

# 3 Selected topics—changes over time

## 3.1 Topic selection

This chapter uses linear regression to examine in more detail changes in management rates of particular problems and medications of interest.

Topic selection was based on:

- medications or problems of topical interest in terms of public health initiatives or developments in treatments. In particular, topics were examined that are associated with the National Health Priority Areas<sup>30</sup>
- any changes over time in the overall rates of management of a problem, or in the overall rates of a medication.

Based on these criteria, five topics were selected for examination of management over time:

- the use of non-steroidal anti-inflammatory drugs (NSAIDs) to manage all arthritis (including osteoarthritis and rheumatoid arthritis) and other musculoskeletal problems
- the use of anti-depressants and the management of depression and other psychological problems
- the use of inhalant medications (preventives and bronchodilators) in the management of asthma
- the use of statins in the management of lipid disorders
- the management rate of injuries.

## 3.2 Methods

All medications prescribed or supplied by the GP (referred to as ‘medication rates’ in this section) are included in the trends analyses.

As in previous years ‘asthma inhalants’ included over-the-counter (OTC) medications so we could gain an accurate estimate of the use of bronchodilators for asthma.

Medications advised by the GP for OTC purchase were also included in the count of the traditional (non-Cox-2 specific) NSAIDS medications to obtain a more accurate estimate of total medications used for arthritis. This differs from reports in previous years, which excluded OTC NSAIDs.<sup>28</sup>

In Chapter 2, changes in medication rates over time are reported for prescribed medications only. Therefore there may be differences in the trends over time between the medication rates reported here and the prescribing rates reported in Chapter 2.

## Statistical methods

Trends over time were analysed using SAS V8.2 regression procedures that adjust the standard error to allow for the design effect of the cluster sample.<sup>21</sup> Test statistics and *p* values based on the adjusted standard error are more conservative than those that are calculated without taking into account the design effect of the cluster sample.

Changes over time in medications prescribed/supplied or advised were examined for specific problems of interest. Linear regression was performed to detect whether changes in medication rate were attributable to:

- changes in the medication management for the problem of interest, *or*
- changes in management rate of the problem(s) for which the medication is prescribed, *or*
- a combination of changes in both the medication management and the management rate of the problem of interest.

Outcomes are expressed as rates per 100 encounters for medications and problems managed. When examining changes in medication rates within specified morbidities (e.g. arthritis), rates are expressed per 100 specified problems. All analyses were weighted for the GP's age, sex and activity level.

## Extrapolated estimates over time

Where we detected a significant change over time, we calculated the estimated annual rate of change. This is expressed as the mean annual increase (or decrease) over the study period in the number of general practice encounters for that problem or medication occurring in Australia each year.

Extrapolated estimates were calculated by multiplying the sample encounter rate for 1998–99 by the number of unreferred attendances (A1 and A2 items) claimed through Medicare in that year to give the estimated number of encounters in Australia for that event in 1998–99. The same was done for 2004–05. The difference between the two estimates was averaged over six years to give the estimated annual rate of change in the number of encounters.

In previous years extrapolated changes over time were calculated after adjustment for patient age and sex. However, since 1998 there have been real changes in the demographics of patients attending a GP as well as in the number of GP visits per head of population (see Chapter 2). Therefore, for this report, rates of change have been calculated from crude rates without adjustment for sample differences in patient age and sex.

## 3.3 Non-steroidal anti-inflammatory drugs for arthritis and other musculoskeletal problems over time

### Definitions

Non-steroidal anti-inflammatory drugs (NSAIDs) were defined as the medications included in the Anatomical Therapeutic Chemical (ATC) classification index code M01A.<sup>31</sup> All NSAIDs prescribed/supplied or advised by the GP for over-the-counter (OTC) purchase were included in the analysis. (*Note:* in previous annual reports OTC NSAIDs were excluded).<sup>28</sup>

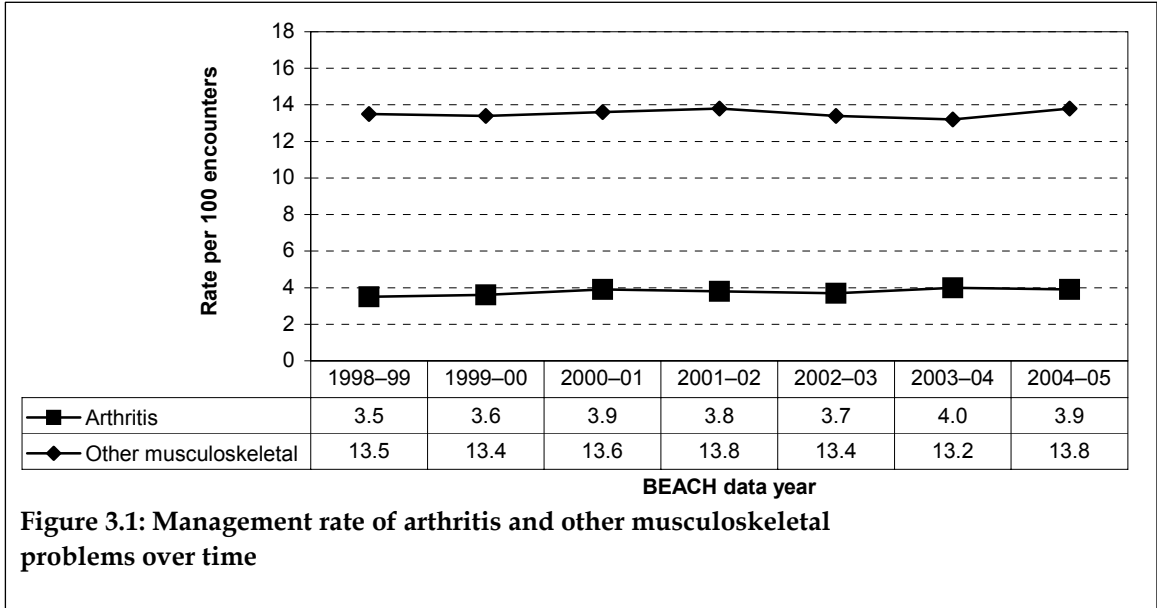
The NSAIDs were subdivided into Cox-2 inhibitors (which included the coxibs – ATC subgroup M01AH, plus meloxicam – M01AC06), and the other ‘traditional’ (not Cox-2 specific) NSAIDs. Coxibs alone (M01AH) were also analysed.

Musculoskeletal problems (ICPC Chapter ‘L’) were divided into all arthritis problems (rheumatoid arthritis, osteoarthritis and unspecified arthritis) versus all other musculoskeletal problems. These broad problem categories were derived from the recommended indications for the use of coxibs<sup>32</sup> and the problems for which NSAIDs were most often prescribed. The medication rate of NSAIDs over time was analysed separately within arthritis problems and within other musculoskeletal problems using linear regression.

