General practice activity in Australia 2000–01

GP Statistics and Classification Unit

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Recent related publications:

Britt H, Miller GC, Charles J, Knox S, Sayer GP, Valenti L, Henderson J, Kelly Z 2000. General practice activity in Australia 1999–2000. AIHW Cat. No. GEP 5. Canberra: Australian Institute of Health and Welfare (General Practice Series No. 5).

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Britt H, Miller GC, Valenti L 2001. 'It's different in the bush': a comparison of general practice activity in metropolitan and rural areas of Australia 1998–2000. AIHW Cat. No. GEP 6. Canberra: Australian Institute of Health and Welfare (General Practice Series No. 6).

Britt H, Miller GC, Knox S 2001. Imaging orders by general practitioners in Australia 1999–00. AIHW Cat. No. GEP 7. Canberra: Australian Institute of Health and Welfare (General Practice Series No. 7).

Senes S & Britt H 2001. A general practice view of cardiovascular disease and diabetes in Australia. AIHW Cat. No. CVD 17. Canberra: Australian Institute of Health and Welfare (Cardiovascular Disease Series No. 17).

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BEACH

Bettering the Evaluation and Care of Health

General practice activity in Australia 2000–01

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December 2001

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Foreword

I am very pleased to make some preliminary comments for this report on general practice activity in Australia for 2000–01.

Many of my colleagues in general practice will find such a report daunting, given their time commitments. Despite that, the work undertaken by the General Practice Statistics and Classification Unit, in the Family Medicine Research Centre at the University of Sydney, is of increasing importance to general practitioners.

For the first time, this report is able to look at trends in general practice activity. With three years of data, the authors are able to begin to report on changes in the field.

The profession needs to use the best available evidence, but it also needs to be involved in the creation of high quality evidence. I note that the survey for this report had a lower response rate than previously, and that full-time GPs were less likely to participate. I commend the research team for considering ways in which participation can be maximised. Although the team suggests that the lower participation rate relates to the timing in the triennium for continuing professional development, I am concerned that it may also relate to a growing demand for unpaid work, and greater workforce pressure.

I understand the competing demands on GPs. The ability to participate in such important research needs to be built into our workforce planning and into our assessment of the overheads of general practice. Unless we do this, our ability to create the evidence on which to build improved patient care will be compromised.

I look forward to the results of the research team's trial of active electronic data collection methods. The use of electronic health records is increasingly common, and though it may be some time before the data quality is equivalent to that provided in a paper survey, this trial is a first step in the path that we must tread. I hope it will make our work better, but also easier.

The quality of care provided by GPs is, of course, also an abiding interest of the Royal Australian College of General Practitioners (RACGP). This report begins to analyse data over time to ascertain the quality of some aspects of practice. Although the judgements are inevitably subjective, the conclusions reached will form a starting point for national benchmarks against which GPs can monitor their own practice.

There is some way to go on an investigation of quality. Though no one report can critically appraise all issues, it would be valuable to know if the large proportion of encounters at which a single problem was managed relates to a deliberate practice amongst GPs to work with patients on constraining the 'shopping list' patients sometimes bring. Managing the number of problems to be dealt with conjointly with patients may be a strategy to improve quality, within the constraints of the current rebate structure. Research such as that done by the Sydney University team could begin to shed light on these issues.

Although there is a growing interest in financial incentives for quality care, I believe that most GPs also pursue quality for intrinsic rewards such as feedback from the patients, and the knowledge that they are doing well. It is of interest, in this context, that this report suggests that even without financial incentives, there has been a considerable increase in the use of psychological counselling in the management of depression over the three-years studied, accompanied by no change in the overall medication rate.

Compared with the previous two years, the report estimates 360,000 fewer GP contacts for asthma, nationally, in the 2000–01. We cannot tell whether this change has arisen from better

management. If it has, then the implication for the direct cost to the health system is significant, the implication for improved involvement in the labour-force is important (with substantial time lost by carers taking leave), and the benefit to patients is also important.

The information held by GPs about the quality of their care is very valuable. This report confirms that a substantial opportunity for quality improvement exists, if GPs begin to critically appraise the data that they collect as a part of routine clinical care. The possibility that lipid disorder detection has not improved in the past three years suggests that we can know where we are doing well, but also know where we can improve our care. The report shows however, that GPs must value the data available to them. Disappointing omissions in the recording of some details of prescriptions and repeats confirm that our ability to draw conclusions is highly dependent on our willingness to value data and record it accurately.

Not only are these data useful in the individual clinical encounter, but the BEACH study shows that they will be increasingly useful at a practice level, and, interpreted correctly, at a national level. The value of research such as that reported here will be increased if we are able to use it to strengthen our arguments for the benefit of general practice intervention, and to assist in planning at the national level.

I would like to thank the many GPs who took valuable time from their practice or personal lives to complete the encounter forms. The report points out that the 999 participants in BEACH this year together had over 10,000 years of general practice clinical experience. As President of the RACGP I know that the fruits of GP participation in such research can seem distant, but the contribution of practising GPs to our knowledge about general practice is vital to the future of patient care and the profession.

Paul Hemming MB ChB, FRACGP, FRCGP, FAMA

President

The Royal Australian College of General Practitioners

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Summary

This report details findings from the third year of the BEACH (Bettering the Evaluation and Care of Health) program, a continuous national study of general practice activity in Australia. The collection period reported is April 2000 to March 2001 inclusive.

This third BEACH year provided the opportunity to undertake trend analyses, and presents the first measures of changes in practice patterns over the 3 years 1998–99 to 2000–01.

