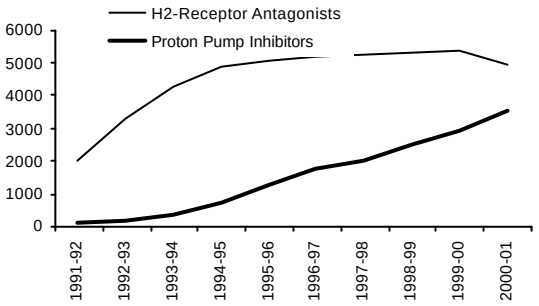


Figure 1.b Treatments for Peptic Ulcer Scripts (thousands)



There are currently 4 types of **H_2-receptor antagonist** listed on the PBS although the Anatomical Therapeutic Chemical (ATC) classification[10] contains at least another 2 types (niperotidine and roxatidine). The newer versions of this type of drug – famotidine and nizatidine – are still protected by patent so there is only one supplier of them. Cimetidine and ranitidine however have been around longer, so there are more versions of them and they have multiple suppliers (Table 3.1). Despite its age,

[9] Most of the price data in this paper is obtained by dividing total cost of the drug by number of scripts. This is a proxy for the retail price of the drug, and care should be exercised in interpreting the data on scripts at an aggregate level. Each drug type consists of different chemical entities in various formulations with differing amounts of drug per script.

[10] The internationally recognised classification scheme for drugs maintained by the WHO Collaborating Centre for Drug Statistics Methodology in Oslo.

ranitidine is still the most widely prescribed drug in the H_2-receptor antagonist class (Figures 2a and 2b).

There are 4 different types of **proton pump inhibitor**, although again the ATC lists one other type (esomeprazole). The newer versions (lansoprazole, pantoprazole, and rabeprazole) were listed within the past 6 years and are still protected by patent. Omeprazole is now the most popular treatment for peptic ulcers and was also provided by one supplier until relatively recently (November 2000) (Figures 3a and 3b).

Table 3.1 Principal Treatments for Peptic Ulcer

	Formulations	PBS Items	Suppliers	Single supplier until
H_2-Receptor Antagonists				
Cimetidine	4	10	6	Prior to 1994
Famotidine	2	8	1	Present
Nizatidine	2	8	1	Present
Ranitidine Hydrochloride	4	12	11	February 1997
Proton Pump Inhibitors				
Lansoprazole	3	5	1	Present
Omeprazole	4	5	2	November 2000
Pantoprazole	2	3	1	Present
Rabeprazole	2	3	1	Present

Figure 2.a H2-Receptor Antagonists Total Cost ($m)

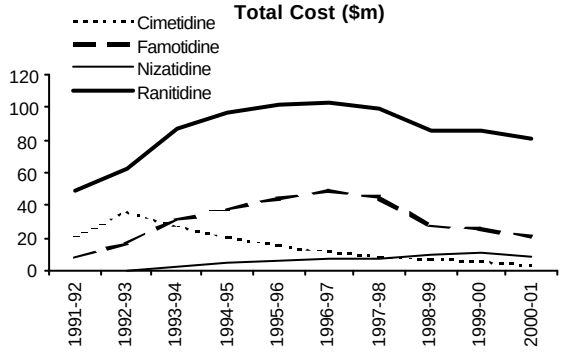


Figure 2.b H2-Receptor Antagonists Scripts (thousands)

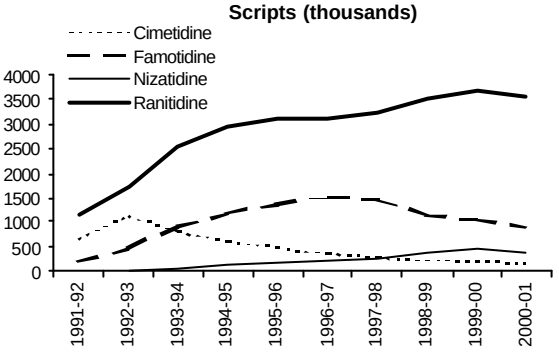


Figure 3.a Proton Pump Inhibitors Total Cost ($m)

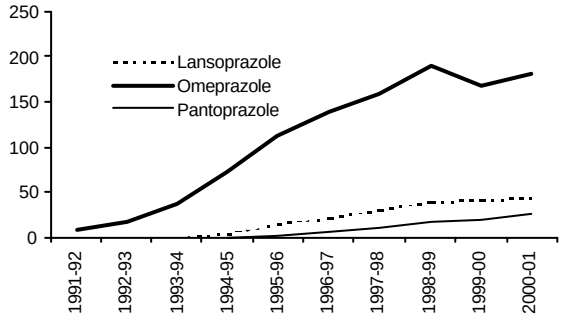
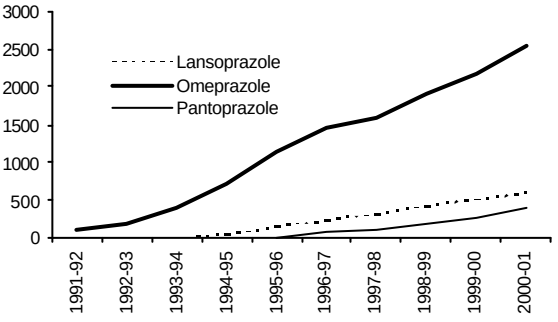


Figure 3.b Proton Pump Inhibitors Scripts (thousands)



For both classes of drugs, and more so for the H_2-receptor antagonists, the PBS has acted to control their costs by applying significant price reductions over the past few

years, which has meant that cost has not risen as quickly as demand (as measured by scripts).

3.2 Ranitidine

The decline in famotidine since 1997-98 and the earlier falls in sales of cimetidine, has left ranitidine as the dominant type of H_2-receptor antagonist, although nizatidine may achieve greater market share in future (Figures 2a and 2b).

Ranitidine was originally developed by the company now known as GlaxoSmithKline (Glaxo) and is marketed by them under the brand name "Zantac". Ranitidine is available in the following forms under the PBS (May 2002).

Table 3.2 Ranitidine

Formulation	PBS items	PBS Cost 2000-01 $m	Availability	Number of suppliers
Tablet 150 mg	8158J, 1978D	62.165	R	11
Tablet 300 mg	8160L, 1977C	16.082	R	11
Effervescent tablet 150 mg	8159K, 1937Y	2.505	R	1
	8902M, 8903N		A	
Syrup 150 mg per 10 mL	8161M, 8162N	0.296	R	1
	8904P, 8905Q		A	

Each line in Table 3.2 above lists 2 PBS items, the first of which is for the initial treatment of peptic ulcer, the second is for maintenance treatment or other indications (and for which repeat prescriptions can be written). Items marked with an "R" indicate the item is a "Restricted benefit", while an "A" indicates "Authority required". Authority is required to prescribe the effervescent tablet or syrup, perhaps because these formulations are still provided by one supplier (Glaxo) protected by patent and have a higher price than the base-priced drug in the ordinary tablet form.

The 150 mg tablet is the most widely prescribed form of ranitidine, and until February 1997, Glaxo was the only supplier. Alphapharm, a US-based manufacturer of generic drugs, introduced a generic equivalent at that time (under the name "Rani 2"), and this was followed by other suppliers, so that by May 2002, there were 11 suppliers listed on the PBS. Five of these suppliers are part of the Mayne company, which operates a number of pharmacy chains in Australia.

Alphapharm quickly took market share from Glaxo, so that by 2000-01 their shares were virtually the same (46% for Alphapharm and 50% for Glaxo), whether measured in terms of cost or scripts. The other suppliers have made almost no impression (Figures 4a, 4b).

The retail price of the 150mg tablet form of ranitidine has declined steadily over the past 10 years. From around $41.18 in 1991-92 it fell 20% to $33.00 in 1995-96, and with the advent of competition, a further 31% to $22.53 in 2000-01 (Figure 4c). These prices are derived from the annual scripts and costs numbers in the database provided to CSES by the Department of Health and Aged Care. The prices set out in the Schedule of Pharmaceutical Benefits are charted in Figure 4d from August 1994 to May 2002. This shows both the wholesale (pharmacist) price and retail price once the pharmacist's margin, dispensing fee, and brand premium has been added.

Figure 4.a Ranitidine 150mg tablet Total Cost ($m)

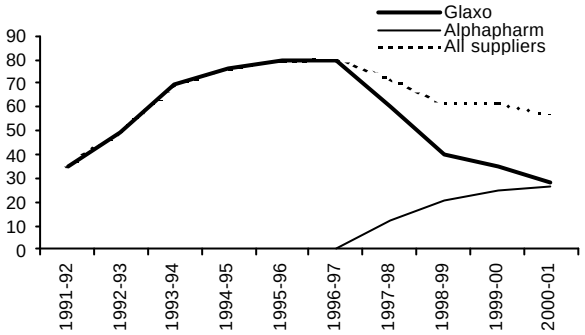


Figure 4.b Ranitidine 150mg tablet Scripts (thousands)

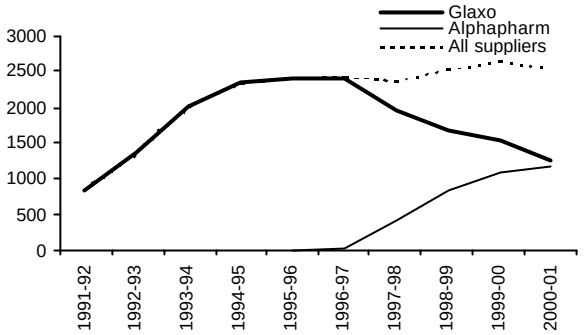


Figure 4.c Ranitidine 150mg tablet Cost per script ($)

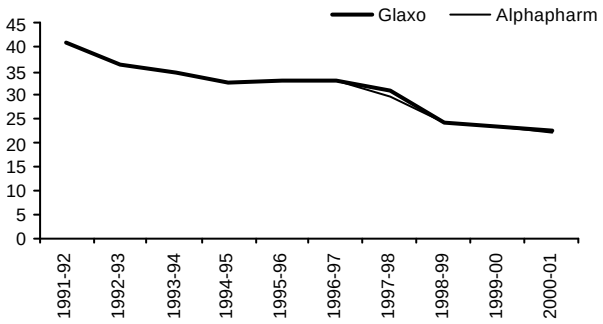
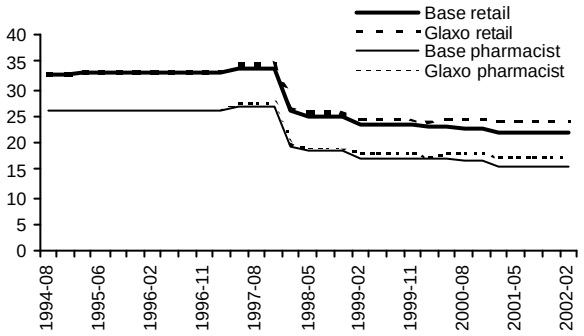


Figure 4.d Ranitidine 150mg tablet PBS listed prices ($)



3.3 Omeprazole

In contrast to ranitidine and the other H_2-receptor antagonists, the demand for the proton pump inhibitors is still growing strongly, particularly for the newer version, pantoprazole.