### Management rates of arthritis and other musculoskeletal problems

Figure 3.1 shows the management rates of arthritis and other musculoskeletal problems over the seven years of data collection.

- There was a significant increase in the management rate of arthritis over time ( $p=0.0003$ ).
- There was no change in the management rate of other musculoskeletal problems between 1998-99 and 2004-05 ( $p=0.94$ ).



### NSAID medication rates for any problem

Figure 3.2 shows the medication rate of NSAIDs per 100 encounters unadjusted for problem under management.

- There was a marked increase in the rate of total NSAIDs prescribed/supplied or advised, from 5.0 per 100 encounters in 1998-99 to 6.8 per 100 encounters in 2000-01.
- The rate of NSAIDs then steadily decreased to 5.6 per 100 encounters in 2004-05.
- The rate of coxibs prescribed/supplied increased significantly in the period 1999-00 to 2001-02 and has since declined with a sharp drop in the most recent 12 months, following the withdrawal of rofecoxib.

- The rate of total Cox-2 inhibitors (including coxibs and meloxicam) declined less markedly, indicating that there was some substitution of meloxicam for the coxibs.

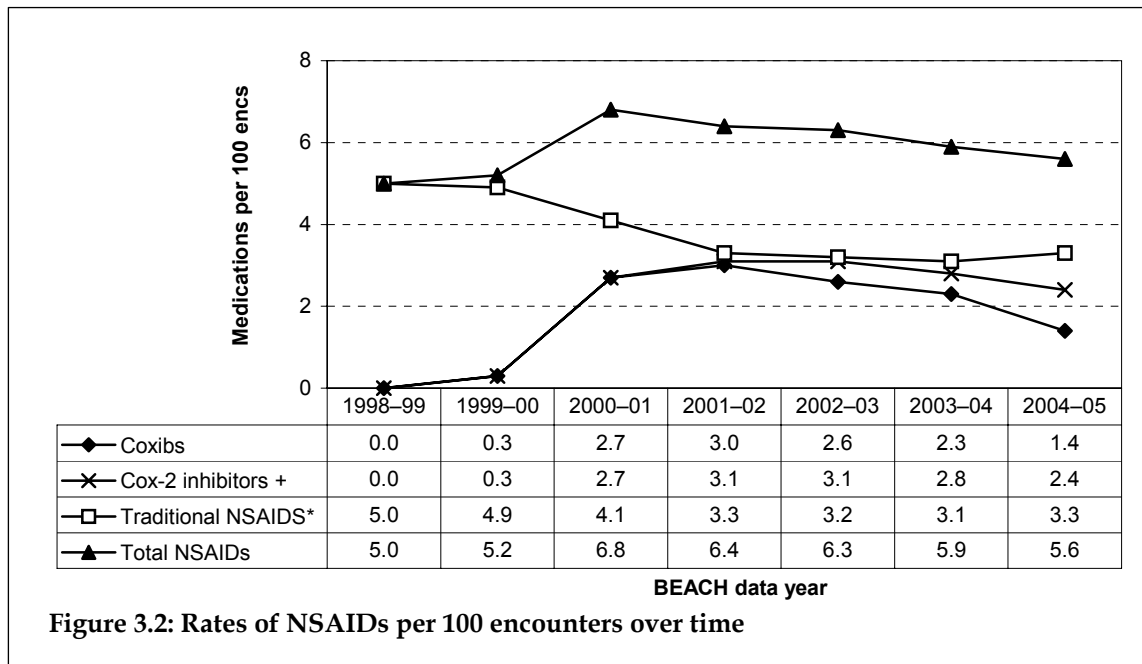


Figure 3.2: Rates of NSAIDs per 100 encounters over time

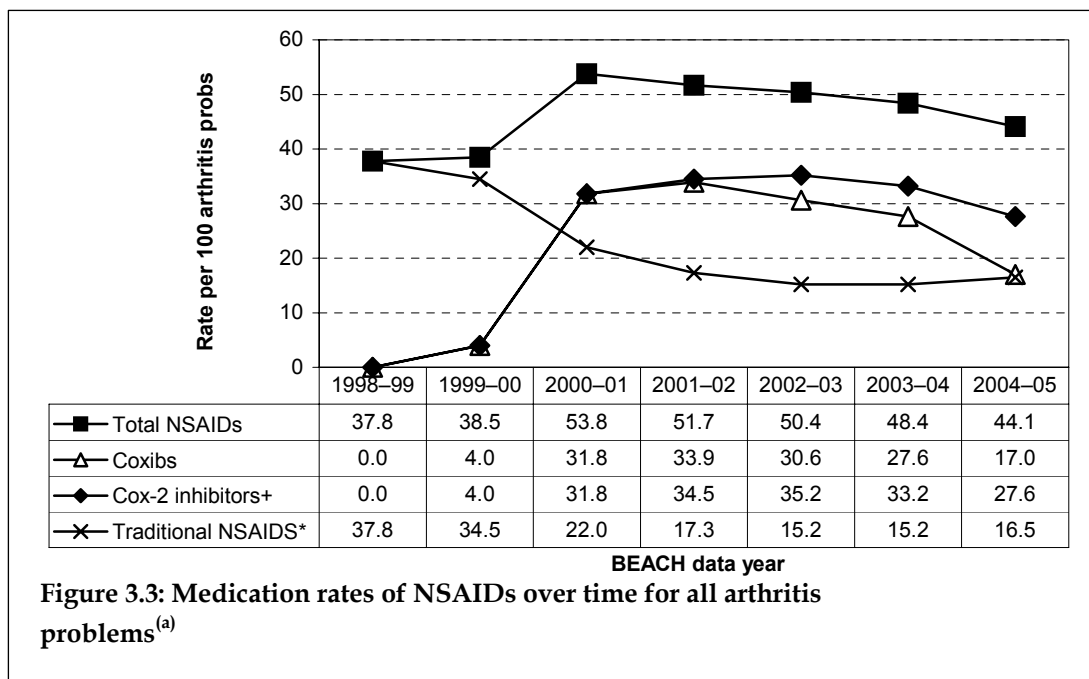
+ Cox-2 inhibitors include meloxicam

\* Traditional NSAIDs exclude meloxicam

## NSAID medication rates for arthritis problems

- In managing arthritis problems, GPs increased the rate of NSAID medications (prescribed/supplied or advised) from 37.8 medications per 100 arthritis problems in 1998-99 to a peak of 53.8 per 100 arthritis problems in 2000-01 (Figure 3.3).
  - This increase was due to an increase in the rate of coxibs from 4.0 per 100 arthritis problems in 1999-00 to 31.8 per 100 arthritis problems in 2000-01, when they were first accepted on the PBS. This rate continued to rise to a peak of 33.9 per 100 arthritis problems in 2001-02.
- Since 2001-02 the rate of NSAIDs prescribed/supplied or advised steadily decreased to 44.1 medications per 100 arthritis problems in 2004-05 (Figure 3.3).
  - Over the last three years there has been a decrease in the prescription and supply of coxibs to 17.0 per 100 arthritis problems in 2004-05, with a substitution of meloxicam for coxibs.
- At the same time, the rate of traditional NSAIDs (without coxibs or meloxicam) decreased from 34.5 per 100 arthritis problems in 1999-00 to an average of 16 per 100 over the years 2001-02 to 2004-05.