Method

A random sample of GPs who claimed at least 375 general practice Medicare items of service in the previous 3 months is regularly drawn from the Health Insurance Commission data by the General Practice Branch of the Department of Health and Aged Care. GPs are approached first by letter and then followed up by telephone recruitment. Each participating GP completes details about 100 consecutive patient encounters on structured paper encounter forms and provides information about themselves and their practice.

In the 2000–01 BEACH data year a random sample of 999 GPs took part, providing details of 99,900 GP–patient encounters across Australia. Results are reported in terms of GP and patient characteristics, patient reasons for encounter, problems managed and management techniques used. Questions about selected patient health risk factors were asked of subsamples of patients and the results are included in this publication. Other subsample covered in the third year of BEACH are reported elsewhere (http://www.fmrc.org.au).

The participating general practitioners

Males made up 68.4% of participants and GPs aged 45 years or older accounted for 63.9%. One in five participants was in solo practice and more than one-quarter had graduated in a country other than Australia. Almost one-third were Fellows of the Royal Australian College of General Practitioners (RACGP) and 2.5% were currently in the Training Program.

A comparison of characteristics of participating GPs (29.8% of those with whom contact was established) with those of the GPs who declined to participate showed that GPs aged less than 35 years were under-represented in the final BEACH GP sample. Further, less busy GPs were significantly more likely to participate than those in the highest activity group. The encounter data underwent post-stratification weighting to adjust for these differences. The weighting also incorporated the differential activity level of each GP to increase the precision of national estimates.

The encounters

After post-stratification weighting for age (stratified by sex) and activity level, there were 99,307 encounters (weighted) included in the analysis. Comparison of the age–sex distribution of patients at these encounters with that of encounters in the Medicare data demonstrated excellent precision of the final encounter sample.

Most encounters (98.1%) were direct encounters (patient seen). By far the majority (94.6%) were claimable from Medicare and 83.9% of these were standard surgery consultations.

The encounters involved 149,962 reasons for encounter, 143,528 problems managed, 107,400 medications, 49,072 non-pharmacological treatments, 10,366 referrals, 29,225 pathology test orders and 8,227 orders for imaging.

The patients

Fourteen per cent of the encounters were with children, 10.3% were with young adults, and 23.0% with elderly patients. The patient was female at 57.1% of encounters, held a health care card at 36.7%, and came from a non-English-speaking background at 7.1% of encounters. The patients identified themselves as an Aboriginal person or a Torres Strait Islander at less than 1%. Only one patient identified themselves as both.

Patient reasons for encounter (RFEs) were recorded at a rate of 151 per 100 encounters. More than half related to the respiratory, musculoskeletal, skin, circulatory and digestive systems. Requests for a prescription, a check-up or for immunisation / vaccination were common RFEs. The remainder of the top ten RFEs were largely symptomatic in nature.

Problems managed

Problems were managed at a rate of 145 per 100 encounters. Problems related to the respiratory system, the skin and the musculoskeletal and circulatory systems accounted for just over half of all problems managed. The most common individual problems were hypertension (8.6 per 100 encounters), upper respiratory tract infection (URTI) (6.9 per 100), immunisation / vaccination (4.6 per 100) and depression (3.7 per 100).

Over the last 3 years (1998–99 to 2000–01) there has been statistically significant increases in the rate of management of problems related to the endocrine and metabolic system, partly explained by an increase in the rate of management of lipid disorders. There was a significant decrease in the rate of management of respiratory problems, in particular of asthma and acute bronchitis. There were also marginal decreases in the rates of management of problems related to the ear, the eye and the neurological system.

Management

There was no specific treatment recorded for 13.6% of problems managed. The most common treatment was medication alone (40.9% of problems) followed by clinical treatments only (9.6%) and then by medication plus clinical treatment (8.6%).

Medications

Medications were recorded at a rate of 108 per 100 encounters, or 75 per 100 problems. These medications could be prescribed (85.2% of all medications), advised for over-the-counter purchase (8.5%), or supplied by the GP (6.3%).

- Prescribed medications: Medications were prescribed at a rate of 92.3 per 100 encounters or 63.9 per 100 problems managed, at least one being prescribed at 59.8% of encounters and for 51.2% of problems managed. Medication groups most frequently prescribed were antibiotics, cardiovascular medications, and central nervous system medications. The most commonly prescribed individual medications were paracetamol (4.2% of all prescriptions), amoxycillin (3.5%), cephalexin (2.4%), the paracetamol-codeine combination (2.4%) and celecoxib (2.3%).
- Other medications: The medications most commonly recommended for over-the-counter purchase were paracetamol, ibuprofen, loratadine and clotrimazole topical. Those supplied by the GP were often vaccines, including the influenza virus vaccine, oral sabin

and triple antigen. However, celecoxib was the second most frequently supplied medication.

Changes in medications over time

Trend analysis demonstrated some significant changes over the last 3 years in some patterns of pharmacological management including:

- a significant increase in the medication rate of angiotensin II antagonists, offset by a decrease in the rates of calcium channel blockers, ACE inhibitors and antihypertensives.
- a significant increase in the serotonin reuptake inhibitor (SSRI) medication rate, offset by a decrease in rates of tricyclic anti-depressants and monoamine oxidase inhibitors while the overall rate of anti-depressants remained constant
- a significant increase in the overall medication rate of non-steroidal anti-inflammatory drugs much of which was explained by the coxibs, accepted onto the Pharmaceutical Benefits Scheme (PBS) in the middle of the BEACH year.
- a significant increase in the rate of lipid-lowering medications, and for the statins in particular
- a significant decrease in the overall medication rate of asthma inhalants.