Omeprazole, however is the most popular form of proton pump inhibitor, either as the original drug – "Losec" provided by AstraZeneca – or as "Acimax" from Alphapharm.

The various formulations of omeprazole available under the PBS are shown in Table 3.3.

Table 3.3 Omeprazole

Formulation	PBS items	PBS Cost 1999-00 $m	PBS Cost 2000-01 $m	Availability	Number of suppliers
Capsule 20 mg (omeprazole)	1326T, 1327W	83.201	9.588	R	1
Tablet 10 mg (omeprazole magnesium)	8332M	0.251	0.456	R	1
Tablet 20 mg (omeprazole magnesium)	8331L, 8333N	234.183	333.836	R	2

For each formulation, the first PBS item is for initial treatment of peptic ulcer, the second version (where relevant) is for gastro-oesophageal reflux disease, scleroderma oesophagus and Zollinger-Ellison syndrome. In August 2001, all versions of omeprazole moved from being "authority required" drugs to "restricted benefit".

Omeprazole was only available as the Losec 20 mg capsule until May 1999, when Alphaparm's Acimax capsule was listed. At the same time the number of capsules in a packet rose from 28 to 30.

In August 1999 AstraZeneca introduced its tablet form – Losec Tablets – in 10 mg and 20 mg versions. In February 2000 it ceased supplying the original 20 mg capsule. In November 2000, Alphapharm introduced a 20 mg tablet formulation – Acimax Tablets.

Despite the introduction of a competitor in the market for omeprazole, AstraZeneca managed to maintain its market dominance, in part at least, by replacing the capsule form with tablets a year earlier than Alphapharm. Script numbers are still high, although the cost has begun to fall.

In contrast to ranitidine, the price of omeprazole rose slightly from $93.50 in 1991-92 to $101.03 in 1998-99, but fell to $73.04 in 2000-01 after the introduction of Acimax. In total however this is only a price drop of 22% over ten years (Figures 5a to 5d).

Figure 5.a Omeprazole 20mg Total Cost ($m)

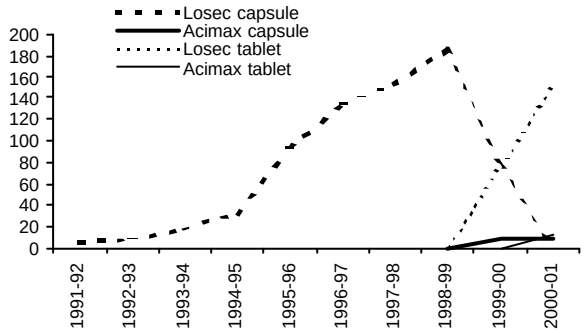


Figure 5.b Omeprazole 20mg Scripts (thousands)

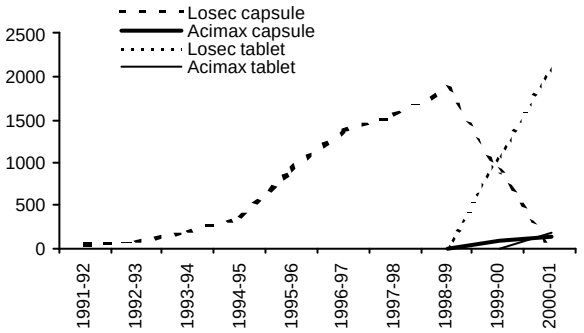


Figure 5.c Omeprazole 20mg Cost per script ($)

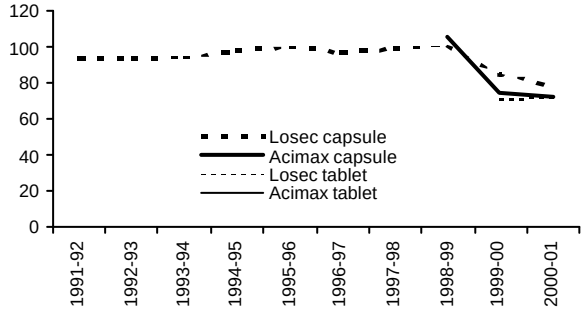
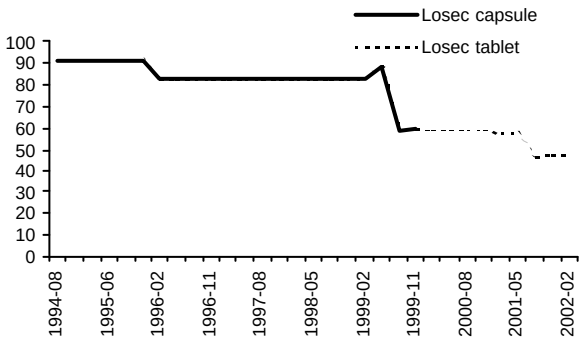


Figure 5.d Omeprazole 20mg PBS listed prices ($)



3.4 Discussion

A detailed analysis of the treatments for peptic ulcer over a number of years provides some insight into the way competitive forces operate under the PBS.

The entrance of newer more effective forms of treatment (in this case the proton pump inhibitors) puts pressure on the more established drugs (the H_2-receptor antagonists) and helps the PBS reduce their price even while the established drug is still under patent ie. before the entrance of suppliers of the same chemical entity. The price of Zantac (Glaxo's brand of ranitidine) had been falling consistently before Alphapharm's Rani 2 arrived. Nonetheless the PBS acted rapidly to bring the price down further once Rani 2 and other generic brands were listed. This price reduction of about 45% over 10 years significantly reduced the cost to the PBS of H_2-receptor antagonists.

Within the H_2-receptor antagonist class, Glaxo managed to hold its initial advantage with ranitidine, despite the listing of 3 similar "follower" drugs. Only famotidine came close to having a significant presence in this market.

By contrast, the PBS seemed to have less success in restricting either the demand for or price of the preferred treatment, omeprazole or the other "follower" proton pump inhibitors. Only the advent of competition from the generic Acimax provided the opportunity for PBS to reduce the price of Losec, so that by 2000-01 it was 21% less than its price in 1991-92.

Both ranitidine and omeprazole as an H_2-receptor antagonist and a proton pump inhibitor respectively fall within the PBS's therapeutic group pricing policy where the price is determined by the WAMTC methodology described in Section 2.2 above.

Omeprazole's advantage in being first in the field is shown in the relatively small headway that the other proton pump inhibitors have made in taking market share from it. In this it is similar to ranitidine.

AstraZeneca's move in August 1999 to introduce a newer formulation of Losec with greater patient acceptance (tablet rather than capsule) seems to have been successful, as demand shifted decisively to this formulation. It has given AstraZeneca at least a further year's worth of revenue while Alphapharm converted Acimax to a tablet.

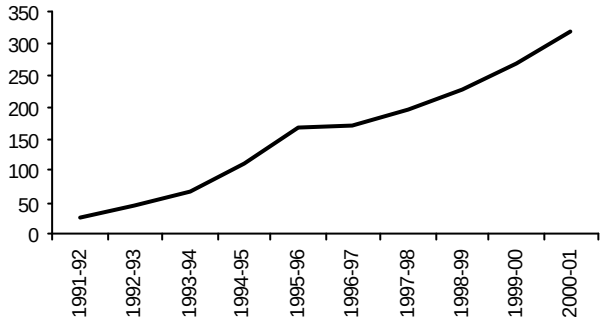
4. Antidepressants

4.1 Overview

The Australian Institute of Health and Welfare has estimated that depression is the fourth most prevalent disease in Australia accounting for about 3.7% of the total disease burden[11].

The use of antidepressants has grown strongly over the past 10 years (at about 17% per annum) resulting in a cost to the PBS of $319.0 million in 2000-01 (Figure 6).

Figure 6 Anti-Depressants Total Cost ($m)



This growth has been generated mainly by the **selective serotonin reuptake inhibitors** (SSRI), which includes citalopram, fluoxetine, fluvoxamine, paroxetine, and sertraline, and also by a newer type of drug, venlafaxine.

Until the advent of the SSRIs, the antidepressant market consisted of non-selective monoamine reuptake inhibitors (NMRI), monoamine oxidase inhibitors (MAO, mainly moclobemide) and various other antidepressants such as lithium and mianserin.

Figure 7a shows that, although the NMRIs are significant in the number of scripts written, their cost is fairly low and has declined steadily for the past 10 years, to a total of $17.5 million in 2000-01. Similarly, the importance of moclobemide has fallen in terms of cost and scripts since 1995-96 to a total of $22.0 million. The miscellaneous group of other antidepressants has grown strongly, but this is almost entirely due to venlafaxine, particularly over the past few years.

Figure 7a Anti-Depressants Total Cost ($m)

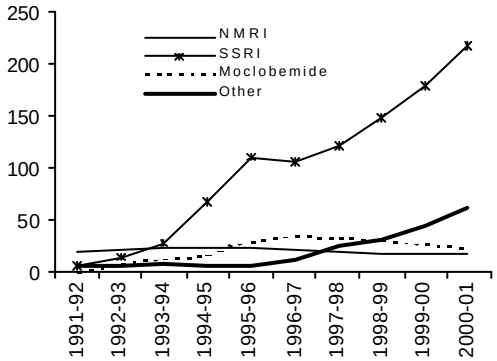
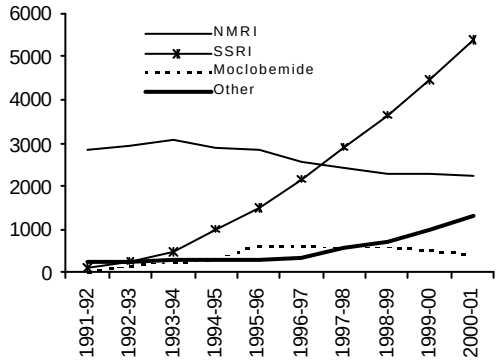


Figure 7b Anti-Depressants Scripts (thousands)



[11] Mathers C, Vos T, Stevenson C, "The burden of disease and injury in Australia", Australian Institute of Health and Welfare, Canberra, November 1999.

Except for fluoxetine and moclobemide, most of the principal antidepressants are still under patent or were so until recently. Those that have been off patent longest have the most number of suppliers (Table 4.1).