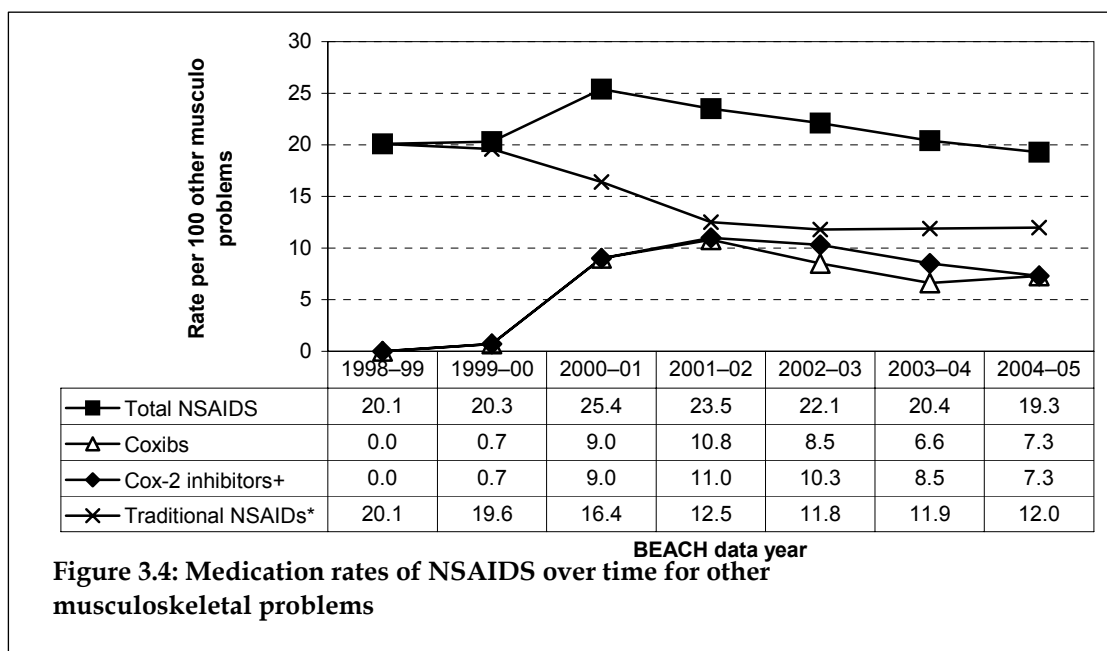
This changing pattern of medication management indicates that the arrival of the coxibs was largely responsible for an overall increase in the total NSAID medication rate for arthritis problems. At the same time a decrease in other NSAIDs indicates that there was also considerable substitution of coxibs for other NSAIDs.



(a) Includes multiple ICPC-2 codes for osteoarthritis and arthritis (see Appendix 3, <[www.aihw.gov.au/publications/index.cfm](http://www.aihw.gov.au/publications/index.cfm)> and rheumatoid arthritis (ICPC rubric L88).  
 + Cox-2 inhibitors include meloxicam. \* Traditional NSAIDs exclude meloxicam. Note: Probs—problems.

## NSAID medication rates for other musculoskeletal problems

In 2004-05 the prescription/supply rate of NSAIDs for musculoskeletal problems other than arthritis continued to fall (Figure 3.4). The medication rate of Cox-2 inhibitors for other musculoskeletal problems peaked in 2001-02 (11.0 per 100 problems), and the rate of all traditional NSAIDs decreased. However, in the last three years there has been a decrease in the medication rate of Cox-2 inhibitors for other musculoskeletal problems to 7.3 per 100 problems in 2004-05, whereas the medication rates of traditional NSAIDs have remained steady.



+ Cox-2 inhibitors include meloxicam.  
 \* Traditional NSAIDs exclude meloxicam.

## Conclusions

The investigation of prescription/supply or advice for purchase of NSAIDs demonstrates that the total medication rate peaked in 2000–01. This was probably largely due to the acceptance of the coxibs onto the Pharmaceutical Benefits Scheme and their immediate uptake in management of both arthritis and other musculoskeletal problems. There is evidence that some substitution for other NSAIDs was made at this time, but the coxibs were also prescribed for many patients who had not already been on a NSAID. Since this peak in 2000–01 the rate of NSAIDs has steadily decreased, particularly the rate for coxibs, and particularly in the most recent 12 months following the withdrawal of rofecoxib. However, there is evidence to suggest that the Cox-2 inhibitor meloxicam is being substituted for the coxibs.

A graphic view of the relationship between coxibs and other variables in the database is available in 2003–04 as Figure 13.1 (p. 93) in *General Practice Activity in Australia 2003–04*.<sup>28</sup>

## 3.4 Anti-depressant medications and the management of psychological problems over time

### Definitions

A problem was defined as depression if the GP recorded it as:

- a depressive disorder (ICPC-2 rubric P76) *or*
- in terms of depressive symptoms (rubric P03).

‘All anti-depressant medications’ included the ATC medication group N06A.<sup>31</sup> This was subdivided into selective serotonin reuptake inhibitors and serotonin-noradrenaline reuptake inhibitors (SSRI/SNRI, ATC codes N06AB, N06AX16, N06AX18), non-selective monoamine reuptake inhibitors (tricyclics, ATC code N06AA) and monoamine oxidase inhibitors (MAOIs, ATC codes N06AG, N06AF). Prescribing rates of anti-depressant medications were compared for depression versus all other psychological problems.