Non-pharmacological treatments

These were classified into two groups, clinical and procedural. At least one non-pharmacological treatment was provided for almost 30% of problems. Clinical treatments were more frequent (37.2 per 100 encounters or 25.8 per 100 problems) than procedures (12.1 and 8.4 respectively). Advice and education about the treatment of a problem (65.9 per 100 encounters) was the most common clinical treatment. The most frequent procedure was excision or removal of tissue (2.6 per 100 encounters).

There has been a significant increase in the overall rate of provision of non-pharmacological treatments since 1998–99 and this is almost totally due to an increase in the rate of clinical treatments from 31.4 per 100 encounters to 35.1 per 100.

Referrals, admissions, tests and investigations

At least one referral was given at 9.9% of encounters for 6.9% of problems. Referral to medical specialists arose at 7.4 per 100 encounters, the most frequent being to surgeons. Referrals to allied health professionals occurred at a rate of 2.3 per 100 encounters, the majority being to physiotherapists. Admissions to hospital and referral to the emergency department were rare. Malignant neoplasms, pregnancy, depression and diabetes were the problems most often referred to a specialist while sprains / strains, back complaints and depression were those most commonly referred to an allied health professional.

Pathology was ordered for one in ten problems (at a rate of 29.4 per 100 encounters). Blood chemistry accounted for more than half the pathology tests ordered, but a full blood count was the most commonly ordered individual test. Problems for which pathology was most often ordered include lipid disorders, hypertension and diabetes.

Imaging was ordered for one in twenty problems, at a rate of 7.7 per 100 encounters. Plain x-rays accounted for almost two-thirds of these, chest x-rays being the most common. Fractures, back complaints and osteoarthritis were the problems for which imaging was most frequently ordered.

Patient health risk factors

- **Body mass index of adults:** Of 31,957 adult respondents (aged 18+ years), more than half were considered obese (20.2%) or overweight (34.1%). Men were more likely to be overweight or obese (60.2%) than women (50.2%). Eight per cent were underweight.
- **Body mass index of children:** BMI was calculated for 4,465 patients aged 2–17 years. Overall, 11.9% of these children were considered obese and a further 15.3% were overweight.
- **Smoking:** Of the 32,124 responding adult patients (aged 18+ years), 19.3% were daily smokers, 4.4% were occasional smokers and 27.3% were previous smokers. Males were more likely to report daily smoking (22.6%) than females (17.1%).
- **Alcohol use:** 'At-risk' levels of alcohol intake were reported by 24.1% of the 32,543 adult respondents. Male patients were more likely to be at-risk drinkers (30.3%) than women (19.9%). Prevalence of at-risk drinking decreased with age for both sexes.

Changes over time

The proportion of adult patients who reported at-risk levels of alcohol intake, and the proportion who said they smoked daily did not change between 1998–99 and 2000–01. However there was a significant increase in the proportion of adults classed as obese, (18.4% in 1998–99 to 20.2% in 2000–01) and in the proportion classed as overweight (32.8%–34.1%).

Selected topics—changes over time

Multiple linear regression was used to investigate changes in medication management of selected problems over the first 3 years of the BEACH program.

- **Depression and other psychological problems:** The rates of management of depression and anti-depressant medication prescription remained steady. However, SSRIs were increasingly substituted for older types of anti-depressant medication. Psychological counselling increased from 34.2 per 100 depression contacts to 40.8 per 100.
- **Lipid disorders and lipid-lowering agents:** The relative management rate of lipid disorders increased significantly over the 3 years and there was a parallel increase in the prescribing rate of lipid-lowering agents, and of statins in particular, such that the prescribing rate of lipid-lowering agents for lipid problems did not change over the study period.
- **Asthma:** There was a decrease in the management rate of asthma and there was a decrease in the prescribing rate of bronchodilators. Consequently, there was no real change in the medication management of asthma over the 3-year period.
- **Non-steroidal anti-inflammatory drugs (NSAIDs):** There was a marked increase in the prescribing of NSAIDs and the increase was entirely explained by the increase in the rate of coxib prescribing. The increase in prescribing of total NSAIDs, the uptake of the coxibs and the discarding of other NSAIDs were more pronounced in the management of arthritic problems relative to other musculoskeletal problems.

Conclusion

This report has described the contribution made by general practice to the healthcare of the Australian community's health, and the usefulness of a continuous data source for the measurement of changes in practice over time.

Acknowledgments

The General Practice Statistics and Classification Unit wish to thank the 999 general practitioners who participated in BEACH 2000–01. This report would not have been possible without their valued cooperation and effort in providing the data.

We also thank the following organisations for their financial support and their contribution to the ongoing development of the BEACH program during the third year of its activities.

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- AstraZeneca (Australia)
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We are grateful for the skilled database management of Matt Hou, the strong administrative support provided by Dulcie Bucksath and Gervaise Woods and the valuable contribution of the general practitioner recruitment staff (particularly Errol Henderson) and data entry staff (particularly Rebecca Chapman). We recognise the earlier contribution of past members of the BEACH team to the first annual BEACH report (1998–99) on which the structure of this report is based. The cooperation of Carolynn Fredericks and Gordon Calcino of the General Practice Branch of the Commonwealth Department of Health and Aged Care in regularly supplying general practitioner random samples and national Health Insurance Commission data is also appreciated. At the Institute, Jenny Hargreaves assisted with the editing of the report and Amanda Nobbs coordinated the printing and publication process.