Table 4.1 Principal Antidepressants

	Forms	Suppliers	Single supplier until
Citalopram	1	3	August 2001
Fluoxetine	3	9	February 1996
Fluvoxamine	2	2	May 2000
Paroxetine	1	3	August 2001
Sertraline	1	1	Present
Moclobemide	2	11	August 1996
Venlafaxine	4	1	Present

Fluoxetine was the original drug in the **SSRI** class and exhibited strong growth over the first half of the 1990s, although demand stabilised thereafter (as measured in terms of scripts). Its cost similarly went through a rapid increase before stablising at a somewhat reduced level. Sertraline and paroxetine entered the PBS at the same time and have gone on to be the first and second largest selling SSRIs respectively. Citalopram and fluvoxamine were listed more recently with citalopram showing the same sort of growth as sertraline (Figures 8a and 8b).

Figure 8a SSRIs Total Cost ($m)

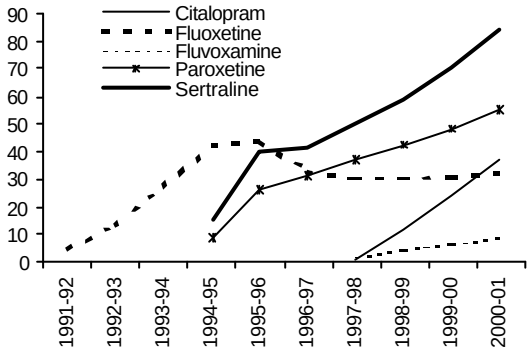
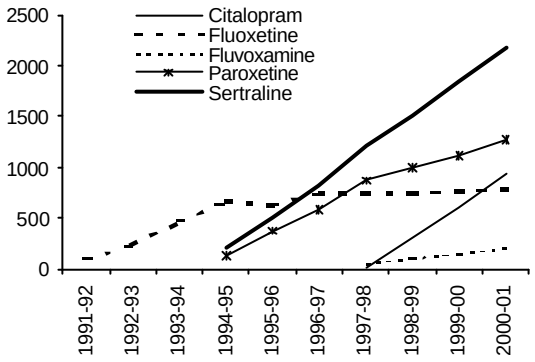


Figure 8b SSRIs Scripts (thousands)



The other two significant antidepressants – moclobemide and venlafaxine – have had varying histories. Moclobemide has a growth and decline profile very similar to that of fluoxetine, while venlafaxine's very strong growth has mimicked that of sertraline and the more recent SSRIs (Figures 9a and 9b).

Figure 9a Other Antidepressants Total Cost ($m)

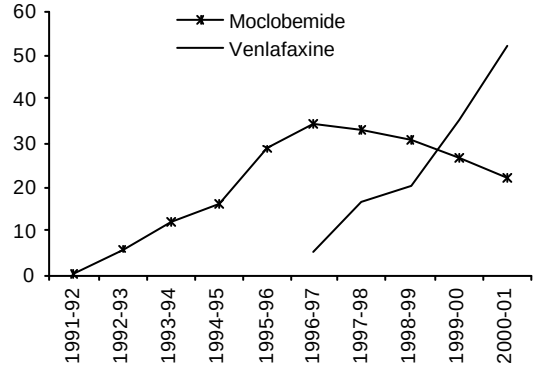
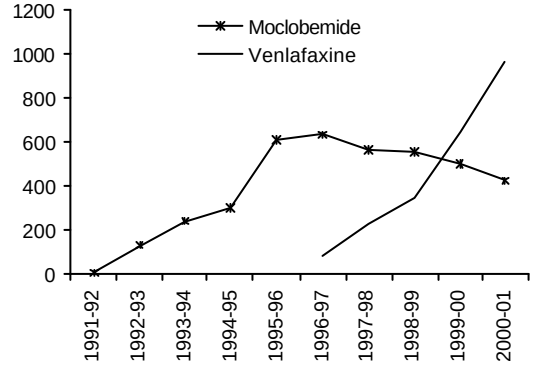


Figure 9b Other Antidepressants Scripts (thousands)



4.2 Fluoxetine

Fluoxetine was originally developed by Lilly under the brand name “Prozac”. It was protected by patent until February 1996, when Alphapharm’s “Lovan” was listed on the PBS. There are now 9 suppliers of this drug, with the most popular formulation being the 20 mg capsule. In August 1996, the drug moved from “authority required” status to “restricted benefit”.

Table 4.2 Fluoxetine

Formulation	PBS item	PBS Cost 2000-01, $m	Availability	Number of suppliers
Tablet 20 mg	8270G	4.336	R	1
Capsule 20 mg	1434L	27.526	R	9
Oral solution 20 mg per 5 mL	1809G	0.369	R	1

Alphapharm quickly took market share from Lilly and by 2000-01 it was the major supplier of fluoxetine under the PBS. Other suppliers have had no impact.

The entry of Alphapharm also triggered a 46% fall in the price of the 20 mg capsule, against a rising trend in previous years. This fall in price for fluoxetine seems to have caused similar falls in the prices of the other SSRIs, sertraline and paroxetine, even though they were still under patent at the time. The prices of these SSRIs also seems to have created the reference price for citalopram when it entered the PBS.

Figure 10a Fluoxetine Total Cost ($m)

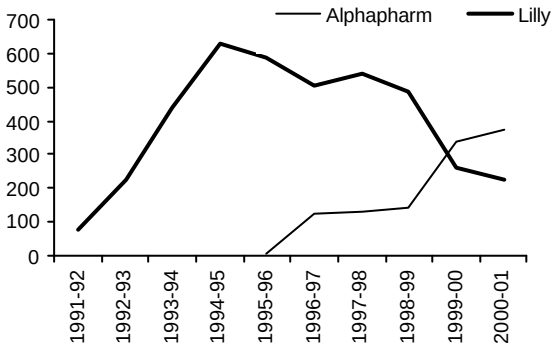


Figure 10b Fluoxetine Scripts (thousands)

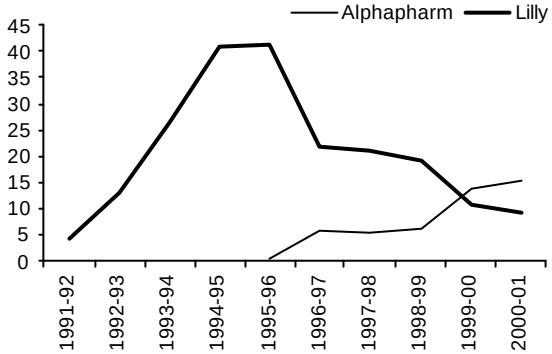


Figure 10c Fluoxetine Cost per script ($)

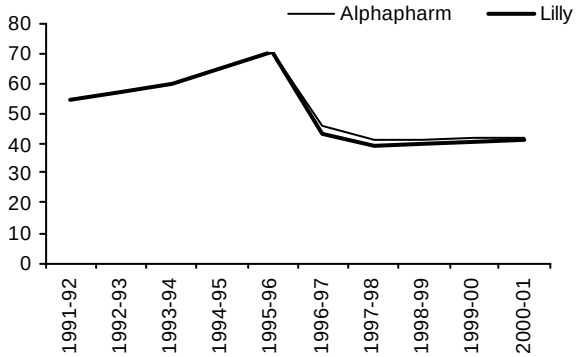
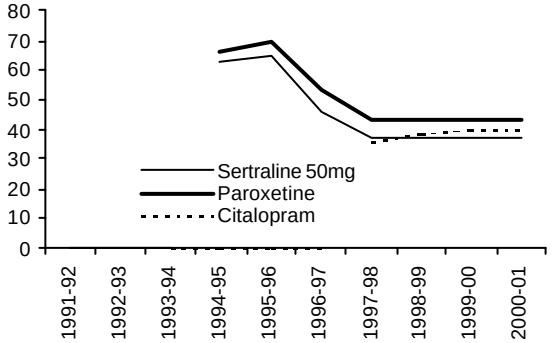


Figure 10d Other SSRIs Cost per script ($)



4.3 Moclobemide

Roche developed moclobemide as a 150 mg tablet under the brand name “Aurorix” and was the sole supplier until Alphapharm introduced its brand “Arima” in August 1996. Other suppliers have also entered the market in recent years. Roche had anticipated this, however and released a 300 mg tablet in November 1995 and this quickly displaced the 150 mg tablet as the preferred formulation. Alphapharm eventually released its 300 mg version in February 2000, as did other suppliers in the following year but by this time both formulations were losing sales (Figures 11a, 11b).

In contrast to fluoxetine, Alphapharm and the other suppliers have had little impact so far on Roche’s market share of both formulations of moclobemide.

However, Alphapharm’s entry in 1995 with a 150 mg tablet had a immediate impact on the PBS price of this formulation and also on the price of the 300 mg version even though Roche remained its only supplier for another 5 years (Figure 11c).

Table 4.3 Moclobemide

Formulation	PBS item	PBS Cost 2000-01, $m	Availability	Number of suppliers
Tablet 150 mg	1900B	3.567	R	11
Tablet 300 mg	8003F	18.441	R	11

Figure 11a Moclobemide 150mg Total Cost ($m)

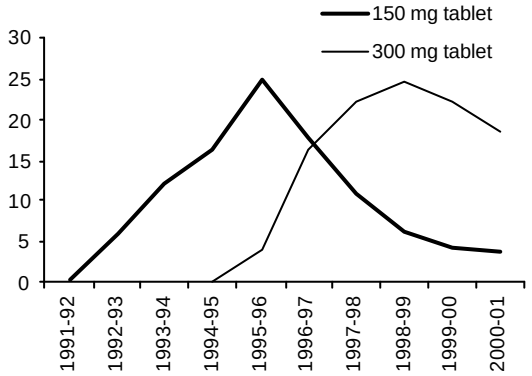


Figure 11b Moclobemide 150mg Scripts (thousands)

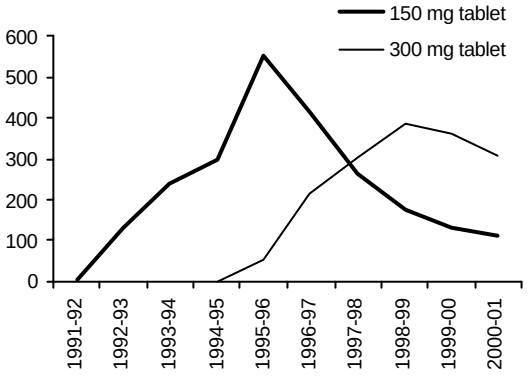
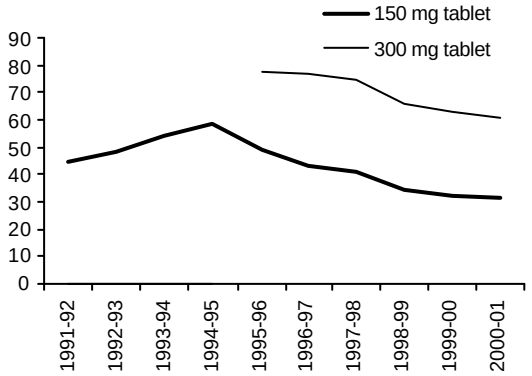


Figure 11c Moclobemide 150mg Cost per script ($)



4.4 Venlafaxine

Venlafaxine is produced by Wyeth under the brand name “Efexor” and entered the market in August 1996 in the 37.5 mg and 75 mg tablet formulations. It moved from “authority required” status to “restricted benefit” status in May 1998.