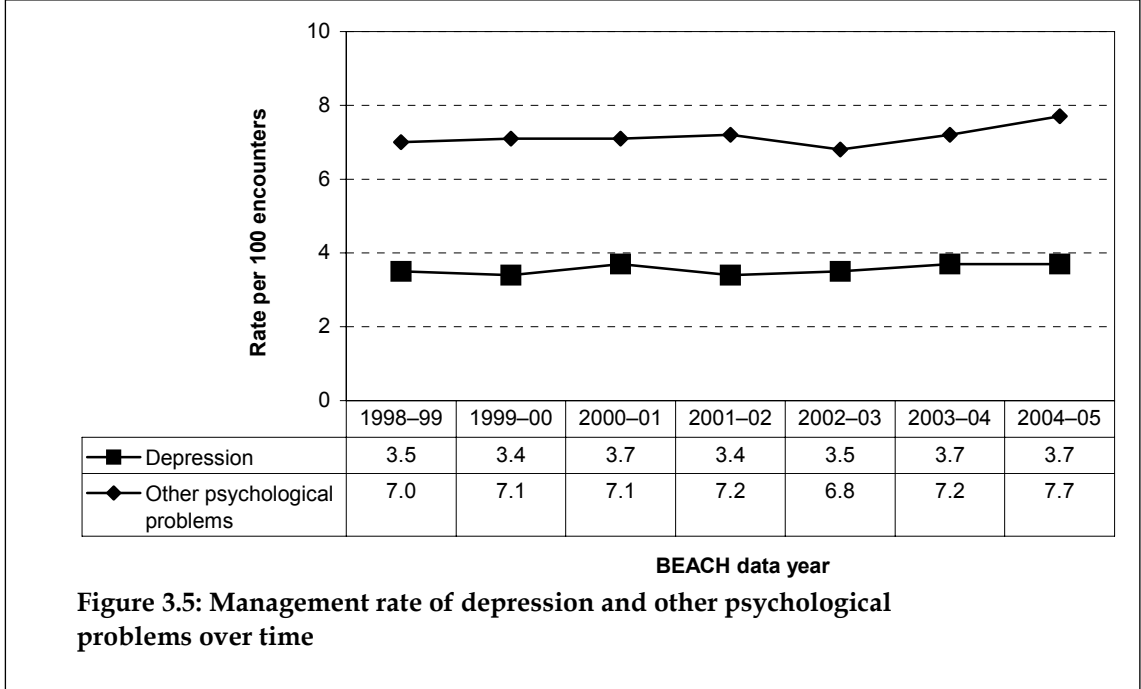
### Management rates of depression and other psychological problems

In 2004–05, depression:

- was the fourth most common problem managed in general practice
- was managed at a rate of 3.7 per 100 encounters
- accounted for 2.6% of all problems managed.

Figure 3.5 shows the overall management rates of depression and other psychological problems over time. From 1998–99 to 2004–05 the management of depression has remained steady at around 3.5 problems per 100 encounters.

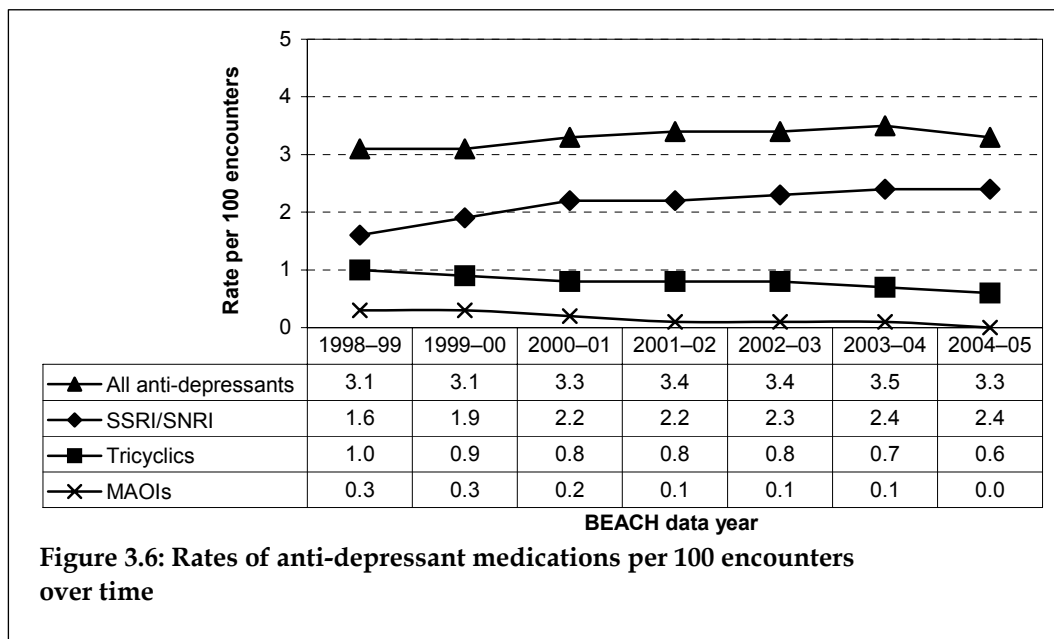
An extrapolation based on 95 million general practice items (A1 and A2) claimed through Medicare each year estimates there were approximately 3.5 million encounters per year in Australia in which GPs managed depression. The management rate of other psychological problems changed little over the seven years of the study, at around 7.2 problems per 100 encounters.



**Anti-depressant medication rates for any problem**

Figure 3.6 shows the overall rates of selected anti-depressant medications per 100 encounters, unadjusted for problem under management.