Ethics approval for this study was obtained from the Human Ethics Committee of the University of Sydney and the Ethics Committee of the Australian Institute of Health and Welfare.

1 Introduction

This publication provides a summary of results from the third year of the BEACH (Bettering the Evaluation and Care of Health) program, a continuous study of general practice activity in Australia. This report covers the period April 2000 to March 2001 inclusive. It uses details of almost 100,000 encounters between general practitioners (GPs) and patients, from a random sample of 999 recognised practising GPs from across the country.

Now that there are three measured data points from the BEACH program, comparisons of results from the 3 years are possible. Some selected analyses of changes over time, in the patterns of morbidity managed and the medications prescribed are included in this report.

A second part of the BEACH program collects information about patient health and risk factors. This section is called SAND (Supplementary Analysis of Nominated Data) and it relies on GPs asking patients questions about specific aspects of their health. Between ten and twenty topics are covered in SAND each year (depending on the subsample size for each topic). However, there are three that are consistent across the whole year and in which all participating GPs are involved. Due to their standard nature, summary results for patient-derived body mass index, smoking status and alcohol consumption are included in this annual report.

General practice is recognised as the first port of call for most patients in the Australian healthcare system with GPs performing a gatekeeper role. Almost all Australians (82%) attended a GP at least once during the year 2000 (personal communication, GP Branch DHAC). There are more than 17,000 vocationally registered general practitioners in Australia and about 1,500 registrars enrolled in the Training Program of the RACGP (Commonwealth Department of Health and Aged Care (DHAC) 2000) or one GP per 90 persons. GPs provided by far the majority of the 103 million non-specialist services to the population that were paid by Medicare (DHAC 2000), at an average rate of 5.4 per person (AIHW 2000). These consultations resulted in secondary costs (for pathology and imaging tests, referred specialist visits and medications etc.), of over four billion dollars in that year (DHAC 2000).

1.1 Aims

The BEACH program has three main aims:

- to provide a reliable and valid data collection process for general practice which is responsive to the ever-changing needs of information users
- to establish an ongoing database of GP–patient encounter information
- to assess patient risk factors and health states and the relationship these factors have with health service activity.

2 Methods

The methods adopted in the BEACH program have been described in detail elsewhere (Britt et al. 1999b; Britt et al. 1999c; Britt et al. 2000). In summary, each of the recognised GPs in a random sample of approximately 1,000 per year records details about 100 doctor–patient encounters of all types. The information is recorded on structured encounter forms (on paper). It is a rolling sample, recruited approximately 3 weeks ahead. Approximately 20 GPs participate each week, 50 weeks a year.

2.1 Sampling methods

The source population includes all GPs who claimed a minimum of 375 general practice A1 Medicare items in the most recently available 3-month HIC data period. This equates with 1,500 Medicare claims a year and ensures inclusion of the majority of part-time GPs while excluding those who are not in private practice but claim for a few consultations a year. The General Practice Branch of the Commonwealth Department of Health and Aged Care (DHAC) draws a sample on a regular basis.

2.2 Recruitment methods

The randomly selected GPs are approached initially by letter, then by telephone follow-up. GPs who agree to participate are set an agreed recording date approximately 3 to 4 weeks ahead. A research pack is sent to each participant about 10 days before their planned recording date. A telephone reminder is made to each participating GP in the first days of the agreed recording period. Non-returns are followed up by regular telephone calls.

Each participating GP earns 25 Clinical Audit points towards their quality assurance (QA) requirements. As part of this QA process, each receives an analysis of his or her results compared with those of nine other unidentified GPs who recorded at approximately the same time. Comparisons with the national average and with targets relating to the National Health Priority Areas are also made. In addition, GPs receive some educational material related to the identification and management of patients who smoke or who consume alcohol at hazardous levels.

2.3 Data elements

BEACH includes three interrelated data collections: encounter data, GP characteristics, and patient health status. An example of the forms used to collect the encounter data and the data on patient health status is included in Appendix 1. The GP characteristics questionnaire is included in Appendix 2.

Encounter data include: date of consultation, type of consultation (direct, indirect), Medicare / Veterans' Affairs item number (where applicable), specified other payment source (tick boxes).

Information about **the patient** includes date of birth, sex, postcode of residence. Tick boxes are provided for health care card holder, Veterans' Affairs white card holder, Veterans'

Affairs gold card holder, non-English-speaking background (NESB), an Aboriginal person (self-identification) and Torres Strait Islander (self-identification). Space is provided for up to three patient reasons for encounter (RFEs).

The **content of the encounter** is described in terms of the problems managed and the management techniques applied to each of these problems. Data elements include up to four diagnoses / problems. Tick boxes are provided to denote the status of each problem as new to the patient (if applicable) and if it was thought to be work-related.

Management data for each problem include medications prescribed, over-the-counter medications advised and other medications supplied by the GP. Details for each **medication** comprise brand name, form (where required), strength, regimen, status (if new medication for this problem for this patient) and number of repeats. **Non-pharmacological management** of each problem includes counselling and procedures, new referrals, and pathology and imaging ordered.

GP characteristics include: age and sex, years in general practice, number of GP sessions worked per week, number of full-time and part-time GPs working in the practice (to generate a measure of practice size), consultations in languages other than English, postcode of major practice address, country of graduation, postgraduate general practice training and FRACGP status, after-hours care arrangements and use of computers in the practice.