Table 4.4 Venlafaxine

Formulation	PBS item	PBS Cost 2000-01 $m	Availability	Number of suppliers
Tablet 37.5 mg	8068P	3.658	R	1
Tablet 75 mg	8069Q	5.259	R	1
Capsule 75 mg	8301X	19.040	R	1
Capsule 150 mg	8302Y	24.161	R	1

The tablet forms of Efexor experienced rapid growth in terms of demand and cost but this was curtailed in part when the price was reduced in a way similar to the SSRIs. In 1998-99 however, Wyeth introduced both a 75 mg capsule in competition with the 75 mg tablet and a higher strength 150 mg capsule. These quickly took over from the tablet forms and to date seemed to have escaped further downward pressure on prices.

Figure12a Venlafaxine Total Cost ($m)

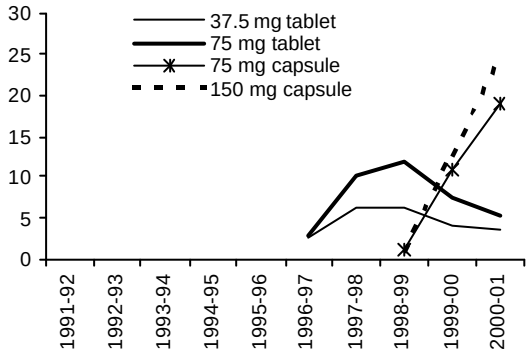


Figure 12b Venlafaxine Scripts (thousands)

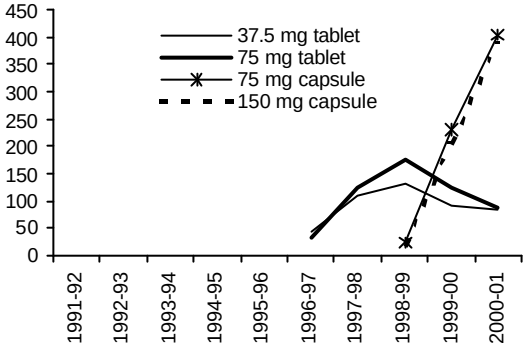
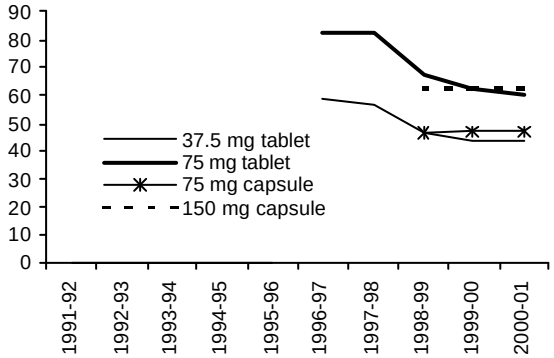


Figure 12c Venlafaxine Cost per script ($)



4.5 Comparison with USA

While sertraline quickly established itself as market leader after 2 years in the PBS, leaving behind paroxetine, in the USA their market shares have been virtually the same for a number of years. Fluoxetine maintained its dominance in the US market for a much longer time than in Australia, while citalopram and venlafaxine have experienced similar growth profiles in both countries.

Figure AD1 Antidepressants - Aust Scripts (thousands)

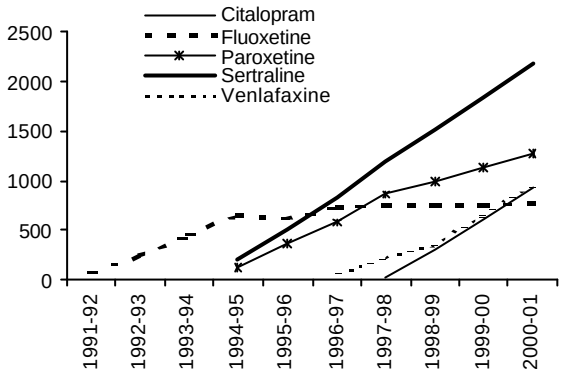
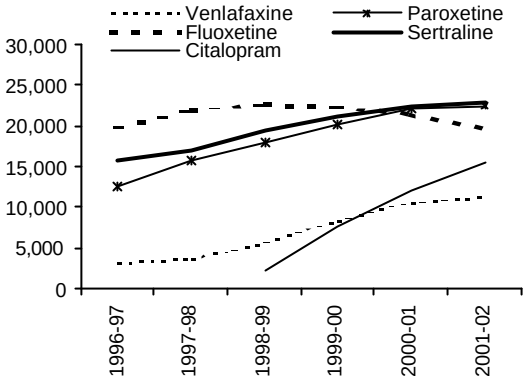


Figure AD2 Antidepressants - US Scripts (thousands)



4.6 Discussion

Through the 1990s the newer types of antidepressants, the selective serotonin reuptake inhibitors not only displaced the older drugs such as the NMRIs and moclobemide, they also expanded the market considerably, indicating that they were fulfilling a demand not being met by these older drugs. There is every indication that their use will continue to grow.

Among the SSRIs, the rapid growth in the cost of fluoxetine was brought to a halt firstly as the "follower" forms sertraline and paroxetine took over from it as the predominant SSRIs, and secondly when Alphapharm introduced its "Lovan" in competition with Lilly's "Prozac".

This second event triggered a major reduction in the price of fluoxetine with flow-on consequences for the prices of the other SSRIs, even though each had only one supplier in the market. As with the treatments for peptic ulcers, this reflects the inclusion of the SSRIs within the PBS's therapeutic group pricing policy using the WAMTC methodology.

Wyeth achieved very strong growth for venlafaxine in its tablet form, and when the price of this was reduced by PBS, it also introduced a capsule form which became dominant, but without further reductions in price.

Roche followed a similar strategy with moclobemide, by releasing a 300 mg tablet version of "Aurorix", after Alphapharm's "Arima" emerged as a competitor for its 150 mg tablet. Unlike venlafaxine, however, it did not avoid further reductions in price for both versions.

Competitive forces in the antidepressant market have worked firstly by competition among classes of drugs and secondly by the introduction of competing suppliers of the same drug.

5. Cholesterol Reducers

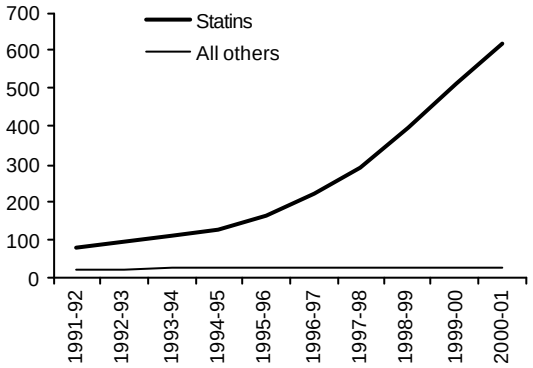
5.1 Overview

The cost of drugs aimed at reducing the levels of cholesterol in the body has grown consistently over the past 10 years – at an average of about 23% per year – so that by 2000-01 the total stood at $642.9 million, or about 14% of the overall cost of the PBS. High levels of cholesterol are associated with cardiovascular disease – in particular heart disease and stroke.

Although other treatments for high levels of cholesterol do exist – the fibrates, bile acid sequestrants, nicotinic acid and others – the introduction of the HMG CoA reductase inhibitors ("statins") in the late 1980s effectively created the market for cholesterol reducers (Table C1, Figure 13).

The statins also are known as serum lipid reducing agents and their demonstrated popularity has lead the PBS to introduce special guidelines for doctors on their use – the so-called "General Statement for Lipid-Lowering Drugs".

Figure 13 Cholesterol Reducers
Total Cost ($m)



5.2 Statins

The first of the statins to be listed on the PBS was **simvastatin** developed by the US company Merck with the brand name "Zocor". This was followed by **pravastatin** ("Pravachol") from Bristol Myer Squibb in 1993-94 and **atorvastatin** ("Lipitor") from Pfizer in February 1998. Another version – **fluvastatin** – was introduced in February 1996 by AstraZeneca.

All the statins have been listed as "restricted benefit" drugs since their introduction. They are all still protected by patent and therefore have only one effective supplier[12].

Competition in the market for cholesterol reducing drugs therefore has been between simvastatin and the "follower" drugs pravastatin and atorvastatin, and does not involve generic drugs.

[12] Until recently simvastatin was distributed by both Merck and Amrad in Australia.

Table 5.1 Statins

Formulation	PBS item	PBS Cost 2000-01 $m	Availability	Introduced
Atorvastatin				
Tablet 10 mg	8213G	78.442	R	February 1998
Tablet 20 mg	8214H	104.563	R	February 1998
Tablet 40 mg	8215J	82.454	R	February 1998
Tablet 80 mg	8521L	na	R	August 2001
Pravastatin				
Tablet 10 mg	2833D	7.695	R	1993-94
Tablet 20 mg	2834E	33.770	R	1993-94
Tablet 40 mg	8197K	39.752	R	November 1997
Simvastatin				
Tablet 5 mg	2013Y	1.861	R	1992-93
Tablet 10 mg	2011W	54.543	R	Prior to 1991-92
Tablet 20 mg	2012X	126.890	R	Prior to 1991-92
Tablet 40 mg	8173E	65.293	R	August 1997
Tablet 80 mg	8313M	18.525	R	May 1999

While pravastatin demonstrated solid growth after entering the market, this was overshadowed by atorvastatin which grew very rapidly, so that by 2000-01 it had equal market share with simvastatin. Fluvastatin, on the other hand, failed to make any headway in the market (Figures 14a, 14b). The relative failures of fluvastatin and pravastatin to gain market share were repeated in the US market, although atorvastatin became the dominant type of statin within 2 years of entering that market (Figure 14c).