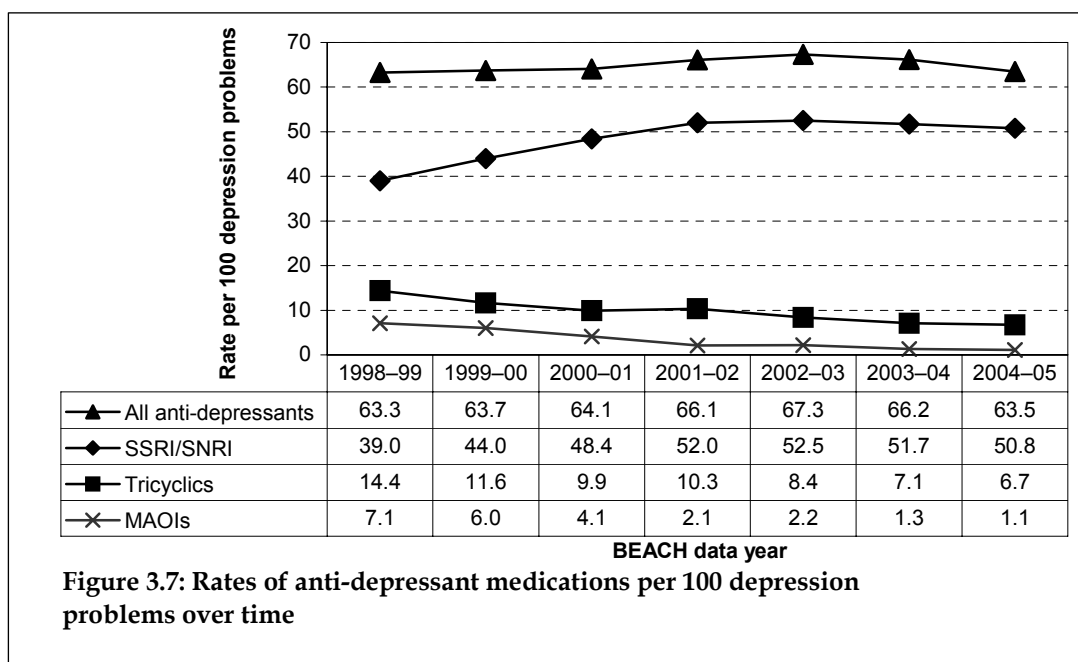
- The rates of anti-depressant medication increased marginally from 3.1 per 100 encounters in 1998-99 to 3.5 per 100 encounters in 2003-04, with a slight drop in 2004-05 to 3.3 ( $p=0.009$ ).
- There was a significant increase in the prescription/supply of selective serotonin reuptake inhibitors and serotonin-noradrenaline reuptake inhibitors (SSRI/SNRI) from 1.6 per 100 encounters in 1998-99 to 2.4 per 100 in 2004-05 ( $p<0.0001$ ).
- The increase in the prescription and supply of SSRI/SNRI medications has been partly offset by a continuing decrease in the rates of other anti-depressant medications, in particular the tricyclic anti-depressants ( $p<0.0001$ ) and MAOIs ( $p<0.0001$ ).
- After adjustment for differences in the number of GP encounters in each year, there were an estimated 97,000 extra SSRI/SNRI medications prescribed or supplied by GPs each year.



### Anti-depressant medication rates for depression

Figure 3.7 shows the rate of anti-depressant medications prescribed/supplied for the management of depression between 1998-99 and 2004-05.

- There was no change in the rate of anti-depressants for depression.
- There was an increase in the rate of SSRI/SNRI medications from 39.0 per 100 problems in 1998-99 to 50.8 per 100 problems in 2004-05.
- The increase in SSRI/SNRIs was offset by a decrease since 1998-99 in the rates of tricyclic anti-depressants (from 14.4 per 100 depression problems to 6.7 per 100,  $p < 0.0001$ ) and MAOIs (7.1 per 100 to 1.1 per 100,  $p < 0.0001$ ).



## Conclusion

There has been little change between 1998–99 and 2004–05 in the management rate of depression in general practice or in the rate of anti-depressant medication use for depression. However the selective serotonin reuptake inhibitors and the serotonin-noradrenaline reuptake inhibitors have continued to increase as the medication of choice for the management of depression.

A graphic view of the overall management of depression in 2003–04 is available as Figure 13.7 (p. 99) in *General Practice Activity in Australia 2003–04*.<sup>28</sup>

## 3.5 Asthma inhalant medications and management of asthma problems over time

### Definitions

A problem was classified as asthma if the GP recorded it in the problem/diagnosis section of the form as asthma, allergic, wheezy or asthmatic bronchitis, or status asthmaticus (ICPC-2 rubric R96).

Asthma inhalant medications were classified as bronchodilators/spasm relaxers or preventives. These categories cross various ATC codes and were defined using the Coding Atlas of Pharmaceutical Substances (CAPS) that distinguishes between bronchodilator inhalants and preventive inhalants. Rates of asthma medications include medications advised for OTC purchase as well as those prescribed or supplied by the GP.

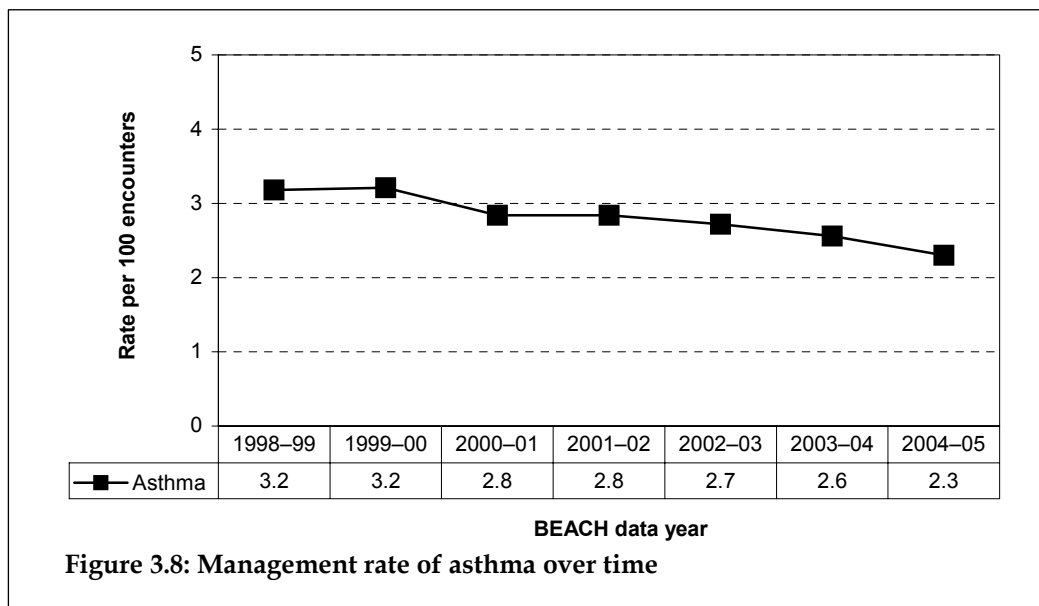
### Management of asthma

In 2004–05, asthma:

- was the tenth most common problem managed in general practice
- was managed at a rate of 2.3 per 100 encounters
- accounted for 1.8% of all problems managed.

Extrapolating to 95 million general practice items (A1 and A2) claimed through Medicare in 2004, there were an estimated 2.2 million encounters in Australia at which GPs managed asthma.