Supplementary analysis of nominated data (SAND): A section on the bottom of each recording form investigates aspects of patient health or healthcare delivery in general practice not covered by the consultation-based data. The year-long data collection period is divided into 10 blocks, each of 5 weeks. Each block is designed to include data from 100 GPs. Each GP's recording pack of 100 forms is made up of 40 forms which contain questions about patient height and weight (for calculation of body mass index, BMI), alcohol intake and smoking status. The remaining 60 forms in each pack are divided into two blocks of 30 forms. Different questions are asked of the patient in each block and these vary throughout the year. The results of topics in the SAND substudies for alcohol consumption, smoking status and BMI are included in this report. Abstracts of results for the substudies conducted in the third year of the program and not reported in this document are available through the web site of the Family Medicine Research Centre (of which the General Practice Statistics and Classification Unit (GPSCU) is a part) at http://www.fmrc.org.au.

2.4 The BEACH relational database

The BEACH relational database is described diagrammatically in Figure 2.1. Note that all variables can be directly related to GP and patient characteristics and to the encounter. Reasons for encounter have only an indirect relationship with problems managed. All types of management are directly related to the problem being treated.

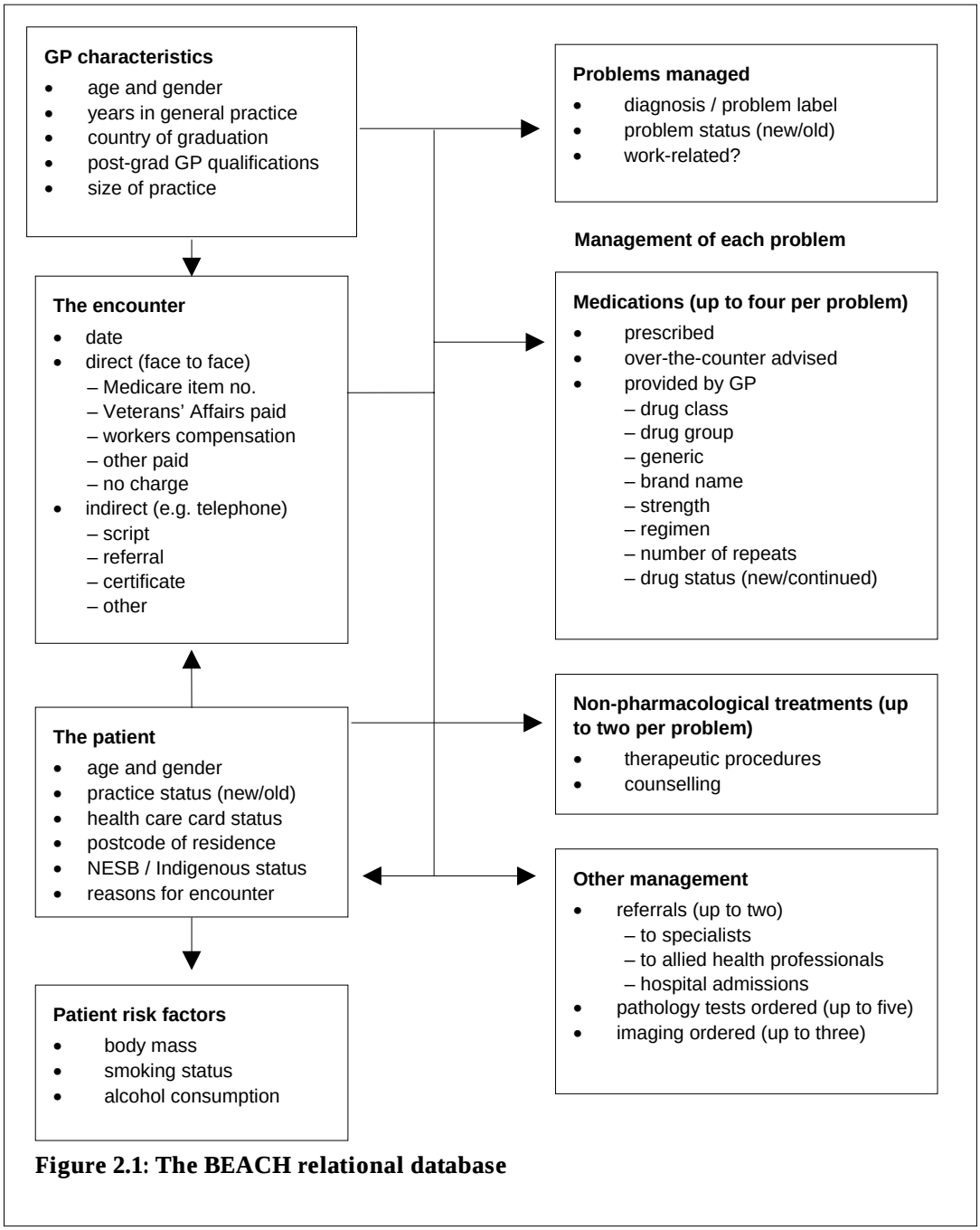


Figure 2.1: The BEACH relational database

2.5 Statistical methods

The analysis of the BEACH database is conducted with SAS version 6.12 (SAS Institute Inc. 1996) and the encounter is the primary unit of analysis. Proportions (%) are used only when describing the distribution of an event that can arise only once at a consultation (e.g. age, sex or item numbers) or to describe the distribution of events within a class of events (e.g. problem *A* as a percentage of total problems).

Rates per 100 encounters are used when an event can occur more than once at the consultation (e.g. RFEs, problems managed or medications). Rates per 100 problems are also sometimes used when a management event can occur more than once per problem managed. In general, the following results present the number of observations *(n)*, rate per 100 encounters and the 95% confidence intervals.