Figure 14a Statins Total Cost ($m)

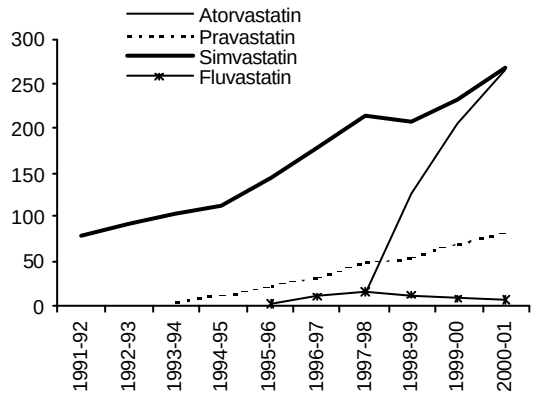


Figure 14b Statins Scripts (thousands)

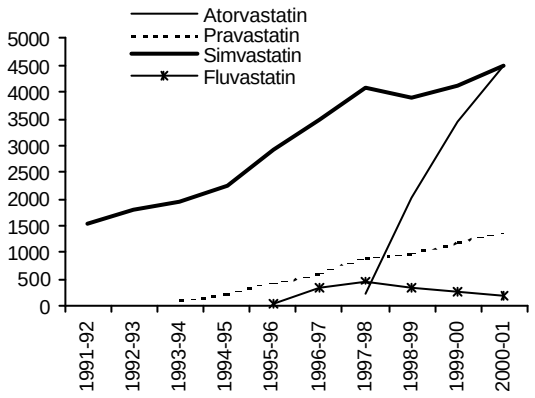
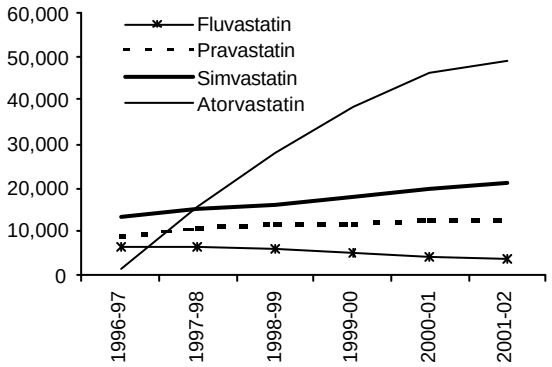


Figure 14c US Cholesterol Reducers Scripts (thousands)



5.3 Different Strengths of Statins

As is the case with a number of the drugs looked at in these case studies, competition in the statin market has revolved around the progressive introduction of different strength formulations.

Merck initially brought Zocor to market as a 10 mg and a 20 mg tablet. BMS also launched Pravachol in these 2 forms in 1993-94. Merck then introduced a higher strength 40 mg tablet in August 1997 and BMS followed in November 1997. When Pfizer's Lipitor entered the market in February 1998, it was as all 3 strengths. When Merck launched a 80 mg tablet in May 1999, Pfizer responded in August 2001, while to date BMS has not followed this lead.

Merck has also had a 5 mg tablet on the market since 1992-93, but this has had relatively insignificant sales.

Higher strength drugs generally mean a reduction in the number taken per day and hence represent a significant benefit for the patient.

The 20 mg tablet of all kinds of statin soon began to outsell the 10 mg version, both in terms of the number of scripts written and also in terms of cost to PBS. Since its introduction, the 40 mg tablet has grown at about the same rate as the 20 mg tablet for scripts and slightly more quickly in terms of cost (Figures 15a and 15b). It is still too early to tell how important the 80 mg tablet will be.

Figure 15a Statins Cost ($m)

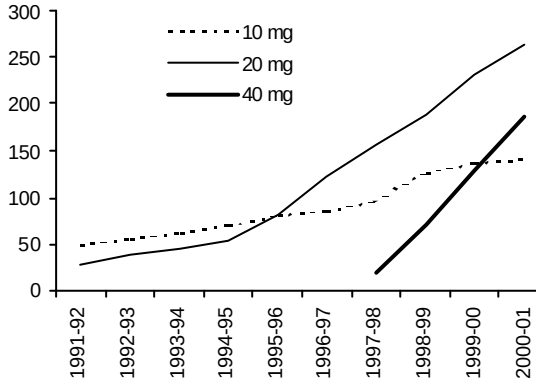
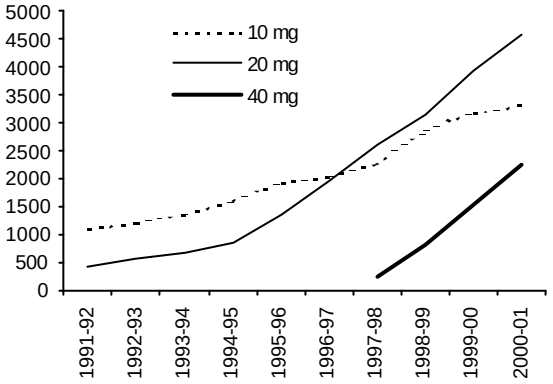


Figure 15b Statins Scripts (thousands)



Of the different kinds of 10 mg tablet, atorvastatin assumed market leadership from simvastatin in 1998-99, two years after entry (Figures 16a-c). Simvastatin however held onto its lead in the largest market, the 20 mg tablet (Figures 17a-c). For the 40 mg tablet, simvastatin and atorvastatin are similarly placed while pravastatin has a much high share in this market than for the other 2 types of tablet (Figures 18a-c).

The response of prices has varied among the different formulations. The price of the 10 mg tablet of simvastatin fell by 8% from about $45.70 in 1991-92 to about $42.00 in 1995-96 after the entry of pravastatin, and has remained at around this price ever since. Initially the price of pravastatin followed that of simvastatin quite closely, but since 1997-98 has fallen significantly. While entering with a $6.00 premium on simvastatin, atorvastatin's price has been reduced to that of simvastatin over a period of 4 years.

The prices of the 20 mg tablet have shown similar movements to those of the 10 mg tablet. However the price fall for simvastatin has been larger, firstly through an 8% drop when pravastatin entered and then a further 4% after the 40 mg tablet was introduced. Again atorvastatin carried a significant premium on entry which was almost completely eroded, and pravastatin has sold at an increasingly significant discount.

The price of the newer 40 mg tablet of simvastatin has remained virtually unchanged since initial listing on the PBS. Again atorvastatin has entered with a $15.50 margin over simvastatin and has seen this reduced to $5.00 in 2000-01. Pravastatin sold for $3.50 less than simvastatin that year.

Figure 16a Tablet 10 mg Total Cost ($m)

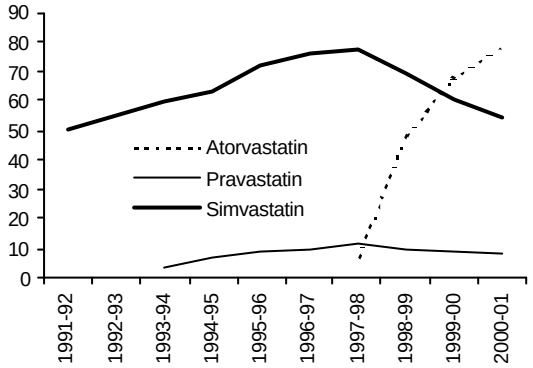


Figure 16b Tablet 10 mg Scripts (thousands)

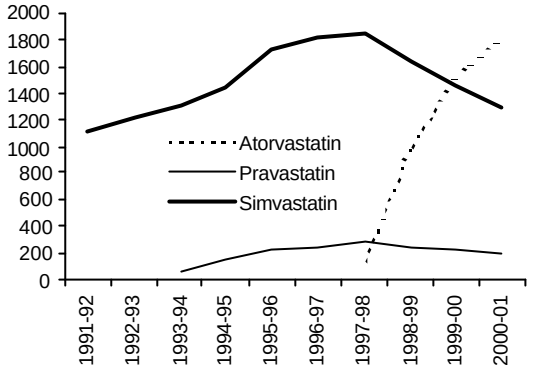


Figure 16c Tablet 10 mg Cost per script ($)

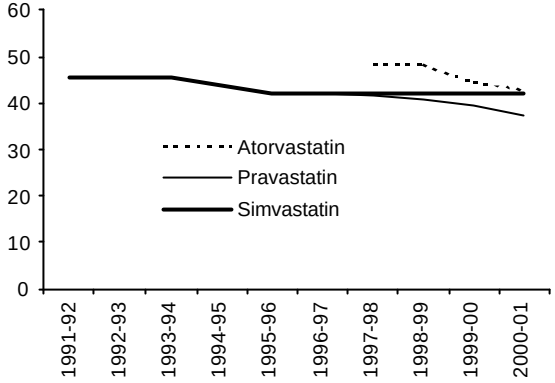


Figure 17a Tablet 20 mg Total Cost ($m)

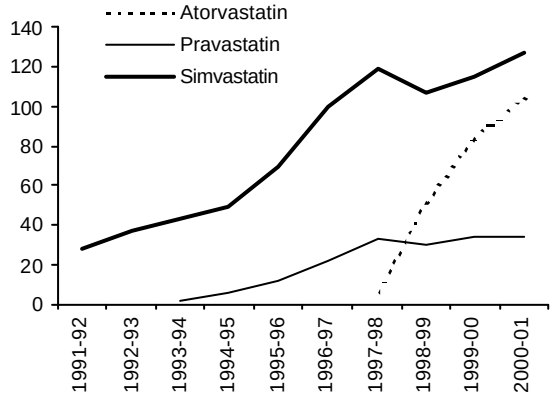


Figure 17b Tablet 20 mg Scripts (thousands)

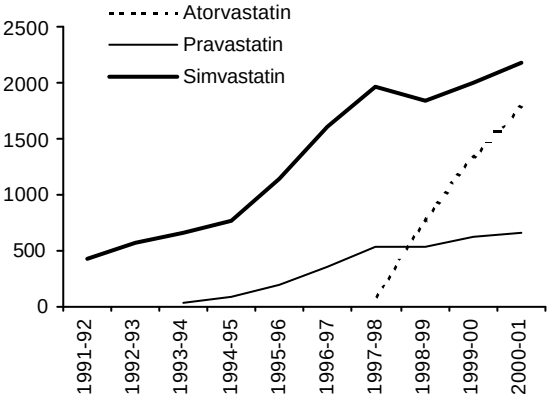


Figure 17c Tablet 20 mg Cost per script ($)

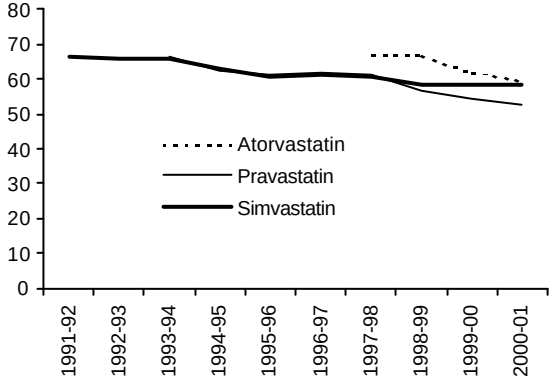


Figure 18a Tablet 40 mg
Total Cost ($m)