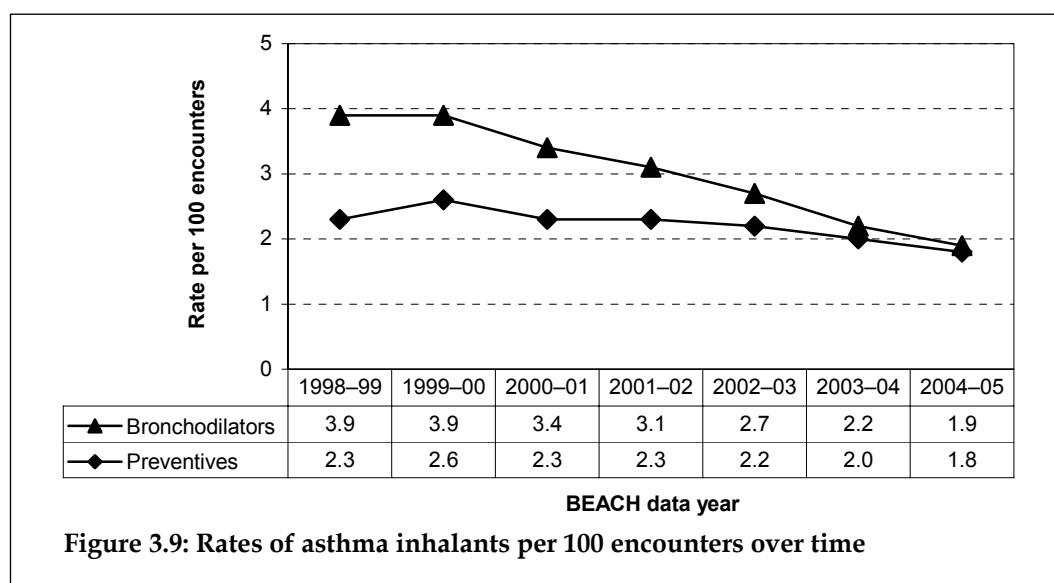
Over the six time intervals of the BEACH study, the management rate of asthma problems has decreased steadily from 3.2 per 100 encounters in 1998–99 to 2.3 per 100 encounters in 2004–05 ( $p < 0.0001$ ). After adjusting for annual differences in the number of asthma encounters in general practice, we estimate that there has been a decrease of 160,000 asthma encounters per year since 1998–99 (Figure 3.8).



## Asthma inhalant medications for all problems

Figure 3.9 shows the rate of asthma inhalant medications per 100 encounters, unadjusted for the problem under management.

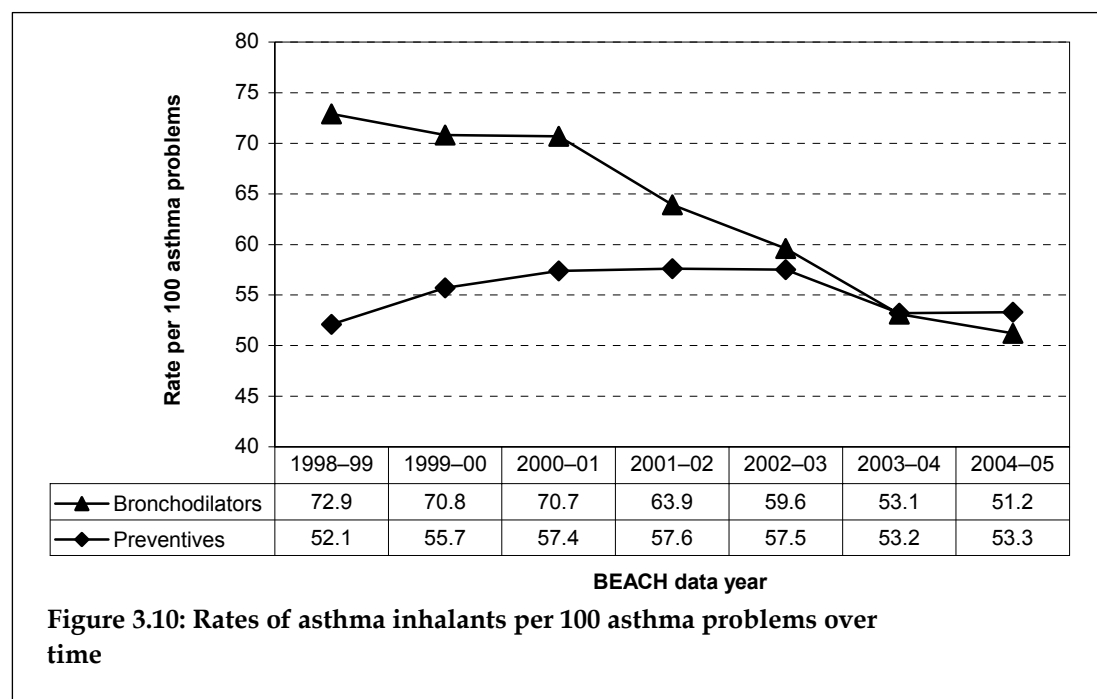
- There was a significant decrease in bronchodilators (prescribed/supplied or advised), from 3.9 per 100 encounters in 1998-99 to 1.9 per 100 encounters in 2004-05 ( $p < 0.001$ ).
- We estimate that since 1998-99 there have been 350,000 fewer occasions each year where the GP prescribed/ supplied or advised bronchodilator medications.
- The decrease in preventive medications was much smaller, from 2.3 per 100 encounters in 1998-99 to 1.8 per 100 encounters in 2004-05 ( $p < 0.0001$ ).



## Bronchodilator and preventive medications for asthma

Figure 3.10 shows the medications prescribed/supplied or advised specifically in the management of asthma problems.

- There was a significant decrease in the rate of bronchodilators over the six time intervals from 72.9 per 100 asthma problems in 1998–99 to 51.2 per 100 problems in 2004–05 ( $p < 0.0001$ ).
- The rate of asthma preventives for asthma problems remained steady over the period, at around 55.5 medications per 100 asthma problems ( $p = 0.89$ ).



## Conclusion

Patients in Australia are visiting the GP less frequently for the management of asthma. There are a number of possible reasons for this trend, which have been discussed in detail elsewhere.<sup>33</sup> Possible explanations include reduced prevalence, differences in diagnostic labels, and better management and control of asthma.<sup>33</sup> A continuing drop in hospital admissions for asthma over the same time period provides a further indication of decreasing prevalence in the population over time.<sup>33</sup>

The current analysis also showed that for asthma patients, GPs continued to prescribe/supply or advise asthma preventives, whereas there was a decreasing rate of bronchodilator medications prescribed/supplied or advised. This pattern of medication use may also indicate that patients are managing their asthma better, thus requiring fewer visits to the GP for acute exacerbations.<sup>27</sup>

A graphic view of the overall management of asthma in 2003–04 is available as Figure 13.15 (p. 107) in *General Practice Activity in Australia 2003–04*.<sup>28</sup>

## 3.6 Lipid-lowering agents and management of lipid disorders over time

### Management of lipid disorders

A problem was classified as a lipid disorder if the GP recorded it in the diagnosis/problem section of the form in terms such as high cholesterol, hypercholesterolaemia, hyperlipidaemia or raised lipids (ICPC-2 rubric T93).

Lipid-lowering agents were defined as medications included under the ATC code C10A.<sup>31</sup> For further analysis, lipid-lowering agents were divided into HMG CoA reductase inhibitors ('statins', ATC subgroup C10A A)<sup>31</sup> and all other lipid-lowering agents.