The BEACH study is essentially a random sample of GPs, each providing data about a cluster of encounters. Cluster sampling study designs in general practice research violate the simple random sample (SRS) assumption because the probability of an encounter being included is a function of the probability of the GP being selected (Sayer 1999).

There is also a secondary probability function of particular encounters being included in the GP's cluster (associated with the characteristics of the GP or the type and place of the practice) and this increases the likelihood of sampling bias. In addition, there will be inherent relationships between encounters from the same cluster and this creates a potential statistical bias. The probability of gaining a representative sample of encounters is therefore reduced by the potential sampling and statistical bias, decreasing the accuracy of national estimates.

When a study design other than SRS is used, analytical techniques that consider the study design should be employed. In this report the standard error calculations used in the 95% confidence intervals accommodate both the single-stage clustered study design and sample weighting according to Kish's description of the formulae (Kish 1965). SAS 6.12 is limited in its capacity to calculate the standard error for the current study design, so additional programming was required to incorporate the formulas. Post-stratification weighting was also applied to the raw data before analysis (see Chapter 4).

The analyses of trends over time were conducted with SAS 8.0 (SAS Institute Inc. 1999) using methods to calculate robust standard error that adjust for the cluster sample.

2.6 Classification of data

The imaging tests ordered, patient reasons for encounter, problems managed, procedures, other non-pharmacological treatments, referrals, pathology and imaging are coded using ICPC–2 PLUS (Britt 1997b). This is an extended vocabulary of terms classified according to the International Classification of Primary Care–2nd edition (ICPC–2), a product of the World Organization of Family Doctors (WONCA) (Classification Committee of the World Organization of Family Doctors (WICC) 1997). The ICPC is used in over 45 countries as the standard for data classification in primary care.

The ICPC has a bi-axial structure, with 17 chapters on one axis (each with an alphabetic code) and seven components on the other (numeric codes). Chapters are based on body systems, with additional chapters for psychological and social problems.

- Component 1 includes symptoms and complaints.
- Component 7 covers diagnoses.

These are independent in each chapter and both can be used for patient reasons for encounter or for problems managed.

- Components 2 to 6 cover the process of care and are common throughout all chapters.

The processes of care, including referrals, non-pharmacological treatments and orders for pathology and imaging, are classified in these process components of ICPC–2.

Component 2 (diagnostic screening and prevention) is also often applied in describing the problem managed (e.g. check-up, immunisation).

The ICPC–2 is an excellent epidemiological tool. The diagnostic and symptomatic rubrics have been selected for inclusion on the basis of their relative frequency in primary care settings or because of their relative importance in describing the health of the community. It has only about 1,370 rubrics and these are sufficient for meaningful analyses. However, reliability of data entry, using ICPC–2 alone, would require a thorough knowledge of the classification if correct classification of a concept were to be ensured. In 1995, recognising a need for a coding and classification system for general practice electronic health records, the Family Medicine Research Centre (then Unit) developed an extended vocabulary of terms classified according to the ICPC. These terms were derived from those recorded in more than half a million encounter forms by. The terms have developed further over the past 6years in response to the use of terminology by GPs participating in the BEACH program and in response to requests from GPs using ICPC–2 PLUS in their electronic clinical systems. This allows far greater specificity in data entry and ensures high inter-coder reliability between secondary coding staff. It also facilitates analyses of information about more specific problems when required (Britt 1997b).

Classification of pharmaceuticals

Pharmaceuticals prescribed or provided and over-the-counter medications advised by the GP are coded and classified according to an in-house classification, the Coding Atlas for Pharmaceutical Substances (CAPS). This is a hierarchical structure that facilitates analysis of data at a variety of levels, such as medication class, medication group, generic composition and brand name. CAPS is mapped to the Anatomical Therapeutic Chemical classification (ATC) (World Health Organization Collaborating Centre for Drug Statistics Methodology (WHO) 1997) which is the Australian standard for classifying medications at the generic level. Strength and regimen are independent fields which, when combined with the CAPS code, give an opportunity to derive prescribed daily dose for any medication or group of medications.

2.7 Quality assurance

All morbidity and therapeutic data elements are automatically coded and classified by the computer as secondary coding staff enter key words or word fragments and select the required term or label from a pick list. A quality assurance program to ensure reliability of data entry includes ongoing development of computer-aided error checks (‘locks’) at the data entry stage and a physical check of samples of data entered versus those on the original recording form. Further logical data checks are conducted through SAS on a regular basis.

2.8 Validity and reliability

In the development of a database such as BEACH, data gathering moves through specific stages: GP sample selection, cluster sampling around each GP, GP data recording, and secondary coding and data entry. At each stage the data can be invalidated by the application of inappropriate methods.

The methods adopted to ensure maximum reliability of coding and data entry have been described above. The statistical techniques adopted to ensure valid reporting of recorded data are described in Chapter 4.

Previous work has demonstrated the extent to which a random sample of GPs recording information about a cluster of patients represents all GPs and all patients attending GPs (Driver et al. 1991). Other studies have reported the degree to which GP-reported patient reasons for encounter and problems managed accurately reflect those recalled by the patient (Britt et al. 1992) and the reliability of secondary coding of RFEs (Britt 1998) and problems managed (Bridges-Webb et al. 1992). The validity of ICPC as a tool with which to classify the data has also been investigated in earlier work (Britt 1997a).

