

14 Changes over time for problem, medication and treatment rates

In the previous chapters there were some significant differences noted across the years in terms of problems managed (Chapter 7), medication rates (Chapter 9) and non-pharmacological treatment rates (Chapter 10). Using simple linear regression this chapter investigates whether these observed changes represent significant linear trends in management and treatment rates over time.

The next chapter uses multiple regression to examine more closely how observed changes in management rates of particular problems and changes in medication rates were reflected in medication management for particular problems of interest.

14.1 Method

Trends over time were analysed by linear regression. SAS regression procedures were used that calculate robust standard errors to correct for the design effect of the cluster sample.¹¹ Test statistics and p-values based on the robust standard error are more conservative than those that are calculated without taking the design effect of the cluster sample into account. Thus the robust standard error provides a more stringent test of significant changes over time.

Unadjusted trends in problem and medication rates

Changes over time in problems rates per 100 encounters, medication rates per 100 encounters and clinical treatments per 100 encounters were analysed using simple linear regression.

Age and sex adjustment for trends in problem, medication and treatment rates

Where there was a significant change over time in the management rates of problems, medication rates or non-pharmacological treatments, the analysis was performed again, adjusting for age and sex of encounters to examine whether demographic differences across the samples were confounding the effect of time on rates per 100 encounters.

National estimated encounters

Where significant trends were found, the average annual increase or decrease in encounters nationally was estimated by multiplying the average change in management rates by the number of GP-patient encounters that occur in Australia annually (105,000,000).

14.2 Changes in annual management rates of problems between 1998–99 and 2001–02

Changes over time were first examined in terms of changes at the ICPC chapter level. For each chapter with significant changes in management rates over time, the most common problems in that chapter were further examined for specific trends at the ICPC rubric level (including groupers).

No changes in management rates over time

At the ICPC chapter level, rates of problems related to the skin, digestive, musculoskeletal, cardiovascular, urinary, male and female genital systems, and rates of psychological and social problems, remained steady over the 4-year period.

Increased management rates over time

There was a significant increase over time in the management rate of endocrine and metabolic problems, from 8.8 problems per 100 encounters in 1998–99 to 10.4 problems per 100 encounters in 2001–02 ($p < 0.0001$). The average yearly increase in endocrine/metabolic problems was 0.55 problems per 100 encounters.

After adjusting for age and sex there was little change in the size of the effect, with an adjusted average annual increase of 0.43 problems per 100 encounters ($p < 0.0001$). This equates to an estimated annual increase of 450,000 GP contacts with endocrine and metabolic problems nationally.

The increase in the management rate of endocrine and metabolic problems was partly explained by an increase in the management rate of lipid disorders, from 2.5 per 100 encounters in 1998–99 to 2.9 per 100 encounters in 2001–02 ($p = 0.0002$). This represents an average annual increase of 0.17 problems per 100 encounters, equivalent to an estimated national annual increase of 180,000 GP contacts with lipid disorder. The increase in the management rate of lipid disorders remained after adjusting for age and sex ($p = 0.0038$).

The increase in management rate of lipid disorder was not explained by the rate of new cases of lipid disorder, which, after adjusting for age and sex, did not increase significantly over time ($p = 0.21$). The increase in management of lipid disorders therefore reflects an increasing workload in the ongoing management of lipid disorders rather than an increase of new cases presenting to general practice.

The first 3 years saw a small increase in the management rate of diabetes and this increase had become significant in the fourth year of the study. Diabetes management increased from 2.6 per 100 encounters in 1998–99 to 3.1 per 100 encounters in 2001–02 ($p < 0.0001$). After adjustment for age and sex there was an average yearly increase of 0.12 problems per 100 encounters ($p = 0.0015$), equivalent to an estimated increase of 126,000 diabetes problems nationally per year.

The management rate of general and unspecified problems increased significantly over time from 13.2 per 100 encounters in 1998–99 to 14.7 per 100 encounters in 2001–02 ($p = 0.0004$). After adjusting for age and sex there was an average annual increase in general and unspecified problems of 0.55 problems per 100 encounters ($p < 0.0001$), equivalent to an estimated increase of 570,000 encounters nationally per year.

Decreased management rates over time

There was a significant decrease in the rate of respiratory problems managed, from 24.3 problems per 100 encounters in 1998–99 to 21.4 problems per 100 encounters in 2001–02 ($p < 0.0001$). This confirmed the decrease that was observed between 1999–00 and 2000–01. Since 1999–00 there has been a total decrease of 2.8 respiratory problems per 100 encounters. Averaged over the 4 years, it is estimated that respiratory problems have decreased at a rate of 500,000 encounters per year. The estimated reduction in respiratory problems remained after adjusting for age and sex ($p < 0.0001$).

The decrease over time in the management rate of respiratory problems was largely explained by a decrease in the rates for asthma ($p = 0.0009$) and acute bronchitis ($p < 0.0009$).

The management rate for asthma decreased from 3.2 problems per 100 encounters in 1998–99 to 2.8 problems per 100 encounters in 2001–02 ($p < 0.0001$). This trend was explained by a reduction between 1999–00 (3.2 problems per 100 encounters) and 2000–01 (2.8 per 100 encounters), a reduction of 0.35 problems per 100 encounters in that year. This equates nationally to an estimated 360,000 fewer GP contacts with asthma in the 2000–01 year compared with the previous 2 years. This lower rate of asthma management was sustained in 2001–02, with no further decrease, indicating that there has been a real reduction in the asthma management rate since 1999–00.