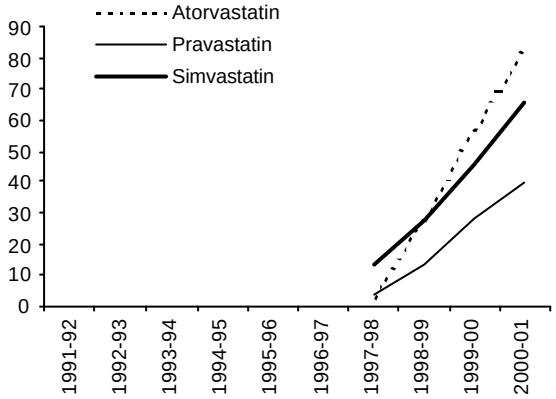


Figure 18b Tablet 40 mg
Scripts (thousands)

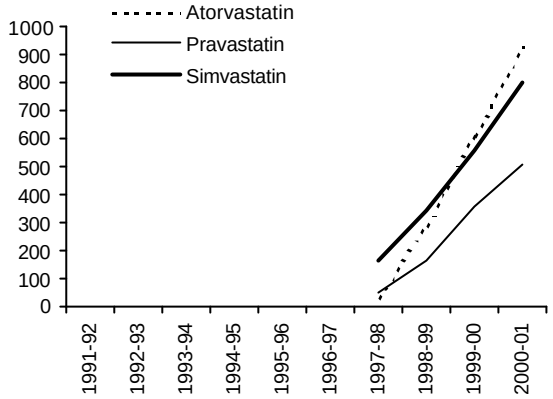
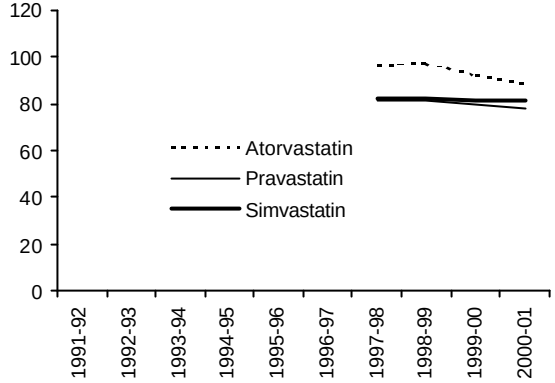


Figure 18c Tablet 40 mg
Cost per script ($)



5.4 Discussion

The statin's have shown very strong growth since being listed on the PBS as the most effective type of cholesterol reducing drug. This growth has shown little signs of tapering off.

Because they are relatively new drugs, all forms of the statins are still protected by patent, so the PBS has not been able to rely on competition from generic suppliers to obtain major price falls. Instead they have used the introduction of a "follower" type of statin – pravastatin– to reduce the price of the original drug simvastatin. They have also acted to bring down the price of the more recent drug atorvastatin, even though it was able to command a price premium on entry.

The statins are subject to WAMTC pricing policy but this has not reduced prices to the same extent as was the case for the treatments for peptic ulcers or the antidepressants.

Through issuing special guidelines to doctors on their use – the "General Statement for Lipid-Lowering Drugs" – the PBS has also acted to restrain usage of all forms of statin.

Merck acted to protect its market for simvastatin by introducing new forms – the 40 mg and 80 mg tablets. Pfizer was quick to respond with a 40 mg version of atorvastatin, but took over 2 years to introduce its 80 mg tablet, giving Merck a significant period in which it had the market to itself. The 80 mg tablet has yet to make any significant inroads into the markets of the other strength tablets however.

6. Conclusions

In its analysis of drug prices in the USA,[13] the Congressional Budget Office found that there is significant price competition in the USA among suppliers of different versions of drugs within a given therapeutic class, even though each holds a patent. This competition often took the form of discounts being offered to those purchasers that were members of pharmacy benefit managers or similar bulk purchasing organisations with standard formularies that can significantly influence a drug's market share. Consumers purchasing drugs through retail pharmacies would not generally receive these discounts.

The CBO confirms other studies showing that the entry of generic competitors has little effect on the prices of the original brand name drug, although the discounts offered by supplier are likely to be larger than before. The same effect occurs when "follower" drugs enter the market.

Savings from the entry of generic drugs therefore depend on how much of the market the generic suppliers can capture by offering a lower price.

Because discounts are made available to some organisations and not others, the effect of lower prices are likely to vary considerably among different types of purchasers.

The case studies examined in this report show that, in Australia under the PBS, drugs also face competition both from "follower" and generic drugs.

However, because most drugs are supplied through the PBS, consumers face only one set of prices, i.e. those negotiated by the PBS. The Productivity Commission study confirms that discounting is not widespread in Australia.[14]

The Productivity Commission also found that when comparing Australia to a range of other OECD countries,

- The prices of new innovative drugs in Australia are broadly similar to other countries, except for the USA
- The prices of "me-too" drugs in Australia are the lowest among the comparison countries
- The prices of generic drugs in Australia is among the lowest of all countries

In general, the real price of drugs in the USA tends to rise over time.[15] In Australia, however, after some tendency to rise in the first half of the 1990s, drug prices have fallen consistently since 1996-97.[16]

Three of the drugs examined in this report – fluoxetine, omeprazole and moclobemide – experienced some rise in prices until about 1995-96, but all drugs have had static or declining prices from that time onwards.

Two of the case studies – peptic ulcer treatments and antidepressants – show that the PBS acts quickly to achieve price reductions once drugs go off patent and

[13] CBO, ibid, pp xi-xiii.
[14] Productivity Commission, ibid, p xxii.
[15] Lu, J and Comanor, W, "Strategic Pricing of New Pharmaceuticals", Review of Economics and Statistics, Feb 1998, Vol 80, No 1, pp 108-111. CBO, ibid, pp 20-21.
[16] Sweeny, Kim, ibid, p 15.

generic suppliers make the same drug available under different brand names. Within 2 years, the PBS had achieved retail price falls of between 18% and 44%.

Although the original drugs elected to include a brand premium in their retail price, this was typically around 5-10% and did little to offset the price reduction. Unlike the US, therefore, the price of both the original and the generic competitor drugs fell at about the same rate.

The case studies show that the outcome for the original brand in the market is hard to predict. For ranitidine and fluoxetine, a generic supplier quickly took market share away from the original supplier. Unlike the US however the market share of the original suppliers is still significant. In the case of omeprazole and moclobemide, generic suppliers made little headway in acquiring market share.

Generic suppliers however enter the market quite late in a drug's life. Before this time, other follower drugs are likely to have emerged within the same class. In addition, completely new classes of drugs are developed to treat the same condition.

While ranitidine successfully fought off challenges from other H_2-receptor antagonists, it had begun losing share in the market for peptic ulcer treatments to omeprazole before the arrival of generic suppliers. Omeprazole has also been successful in its competition with other proton pump inhibitors. In these 2 instances, the original drug has been more successful than the "follower" drugs.

The presence of omeprazole enabled the PBS to reduce the price of ranitidine by 20% before generics arrived

The market for antidepressants presents a somewhat different story. Fluoxetine, the original drug in the SSRI class, was successful in displacing moclobemide, the NMRIs and the other antidepressants, when it first appeared. However fluoxetine in turn was displaced by sertraline and paroxetine as the preferred SSRIs – a process that started before fluoxetine went off patent. In addition a further challenger, venlafaxine has emerged in recent years to take market share from the SSRIs.

In contrast to ranitidine, the price of fluoxetine rose steadily before generics became available. At that point however it suffered a 39% price fall. The PBS was successful in transferring the price reductions achieved after generic competition began for fluoxetine to all the other antidepressants including the market leaders – sertraline, paroxetine and venlafaxine - even though these were still covered by patent and did not face generic competition.

The other case study – the cholesterol reducers – does not include any generic drugs. Nonetheless there has been significant competition among the three main forms of statins. Simvastatin, the original statin, lost some market share to pravastatin when it arrived, and greater share to atorvastatin, a more recent version.

Despite the absence of generics, the PBS has achieved a 12%, 11% and 20% falls in the prices of the 20 mg tablet form of simvastatin, atorvastatin and pravastatin respectively since each first entered the market. It has been less successful in dropping the price of more recent formulations.

Although the PBS is effectively the single source of drugs for most Australians, it has managed to promote effective markets where it can within the three case studies examined in this paper. It has used the WAMTC pricing methodology entry to force prices lower for drugs still under patent once "follower" drugs are listed, and has

moved quickly to impose the even lower prices offered by generic suppliers once drugs go off patent.

In doing this it has still enabled suppliers to compete freely for market share.

APPENDIX

Data Used In Case Studies

Table A1 Treatments for Peptic Ulcer

a. Total Cost

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
H_2-Receptor Antagonists										
Cimetidine	21.1	36.8	27.7	20.5	15.7	11.6	8.7	6.8	5.5	4.2
Famotidine	8.2	17.0	31.2	37.5	44.6	48.7	45.6	27.8	25.2	20.7
Nizatidine	0.0	0.0	1.9	4.6	6.1	6.6	7.9	9.8	10.7	8.9
Ranitidine Hydrochloride	49.1	62.8	87.5	97.7	102.1	103.7	99.3	86.3	86.4	81.1
Total	78.4	116.6	148.3	160.3	168.5	170.6	161.5	130.7	127.8	114.9
Prostaglandins										
Misoprostol	0.2	0.2	0.2	0.2	0.4	0.8	0.9	1.0	0.9	0.4
Proton Pump Inhibitors										
Lansoprazole	0.0	0.0	0.0	3.7	13.4	22.3	30.1	39.2	40.9	42.0
Omeprazole	9.7	18.3	38.1	72.0	113.3	139.5	158.1	190.6	167.3	181.2
Pantoprazole	0.0	0.0	0.0	0.0	1.0	5.9	10.5	17.1	20.3	26.1
Rabeprazole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	9.7	18.3	38.1	75.7	127.7	167.7	198.7	246.9	228.5	249.4
Combinations for Eradication of H Pylori										
Bismuth, Metronidazole, Tetracycline	0.0	0.0	0.0	0.0	0.0	1.1	3.5	1.0	0.4	0.3
Omeprazole, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	6.5	1.2
Omeprazole Magnesium, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	7.5
Omeprazole Magnesium, Metronidazole, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	3.1	1.2	0.4	0.4
Ranitidine Bismuth, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4
Total	0.0	0.0	0.0	0.0	0.0	1.1	6.6	11.1	10.1	9.8
Other Drugs for Peptic Ulcer										
Sucralfate	4.4	2.5	1.5	1.1	0.8	0.7	0.5	0.4	0.4	0.4
All Treatments for Peptic Ulcer	92.8	137.6	188.0	237.3	297.4	340.7	368.1	390.1	367.6	374.6