Limitations regarding the reliability and validity of practitioner-recorded morbidity have been discussed elsewhere and should always be borne in mind. However, these apply equally to data drawn from medical records (whether paper-based or electronic) and to active data collection methods (Britt et al. 1996; Gehlbach 1979). There is as yet no more reliable method of gaining detailed data about morbidity and its management in general practice. Further, irrespective of the differences between individual GPs in their labelling of problems, morbidity data collected by GPs in active data collection methods have been shown to provide a reliable overview of the morbidity managed in general practice (Britt et al. 1998).

3 The general practitioners

3.1 Results of recruitment

Contact was attempted with 3,624 GPs, and established with 3,350 (92.4%) of these. Of the 274 who could not be contacted (7.6% of those approached), there were 91 for whom telephone numbers could not be established, 103 had moved and were untraceable or were retired or deceased, and 41 were unavailable for other reasons (e.g. overseas, on maternity leave). A further 39 were unable to be contacted after five attempts by telephone recruiters. Of the 3,350 available practitioners, 1,224 (36.5%) agreed to participate but 225 (6.7%) failed to complete the study. The final participating sample consisted of 999 practitioners, representing 29.8% of those who were contacted and available, and 27.6% of those with whom contact was attempted (Table 3.1).

Table 3.1: Recruitment and participation rates

	Number	Per cent of approached (*n* = 3,624)	Per cent of contacts established (*n* = 3,350)
Letter sent and phone contact attempted	3,624	100.0	. .
No contact	274	7.6	. .
No phone number	91	2.5	. .
Moved/retired/deceased	103	2.8	. .
Unavailable	41	1.1	. .
No contact after five calls	39	1.1	. .
Telephone contact established	3,350	92.4	100.0
Declined to participate	2,126	58.7	63.5
Agreed but withdrew	225	6.2	6.7
Agreed and completed	999	27.6	29.8

3.2 The participating GPs

All participants returned a GP profile questionnaire although some were incomplete. Of the 999 participants, 68.4% were male and 63.9% were 45 years of age or older. Three-quarters of the participants (78.7%) had been in general practice for more than 10 years and 15.9% could be regarded as practising part-time, working fewer than six sessions per week. Almost one-fifth of participants were in solo practice (19.3%). The majority (72.7%) had graduated in Australia and almost one-third (31.4%) were Fellows of the RACGP. Just over one in ten respondents (13.5%) conducted more than half of their consultations in a language other than English. Twenty-five GPs (2.5%) were currently undertaking the RACGP Training Program and 31.6% had already completed it. Computers were used in 87.4% of practices, and 64.7% provided their own after hours practice arrangements or worked in cooperation with other practices to provide after-hours services (Table 3.2).

Table 3.2: Characteristics of participating GPs

GP characteristic	Number[(a)]	Per cent of GPs[(a)] (*n* = 999)
Sex	. .	. .
Male	683	68.4
Female	316	31.6
Age (missing = 9)	. .	. .
< 35 years	67	6.7
35–44 years	284	28.4
45–54 years	342	34.2
55+ years	297	29.7
Years in general practice (missing = 6)	. .	. .
< 2 years	5	0.5
2–5 years	64	6.4
6–10 years	137	13.7
11–19 years	299	29.9
20+ years	488	48.8
Sessions per week (missing = 16)	. .	. .
< 6 per week	159	15.9
6–10 per week	662	66.3
11+ per week	162	16.2
Size of practice (missing = 28)	. .	. .
Solo	187	19.3
2–4 GPs	375	38.6
5+ GPs	409	42.1
Place of graduation (missing = 7)	. .	. .
Australia	726	72.7
UK	82	8.2
Asia	47	4.7
Europe	19	1.9
Africa	15	1.5
New Zealand	15	1.5
Other	95	9.5
More than 50% consultations in languages other than English	135	13.5
Currently in RACGP Training Program	25	2.5
Completed RACGP Training Program	316	31.6
Fellow of RACGP	314	31.4
Own or cooperative after hours arrangements	646	64.7
Computer use for administrative and/or clinical purposes	873	87.4

(a) Missing data removed.

3.3 Comparison of participating and non-participating GPs

The General Practice Branch of the DHAC provided some information about each of the GPs drawn in the initial sample from HIC data. This information was used to determine the extent to which the final participating GPs were representative of the initial sample of practitioners. These data included the number of general practice A1 Medicare items claimed in the previous 12 months and in the previous quarter. For the purposes of this analysis, the number of items in the previous quarter was compared and is referred to as 'activity level'.

In Table 3.3 the characteristics of the final participants are compared with those of all other GPs drawn in the initial sample using DHAC data elements. There are considerable discrepancies between the DHAC information about the participants (Table 3.3) and that self-reported by the GPs (Table 3.2), suggesting that the reliability of DHAC GP characteristic data may be questionable. There is, however, no reason to assume that the accuracy of DHAC data should differ between the participants and non-participants.

Differences between participants and non-participants were tested using the chi-square statistic (significance at the 5% level), using the DHAC characteristic data from both groups. There were no significant differences between participants and non-participants in terms of sex, place of graduation and location of practice categorised using the Rural Remote Metropolitan Area (RRMA) classification.

The age distributions for participants and non-participants were significantly different, with GPs under the age of 35 years being under-represented in the participant population and those aged 55 years or more over-represented. The difference in years since graduation between the groups reflected this age difference (results not shown).