### Management of lipid disorders

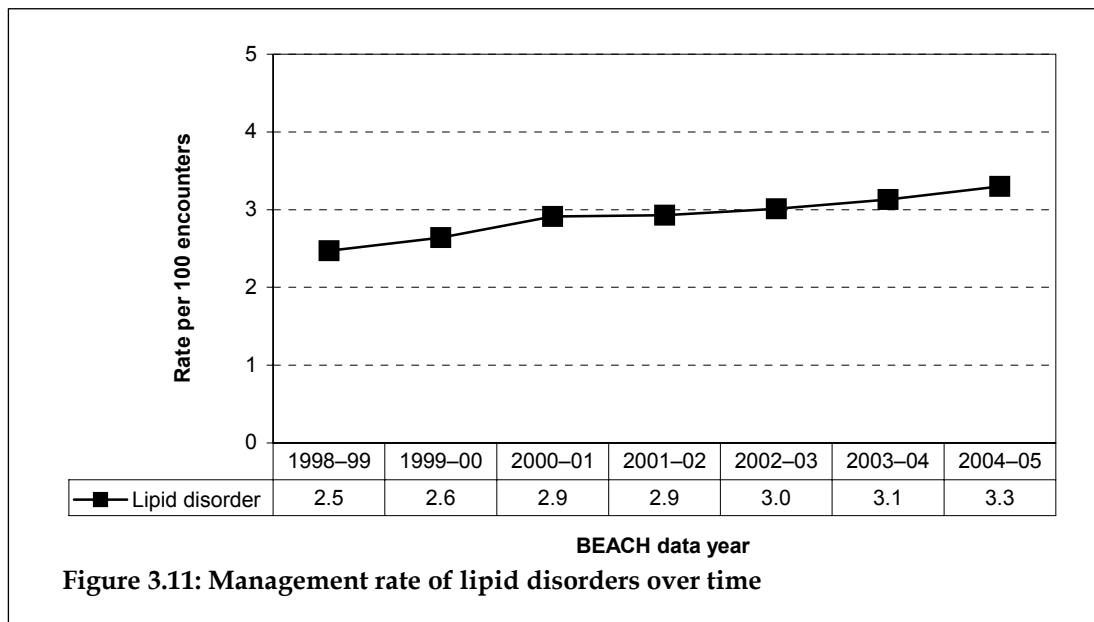
In 2004–05, lipid disorder:

- was the fifth most common problem managed in general practice
- was managed at a rate of 3.1 per 100 encounters
- accounted for 2.1% of all problems managed.

An extrapolation based on 95 million general practice items (A1 and A2) claimed through Medicare each year estimates that there were approximately 2.9 million encounters per year in Australia in which GPs managed lipid disorders.

The management of lipid disorders increased significantly from 1998–99 (2.5 per 100 encounters) to 2004–05 (3.3 per 100 encounters,  $p < 0.0001$ ).

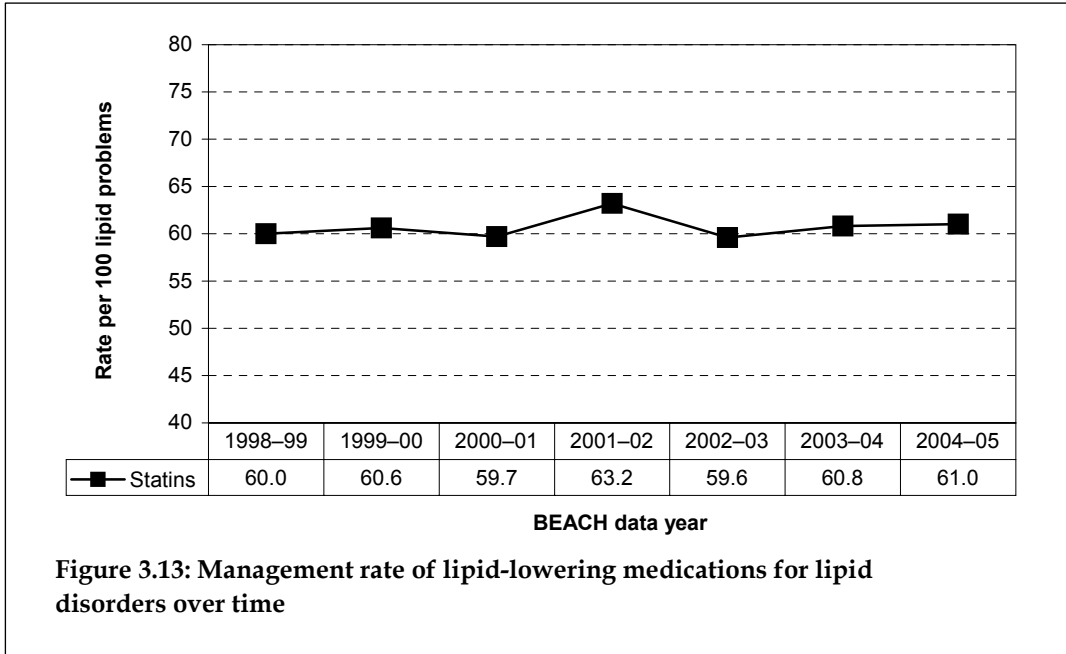
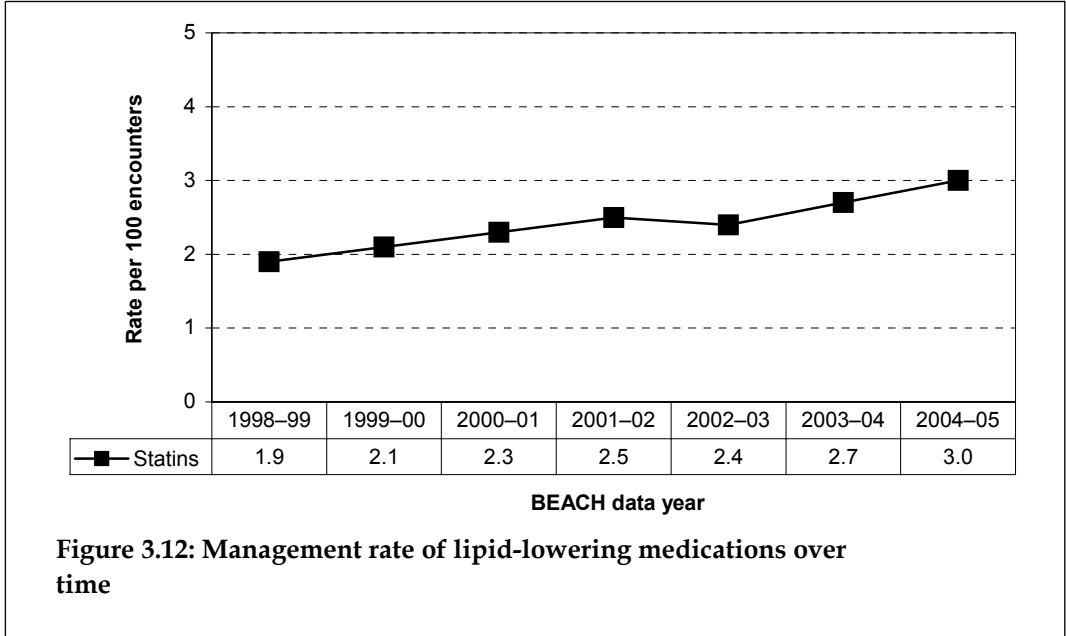
After adjustment for differences in the number of GP encounters each year, there was an estimated increase of 111,000 extra lipid problems managed in general practice each year (Figure 3.11).