The acute bronchitis rate decreased from 3.3 per 100 encounters in 1998–99 to 2.7 per 100 encounters in 2000–01 ($p < 0.0001$), again confirming the decrease in management observed in 2000–01. After adjusting for age and sex, the lower management rates of asthma and bronchitis remained significant ($p < 0.0001$).

There was a marginal decrease over time in the management rate of neurological problems, from 4.0 problems per 100 encounters in 1998–99 to 3.7 problems per 100 encounters in 2001–02 ($p = 0.009$). The average annual decrease was 0.11 problem per 100 encounters. The reduction in rate of neurological problems over time remained after adjusting for age and sex, with an adjusted estimated average annual decrease of 0.12 problems per 100 encounters ($p = 0.0027$), equivalent to an estimated 63,000 fewer GP contacts with neurological problems nationally per year. Due to the relatively small numbers, there was no detectable decrease over time in the management rate of any specific neurological problem.

The rate of management of blood problems decreased significantly, to 13.0 problems per 100 encounters in 2001–02 ($p = 0.0003$) from a steady rate of around 16.8 problems per 100 encounters in the previous 3 years. This represents an estimated of 3,700,000 fewer encounters with blood problems nationally in 2001–02 compared with 2000–01. After adjusting for age and sex this decrease remained significant ($p < 0.0001$).

Management of ear problems decreased from 4.9 problems per 100 encounters in 1998–99 to 4.2 problems per 100 encounters in 2001–02 ($p < 0.0001$). After adjusting for age and sex it was estimated that the management of ear problems has been decreasing at an annual rate of 180,000 encounters nationally ($p = 0.0003$).

The rate of management of eye problems decreased somewhat, from 2.8 per 100 encounters in 1998–99 to 2.5 per 100 encounters in 2001–02 ($p = 0.0005$). After adjusting for age and sex, it is estimated that the management of eye problems has been decreasing at an annual rate of 100,000 encounters nationally ($p = 0.0001$).

14.3 Changes in medication rates between 1998–99 and 2001–02

Changes in prescribed medications CAPS

Decreases over time

For prescribed medications using the CAPs medication group level there has been a significant decrease in the prescription of antibiotics, from 17.3 prescriptions per 100 encounters in 1998–99 to 14.4 medications per 100 encounters in 2001–02 ($p < 0.001$). This translates to an estimated rate of decrease of 1,000,000 antibiotic prescriptions nationally per year. Within antibiotics, the prescription rate for the subgroup cephalosporins has decreased significantly, from 4.3 per 100 encounters in 1998–99 to 3.2 per 100 encounters in 2001–02 ($p < 0.0001$), accounting for 39% of the decrease in antibiotic prescribing. The prescribing rates for penicillins and broad-spectrum penicillins remained steady over time (see Chapter 9, Table 9.1).

Respiratory medications decreased from 6.9 prescriptions per 100 encounters in 1998–99 to 5.8 prescriptions per 100 encounters in 2001–02 ($p < 0.0001$). Prescriptions for bronchodilators have significantly decreased, from 3.7 per 100 encounters in 1998–99 to 2.9 per 100 encounters in 2001–02 ($p < 0.0001$). The prescription rate for asthma preventives has remained steady over the 4 years.

There has been little change in the overall prescription rate for central nervous system drugs. However prescription rates for simple and compound analgesics have decreased between 1998–99 and 2001–02, from 4.7 per 100 encounters to 3.8 per 100 encounters for simple analgesics ($p < 0.0001$) and from 3.3 per 100 encounters to 2.7 per 100 encounters for compound analgesics ($p < 0.0001$).

Increases in prescription rate over time

There was a significant increase in the prescription rate for musculoskeletal medications, from 5.7 per 100 encounters in 1998–99 to 6.1 per 100 encounters in 2001–02 ($p = 0.0003$). There was a significant increase in the rate of prescribing of non-steroidal anti-inflammatory drugs (NSAIDs), from 4.5 per 100 encounters in 1998–99 to 5.3 per 100 encounters in 2001–02 ($p < 0.0001$).

14.4 Changes in other treatments between 1998–99 and 2001–02

Therapeutic procedures

Therapeutic procedures increased from 11.8 per 100 encounters in 1998–99 to 14.7 per 100 encounters in 2001–02, an annual rate of increase of 0.8 per 100 encounters ($p < 0.0001$). This is equivalent to an annual increase of 840,000 encounters where the GP performed therapeutic procedures. This increase remained after adjusting for age and sex ($p < 0.0001$).

Clinical treatments

Clinical treatments increased from 31.4 per 100 encounters in 1998–99 to 38.1 per 100 encounters in 2001–02, a significant increase of 2.4 per 100 encounters per year, an increase that remained after adjusting for age and sex ($p < 0.0001$). This is equivalent to a rate of increase of 2,500,000 clinical treatments nationally per year.

Lifestyle counselling

Lifestyle counselling increased from 6.4% of encounters in 1998–99 to 8.1% of encounters in 2001–02, a significant increase of 0.6% of encounters per year ($p < 0.0001$). This is equivalent to an annual rate of increase of 600,000 encounters at which the GP has given advice on lifestyle. This trend remained significant after adjusting for age and sex ($p < 0.0001$).