Table A1 Treatments for Peptic Ulcer

b. Scripts

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
H_2-Receptor Antagonists										
Cimetidine	650.5	1,125.7	798.2	618.9	480.0	367.3	282.5	230.7	190.3	154.6
Famotidine	189.6	463.6	899.6	1,166.2	1,371.9	1,493.4	1,475.0	1,133.6	1,041.3	866.4
Nizatidine	0.0	0.3	53.3	131.4	176.7	196.0	258.4	395.4	449.2	391.3
Ranitidine Hydrochloride	1,179.6	1,719.4	2,537.5	2,974.4	3,083.1	3,116.8	3,226.7	3,527.3	3,688.4	3,567.6
Prostaglandins										
Misoprostol	4.7	4.2	4.7	4.3	9.3	17.5	18.1	19.7	17.1	8.3
Proton Pump Inhibitors										
Lansoprazole	0.0	0.0	0.0	38.0	138.6	242.6	323.2	418.7	503.2	598.4
Omeprazole	99.5	187.8	387.1	712.2	1,120.0	1,438.2	1,597.5	1,891.2	2,167.6	2,529.2
Pantoprazole	0.0	0.0	0.0	0.0	10.4	63.4	112.7	173.4	247.4	402.8
Rabeprazole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Combinations for Eradication of H Pylori										
Bismuth, Metronidazole, Tetracycline	0.0	0.0	0.0	0.0	0.0	14.7	50.1	16.1	5.7	4.2
Omeprazole, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.9	64.3	11.8
Omeprazole Magnesium, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	76.5
Omeprazole Magnesium, Metronidazole, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	30.5	13.2	4.4	3.9
Ranitidine Bismuth, Clarithromycin, Amoxycillin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.1	3.9
Other Drugs for Peptic Ulcer										
Sucralfate	152.6	90.7	63.6	46.5	36.7	29.0	23.5	19.2	16.7	15.6

Table A1 Treatments for Peptic Ulcer

c. Prices

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
H_2-Receptor Antagonists										
Cimetidine	32.50	32.72	34.65	33.06	32.64	31.46	30.88	29.60	28.92	27.09
Famotidine	43.23	36.76	34.73	32.13	32.48	32.62	30.93	24.50	24.23	23.86
Nizatidine		34.65	34.73	35.01	34.77	33.78	30.41	24.88	23.76	22.65
Ranitidine Hydrochloride	41.59	36.52	34.47	32.85	33.13	33.26	30.76	24.46	23.43	22.72
Prostaglandins										
Misoprostol	44.79	44.91	45.07	45.38	46.33	46.93	46.99	48.34	51.28	51.35
Proton Pump Inhibitors										
Lansoprazole				98.50	96.79	91.76	93.00	93.57	81.34	70.26
Omeprazole	97.89	97.41	98.38	101.15	101.14	97.02	98.98	100.80	77.18	71.64
Pantoprazole					92.54	92.70	93.06	98.59	82.01	64.75
Rabeprazole										63.52
Combinations for Eradication of H Pylori										
Bismuth, Metronidazole, Tetracycline						71.51	69.46	64.85	64.89	64.94
Omeprazole, Clarithromycin, Amoxycillin								108.09	100.38	97.80
Omeprazole Magnesium, Clarithromycin, Amoxycillin									97.76	97.62
Omeprazole Magnesium, Metronidazole, Amoxycillin							102.87	90.96	90.61	90.48
Ranitidine Bismuth, Clarithromycin, Amoxycillin								108.08	99.30	97.85
Other Drugs for Peptic Ulcer										
Sucralfate	28.90	27.11	23.33	22.64	22.90	22.95	23.00	23.01	23.08	22.95

Table A2 Ranitidine Tablets 150 mg

a. Cost

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Alphapharm	0	0	0	0	0	0.609	12.282	20.529	25.150	26.355
Biochemie	0	0	0	0	0	0	0	0	0	0
David Bull*	0	0	0	0	0	0	0.061	0.262	0.310	0.208
Chem mart*	0	0	0	0	0	0	0	0	0	0.057
Douglas Pharmaceuticals	0	0	0	0	0	0	0	0	0.162	0.350
Faulding Healthcare*	0	0	0	0	0	0	0	0	0	0.032
GlaxoSmithKline	34.746	49.697	69.111	76.579	80.018	80.127	60.097	40.708	35.563	28.628
Healthsense*	0	0	0	0	0	0	0	0	0	0.033
Hexal Australia	0	0	0	0	0	0	0	0	0.361	1.267
Sigma Pharmaceuticals	0	0	0	0	0	0	0	0	0.002	0.340
SBPA (Biochemie)	0	0	0	0	0	0	0	0	0.001	0.127
Terry White Chemists*	0	0	0	0	0	0	0	0	0	0.029
All suppliers	34.746	49.697	69.111	76.579	80.018	80.736	72.440	61.499	61.549	57.425

Table A2 Ranitidine Tablets 150 mg

b. Scripts

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Alphapharm	0	0	0	0	0	18	480	860	1,066	1,108
Biochemie	0	0	0	0	0	0	0	0	0	0
David Bull*	0	0	0	0	0	0	3	11	13	9
Chem mart*	0	0	0	0	0	0	0	0	0	2
Douglas Pharmaceuticals	0	0	0	0	0	0	2	1	6	14
Faulding Healthcare*	0	0	0	0	0	0	0	0	0	1
GlaxoSmithKline	844	1,367	2,011	2,338	2,425	2,421	1,886	1,647	1,555	1,330
Healthsense*	0	0	0	0	0	0	0	0	0	1
Hexal Australia	0	0	0	0	0	0	8	3	12	48
Sigma Pharmaceuticals	0	0	0	0	0	0	2	0	0	13
SBPA (Biochemie)	0	0	0	0	0	0	1	0	0	5
Terry White Chemists*	0	0	0	0	0	0	0	0	0	1
All suppliers	844	1,367	2,011	2,338	2,425	2,440	2,383	2,523	2,652	2,532

Table A2 Ranitidine Tablets 150 mg

c. Price

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Alphapharm						33.01	25.60	23.87	23.59	23.78
Biochemie										22.89
David Bull*							21.15	23.29	24.08	24.14
Chem mart*										25.05
Douglas Pharmaceuticals									28.69	25.63
Faulding Healthcare*										26.52
GlaxoSmithKline	41.18	36.35	34.37	32.75	33.00	33.09	31.86	24.72	22.87	21.53
Healthsense*										24.74
Hexal Australia									29.40	26.44
Sigma Pharmaceuticals									36.12	25.88
SBPA (Biochemie)									29.20	26.81
Terry White Chemists*										24.46
All suppliers	41.18	36.35	34.37	32.75	33.00	33.09	30.40	24.38	23.21	22.68

Table A3 Omeprazole 20mg

a. Scripts

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Capsule										
Acimax (Alphapharm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	100.7	131.2
Losec (AstraZeneca)	46.5	83.1	186.4	341.7	932.0	1,385.1	1,549.2	1,837.1	893.0	0.1
Total capsules	46.5	83.1	186.4	341.7	932.0	1,385.1	1,549.2	1,837.4	993.7	131.3
Tablet										
Acimax (Alphapharm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.1
Losec (AstraZeneca)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,056.5	2,084.5
Total tablets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,056.5	2,259.6
Total all forms	46.5	83.1	186.4	341.7	932.0	1,385.1	1,549.2	1,837.4	2,050.2	2,390.9

b. Cost

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Capsule										
Acimax (Alphapharm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	9.6
Losec (AstraZeneca)	4.4	7.7	17.5	33.5	92.5	134.5	153.5	185.6	75.7	0.0
Total capsules	4.4	7.7	17.5	33.5	92.5	134.5	153.5	185.6	83.2	9.6
Tablet										
Acimax (Alphapharm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6
Losec (AstraZeneca)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.4	149.3
Total tablets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.4	161.9
Total all forms	4.4	7.7	17.5	33.5	92.5	134.5	153.5	185.6	158.6	171.5

Table A3 Omeprazole 20mg

c. Price

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Capsule										
Acimax (Alphapharm)								105.40	74.36	73.04
Losec (AstraZeneca)	93.50	92.89	94.16	97.97	99.29	97.08	99.05	101.03	84.79	78.12
Total capsules	93.50	92.89	94.16	97.97	99.29	97.08	99.05	101.03	83.73	73.04
Tablet										
Acimax (Alphapharm)										72.18
Losec (AstraZeneca)									71.33	71.60
Total tablets									71.33	71.65
Total all forms	93.50	92.89	94.16	97.97	99.29	97.08	99.05	101.03	77.34	71.72

Table B1 Antidepressants

a. Total Cost

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Non-Selective Monoamine Reuptake Inhibitors										
Total	18.2	20.2	22.0	21.8	21.8	20.0	18.4	17.7	17.7	17.5
Selective Serotonin Reuptake Inhibitors										
Citalopram Hydrobromide							0.8	11.5	23.6	37.5
Fluoxetine Hydrochloride	4.5	13.6	27.6	42.5	44.0	32.8	30.0	30.1	31.0	32.2
Fluvoxamine Maleate							1.8	4.4	6.2	9.2
Paroxetine Hydrochloride				8.8	26.3	31.2	37.5	42.6	48.1	55.0
Sertraline Hydrochloride				15.5	39.6	41.9	50.5	58.9	70.6	84.0
Total	4.5	13.6	27.6	66.8	109.9	105.9	120.6	147.4	179.6	217.9
Monoamine Oxidase Inhibitors, Non-Selective										
Total	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Monoamine Oxidase Type A Inhibitors										
Moclobemide	0.2	6.1	12.2	16.2	28.8	34.0	32.9	30.6	26.5	22.0
Other Antidepressants										
Venlafaxine Hydrochloride						5.6	16.3	20.2	35.3	52.1
All other antidepressants	4.6	5.4	6.5	5.6	5.5	5.1	8.6	10.0	9.8	8.8
Total	4.6	5.4	6.5	5.6	5.5	10.7	24.9	30.3	45.0	60.9
Total Antidepressants	28.0	45.7	68.8	110.9	166.5	171.2	197.4	226.6	269.3	319.0