### Statin medication rates for any problem

The rate of statins prescribed or supplied increased from 1.9 medications per 100 encounters in 1998-99 to 3.3 per 100 encounters in 2004-05 ( $p < 0.0001$ ).

After adjustment for differences in the number of GP encounters each year there were an estimated 150,000 extra occasions each year where a GP prescribed or supplied statin medications (Figure 3.12).



## Lipid-lowering medications for lipid disorders over time

The increase in lipid medications was entirely explained by the increase in the management rate of lipid disorders. There was no significant change in the rate of statins prescribed or supplied for management of lipid disorder problems (Figure 3.13). Since 1998–99 they have been prescribed/supplied at about 61 medications per 100 lipid disorder problems ( $p=0.71$ ).

## Conclusion

The management rate of lipid disorders continues to increase, indicating an increasing prevalence of hypercholesterolaemia in the Australian population. This increase is accompanied by a continued growth in prescriptions for lipid-lowering medications, specifically the statins.

Graphic views of the relationship between statin prescribing and other variables, and in the management of diabetes 2003–04 are available as Figure 13.15 (p. 107) and Figure 13.19 (p. 100) in *General Practice Activity in Australia 2003–04*.<sup>28</sup>

## 3.7 The management of injuries over time

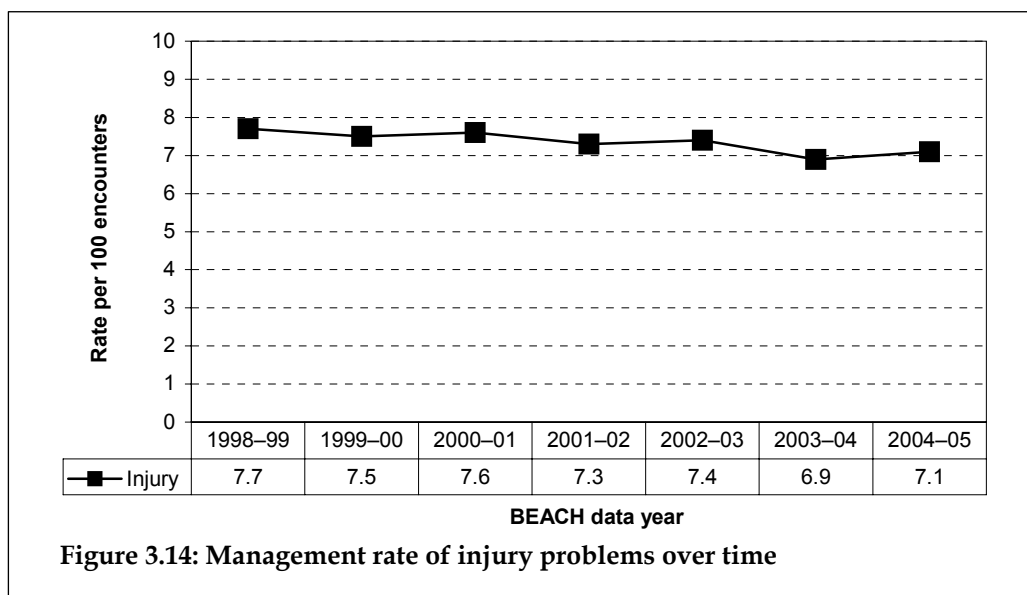
For the purpose of this analysis, ‘injuries’ includes all injury rubrics and terms across all ICPC-2 chapters (see Appendix 3, <[www.aihw.gov.au/publications/index.cfm](http://www.aihw.gov.au/publications/index.cfm)>). In 2004–05 injuries were managed at a rate of 5.9 problems per 100 encounters. An extrapolation based on 95 million general practice items claimed through Medicare in 2004–05 estimates that there were approximately 5.6 million encounters per year in Australia in which GPs managed any injuries.

### Changes over time

Figure 3.14 shows the management of injuries, which decreased from 7.7 per 100 encounters in 1998–99 to 7.1 per 100 encounters in 2004–05 ( $p=0.004$ ). After adjustment for differences in the number of GP encounters each year there were an estimated 170,000 fewer injury problems managed each year (i.e. about 1 million fewer occasions in 2004–05 than in 1998–99 when injury was managed by a GP).

### Most common injuries managed 2004–05

Table 3.1 shows the top ten injuries managed in 2004–05, which accounted for 90% of injuries managed. Musculoskeletal injuries (sprain/strain and fracture) and skin injuries were the most common physical injuries managed in 2004–05 and the distribution of the most common injuries managed has changed little since 1998–99 (results not shown).



**Table 3.1: Most common injury problems managed 2004-05**

<b>Injury</b>	<b>Number</b>	<b>Per cent of injury problems</b>
Sprain/strain*	1,603	23.9
Fracture*	927	13.8
Laceration/cut	701	10.5
Injury skin, other	658	9.8
Bruise/contusion	401	6.0
Insect bite/sting	169	2.5
Trauma/injury, NOS	159	2.4
Abrasion/scratch/blister	149	2.2
Burns/scalds	120	1.8
Foreign body in skin	96	1.4
<i>Subtotal</i>	<i>6,020</i>	<i>89.7</i>
<b>All injuries</b>	<b>6,702</b>	<b>100.0</b>

\* Includes multiple ICPC-2 or ICPC-2 Plus codes (see Appendix 3, <[www.aihw.gov.au/publications/index.cfm](http://www.aihw.gov.au/publications/index.cfm)>)

## Conclusion

This is the first time that the trend in physical injury management in general practice has been reported. The decrease over time in injury management may indicate that a proportion of patients are increasingly using other therapists such as physiotherapists and hospital emergency departments as the first line of management for physical injuries.