Table B1 Antidepressants

b. Scripts

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Non-Selective Monoamine Reuptake Inhibitors										
Total	2,809.6	2,942.2	3,056.5	2,917.2	2,794.4	2,581.1	2,381.6	2,283.3	2,265.5	2,239.3
Selective Serotonin Reuptake Inhibitors										
Citalopram Hydrobromide							21.4	299.9	595.7	937.5
Fluoxetine Hydrochloride	81.7	236.8	459.3	655.6	620.6	736.8	752.8	743.1	754.3	777.7
Fluvoxamine Maleate							44.7	104.4	144.6	213.3
Paroxetine Hydrochloride				132.9	374.1	587.1	860.4	997.5	1,124.3	1,273.2
Sertraline Hydrochloride				210.8	501.3	823.1	1,209.1	1,514.9	1,836.9	2,173.8
Total	81.7	236.8	459.3	999.2	1,496.1	2,147.1	2,888.5	3,659.7	4,455.8	5,375.5
Monoamine Oxidase Inhibitors, Non-Selective										
Total	51.7	45.7	44.3	40.1	37.1	34.1	31.2	30.0	29.7	30.4
Monoamine Oxidase Type A Inhibitors										
Moclobemide	5.4	131.7	242.7	302.1	609.3	634.1	567.8	561.2	496.9	423.1
Other Antidepressants										
Venlafaxine Hydrochloride						81.3	232.6	350.1	652.7	964.3
All other antidepressants	251.5	268.6	303.1	289.2	278.5	254.5	339.8	368.6	354.9	323.3
Total	251.5	268.6	303.1	289.2	278.5	335.7	572.4	718.8	1,007.6	1,287.6
Total Antidepressants	3,199.9	3,625.0	4,105.9	4,547.8	5,215.3	5,732.1	6,441.4	7,253.0	8,255.5	9,356.0

Table B1 Antidepressants

c. Prices

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Non-Selective Monoamine Reuptake Inhibitors										
Total	6.49	6.86	7.20	7.47	7.80	7.75	7.72	7.75	7.81	7.84
Selective Serotonin Reuptake Inhibitors										
Citalopram Hydrobromide							36.00	38.41	39.57	39.97
Fluoxetine Hydrochloride	55.15	57.54	60.11	64.89	70.95	44.57	39.90	40.46	41.14	41.44
Fluvoxamine Maleate							40.91	42.27	42.89	42.97
Paroxetine Hydrochloride				66.06	70.21	53.15	43.64	42.68	42.80	43.17
Sertraline Hydrochloride				73.67	79.00	50.88	41.73	38.86	38.45	38.65
Total	55.15	57.54	60.11	66.90	73.46	49.34	41.77	40.29	40.30	40.53
Monoamine Oxidase Inhibitors, Non-Selective										
Total	9.76	10.02	10.75	12.20	13.05	16.76	19.36	19.90	20.43	20.55
Monoamine Oxidase Type A Inhibitors										
Moclobemide	42.91	46.00	50.37	53.54	47.29	53.66	57.99	54.61	53.24	52.01
Other Antidepressants										
Venlafaxine Hydrochloride						69.06	70.18	57.81	54.02	54.05
All other antidepressants	18.16	20.07	21.32	19.40	19.64	19.92	25.22	27.18	27.48	27.22
Total	18.16	20.07	21.32	19.40	19.64	31.81	43.49	42.10	44.67	47.31
Total Antidepressants	8.76	12.61	16.75	24.39	31.92	29.87	30.65	31.25	32.62	34.09

Table B2 Fluoxetine, 20 mg capsule

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Scripts										
Alphapharm	0.0	0.0	0.0	0.0	5.6	124.5	127.3	144.5	336.9	369.0
Lilly	75.7	227.5	442.0	628.2	587.6	504.4	540.1	487.1	266.5	228.6
Others	0.0	0.0	0.0	0.0	0.0	2.9	9.6	13.3	11.8	13.6
All suppliers	75.7	227.5	442.0	628.2	593.2	631.8	677.0	644.9	615.1	611.1
Cost										
Alphapharm	0.000	0.000	0.000	0.000	0.395	5.730	5.179	5.957	13.997	15.433
Lilly	4.167	13.071	26.526	40.662	41.576	21.692	21.188	19.463	10.806	9.417
Others	0.000	0.000	0.000	0.000	0.000	0.113	0.379	0.536	0.477	0.563
All suppliers	4.167	13.071	26.526	40.662	41.972	27.535	26.746	25.956	25.280	25.413
Cost per script										
Alphapharm					70.77	46.02	40.70	41.22	41.55	41.82
Lilly	55.07	57.46	60.02	64.72	70.76	43.01	39.23	39.96	40.55	41.20
Others						38.36	39.62	40.28	40.53	41.53
All suppliers	55.07	57.46	60.02	64.72	70.76	43.58	39.51	40.25	41.10	41.58

Table B3 Moclobemide

a. 150 mg tablet

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Scripts										
Alphapharm	0.0	0.0	0.0	0.0	0.0	3.4	8.9	10.0	9.5	16.2
Roche	4.6	119.4	223.6	278.9	533.5	402.2	243.6	157.0	116.7	88.2
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
All suppliers	5.4	131.7	242.7	302.1	556.8	419.4	264.2	176.2	133.7	114.2
Cost										
Alphapharm	0.000	0.000	0.000	0.000	0.000	0.143	0.360	0.345	0.304	0.505
Roche	0.194	5.464	11.185	14.809	23.694	17.038	9.954	5.448	3.734	2.753
Others	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.028
All suppliers	0.233	6.057	12.224	16.173	24.842	17.779	10.790	6.110	4.279	3.567
Cost per script										
Alphapharm						42.01	40.50	34.42	31.91	31.24
Roche	42.53	45.75	50.03	53.09	44.41	42.37	40.86	34.70	32.00	31.23
Others										31.09
All suppliers	44.86	48.34	54.38	58.97	49.42	43.10	40.82	34.68	32.09	31.28

Table B3 Moclobemide

b. 300 mg tablet

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Scripts										
Alphapharm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	30.9
Roche	0.0	0.0	0.0	0.0	49.4	203.8	293.1	374.1	352.7	252.4
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8
All suppliers	0.0	0.0	0.0	0.0	52.6	214.6	303.6	385.0	363.2	309.0
Cost										
Alphapharm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	1.861
Roche	0.000	0.000	0.000	0.000	3.726	15.415	21.336	23.812	21.513	15.030
Others	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.169
All suppliers	0.000	0.000	0.000	0.000	3.975	16.248	22.132	24.537	22.175	18.441
Cost per script										
Alphapharm									59.52	60.15
Roche					75.49	75.63	72.81	63.66	61.00	59.54
Others										
All suppliers										

Table B4 Venlafaxine

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Scripts										
Tablet 37.5 mg						45.7	109.4	133.0	93.7	83.7
Tablet 75 mg						35.6	123.2	177.4	122.9	87.9
Capsule 75 mg								22.9	232.4	405.4
Capsule 150 mg								16.9	203.6	387.4
Cost										
Tablet 37.5 mg						2.681	6.158	6.131	4.120	3.658
Tablet 75 mg						2.932	10.166	11.999	7.586	5.259
Capsule 75 mg								1.068	10.944	19.040
Capsule 150 mg								1.046	12.609	24.161
Cost per script										
Tablet 37.5 mg						58.70	56.27	46.09	43.96	43.70
Tablet 75 mg						82.35	82.54	67.64	61.73	59.85
Capsule 75 mg								46.70	47.08	46.97
Capsule 150 mg								61.99	61.92	62.38

Table C1 Cholesterol and Triglyceride Reducers

a. Total Cost

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
HMG CoA Reductase Inhibitors										
Atorvastatin Calcium	0.0	0.0	0.0	0.0	0.0	0.0	14.4	126.7	206.3	265.5
Fluvastatin Sodium	0.0	0.0	0.0	0.0	1.2	10.3	15.7	11.1	8.1	6.6
Pravastatin Sodium	0.0	0.0	4.7	12.2	22.4	32.1	49.0	53.9	71.4	81.6
Simvastatin	79.0	92.6	103.5	113.4	144.2	177.7	212.8	206.9	231.3	267.1
Fibrates										
Gemfibrozil	9.3	12.3	16.1	18.3	22.3	25.5	26.6	20.6	19.3	19.4
Bile Acid Sequestrants										
Cholestyramine	9.1	6.0	4.7	4.1	3.5	3.1	2.8	2.2	2.1	2.2
Colestipol Hydrochloride	1.2	0.7	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1
Nicotinic Acid and Derivatives										
Nicotinic Acid	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2
Other Cholesterol and Triglyceride Reducers										
Probucol	1.0	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2
All Cholesterol Reducers	99.9	112.5	130.3	149.1	194.7	249.8	322.1	422.1	538.9	642.9

Table C1 Cholesterol and Triglyceride Reducers

b. Scripts

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
HMG CoA Reductase Inhibitors										
Atorvastatin Calcium	0.0	0.0	0.0	0.0	0.0	0.0	241.0	2,037.7	3,442.6	4,512.1
Fluvastatin Sodium	0.0	0.0	0.0	0.0	38.8	323.9	475.3	342.1	254.4	205.5
Pravastatin Sodium	0.0	0.0	91.6	246.8	447.8	605.4	892.2	962.1	1,212.4	1,372.3
Simvastatin	1,537.0	1,785.0	1,983.2	2,259.0	2,942.8	3,507.3	4,069.5	3,905.6	4,124.5	4,498.3
Fibrates										
Gemfibrozil	215.5	271.1	321.2	382.7	485.3	555.9	578.8	458.7	427.8	434.8
Bile Acid Sequestrants										
Cholestyramine	179.7	117.8	93.3	80.5	69.1	60.6	54.6	42.4	41.1	41.9
Colestipol Hydrochloride	18.9	11.4	8.7	6.9	6.1	5.1	4.1	2.8	2.4	2.1
Nicotinic Acid and Derivatives										
Nicotinic Acid	51.0	46.5	41.7	28.8	26.7	21.7	18.0	14.2	12.7	11.9
Other Cholesterol and Triglyceride Reducers										
Probucol	32.5	18.8	14.3	11.2	8.9	7.6	7.5	5.7	5.4	5.7

Table C1 Cholesterol and Triglyceride Reducers

c. Prices

	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
HMG CoA Reductase Inhibitors										
Atorvastatin Calcium							59.78	62.19	59.93	58.83
Fluvastatin Sodium					30.99	31.95	33.00	32.50	31.67	32.07
Pravastatin Sodium		48.85	50.92	49.26	49.99	53.01	54.96	56.03	58.88	59.43
Simvastatin	51.38	51.89	52.20	50.18	48.99	50.68	52.28	52.98	56.07	59.38
Fibrates										
Gemfibrozil	43.24	45.51	50.01	47.86	45.89	45.94	45.93	44.97	45.01	44.70
Bile Acid Sequestrants										
Cholestyramine	50.63	50.62	50.68	50.94	51.31	51.35	51.31	51.33	51.36	51.92
Colestipol Hydrochloride	60.92	59.82	60.85	62.27	62.60	62.85	62.69	62.70	63.00	63.49
Nicotinic Acid and Derivatives										
Nicotinic Acid	7.02	7.57	8.71	14.68	16.15	17.10	17.17	17.52	18.00	18.44
Other Cholesterol and Triglyceride Reducers										
Probucol	31.09	31.07	31.21	31.48	31.78	31.86	31.85	31.86	31.93	32.05