For State or Territory, the statistically significant difference in distribution resulted from a higher participation rate by GPs from New South Wales and a lower participation rate in Queensland. The proportion of participants in other States was similar to that of non-participants. There was no statistically significant difference in mean activity level in the previous quarter (measured by the number of A1 Medicare items of service claimed) between participants and non-participants. However, GPs with an activity level of 375–750 services in the previous quarter were more likely to participate than those in the highest activity group. Possible explanations for this are the time required to participate in BEACH, which may be a greater issue for full-time GPs than part-time GPs. Alternatively, BEACH may offer an avenue for fulfilling RACGP Clinical Audit requirements to part-time GPs who may not be as able to take advantage of meeting these requirements through other avenues.

3.4 Discussion

The response rate of GPs to BEACH was 29.8% of those with whom contact was established. This rate is lower than the previous 2 years of BEACH (38.4 and 39.1) and probably reflects the 'middle' year of the RACGP Quality Assurance triennium when many GPs have either completed their QA points requirements or are postponing this requirement until nearer the triennium's end.

The under-representation of GPs aged less than 35 years also possibly reflects the fact that GP Registrars are not required to undertake QA activities during training or during the QA triennium on completion of training. Incentives may be required to encourage the participation of these younger GPs to ensure their sufficient representation in the future.

Table 3.3: Comparison of characteristics of participating and non-participating GPs

	Participants (*n* = 999) [(a)]		Non-participants (*n* = 2,351) [(a)]	
GP characteristics	**Number**	**Per cent of GPs[(b)]**	**Number**	**Per cent of GPs[(b)]**
Sex (χ^2 = 3.5, p = 0.174)	. .	. .	. .	. .
Male	683	68.4	1,683	71.6
Female	316	31.6	668	28.4
Age (χ^2 = 19.4, p = 0.0002)	. .	. .	. .	. .
< 35 years	65	6.5	240	10.2
35–44 years	253	25.3	615	26.2
45–54 years	321	32.1	745	31.7
55+ years	307	28.3	585	24.9
Missing	53	. .	166	. .
Place of graduation (χ^2 = 2.9, p = 0.235)	. .	. .	. .	. .
Australia	735	73.6	1,797	76.4
Overseas	264	26.4	557	23.7
State (χ^2 = 19.1, p = 0.007)	. .	. .	. .	. .
New South Wales	385	38.5	758	32.2
Victoria	239	23.9	601	25.6
Queensland	145	14.5	404	17.2
South Australia	78	7.8	239	10.2
Western Australia	87	8.7	222	9.4
Tasmania	34	3.4	74	3.2
Australian Capital Territory	23	2.3	37	1.6
Northern Territory	8	0.8	14	0.6
RRMA (χ^2 = 10.5, p = 0.160)	. .	. .	. .	. .
Capital	678	67.9	1,625	69.2
Other metropolitan	66	6.6	178	7.6
Large rural	56	5.6	139	5.9
Small rural	58	5.8	155	6.6
Other rural	121	12.1	214	9.1
Remote centre	11	1.1	19	0.8
Other remote	5	0.5	14	0.6
Activity (χ^2 = 6.61, p = 0.037)	. .	. .	. .	. .
375–750 services in previous quarter	205	20.5	402	17.1
751–1,500 services in previous quarter	442	44.2	1,042	44.3
> 1,500 services in previous quarter	352	35.2	907	38.6
Mean activity level (*t* = 1.33, p = 0.18)	1,399.3	. .	1,437.1	. .

(a) Data drawn from that provided by the DHAC. (b) Missing data removed.

4 Representativeness

4.1 Comparison of BEACH GPs and the national GP population

The extent to which results from a study sample can be generalised is a function of the extent to which the sample represents the population from which it is drawn. Random sampling of GPs improves the likelihood that a study will be representative, as each GP has an equal probability of being selected in the study sample. The representativeness of a study can also be improved through the calculation of sample weights to better reflect the population characteristics that may influence the final results. Wherever possible there should be a comparison between the final study group of GPs and the population from which the GPs were drawn in order to identify, consider and adjust for any bias that may affect the findings of the study.

Comparisons of the characteristics of participants and non-participants were reported in Chapter 3 (Table 3.3). In this Chapter, statistical comparisons, using the chi-square statistic (χ^2), are made between BEACH participants and all recognised GPs in Australia who claimed 375 or more general practice Medicare item numbers in the last quarter of 2000 (Table 4.1). The GP characteristic data for the BEACH participants have been drawn from the GP profile questionnaire to ensure highest reliability. The data for Australia were provided by the GP Branch of the DHAC.

No statistical differences were apparent for GP sex and place of graduation. However, as in previous BEACH samples, the BEACH participants were significantly less likely to be under 35 years of age ($\chi^2 = 43.5$; $p < 0.001$). This is likely to be due to the fact that the national GP profile utilises a sample frame that includes GPs who are currently undertaking the RACGP Training Program. These GPs are not required to complete QA activities during training, nor in the QA triennium in which they complete training. This means that the offer of QA points is far less likely to attract them. In the majority these GPs would be aged less than 35 years.

A significantly greater proportion of participants were from New South Wales and a smaller proportion were from Queensland, compared with the national profile of GPs ($\chi^2 = 17.08$, $p = 0.017$). However, there were no differences between participants and the national profile of GPs by RRMA (rural, remote or metropolitan area).

4.2 Sample weights

Most research studies rely on random sampling to reduce the impact of any sampling bias. It is also unusual to have information on the underlying population from which the sample is drawn with which the sample can be compared. When such information is available it is important to consider the possible effect of any differences between the sample and the total population on the extent to which the findings could be generalised.

Table 4.1: Comparison of BEACH participants and all active recognised GPs in Australia

	BEACH[a][b]		Australia[a][c][d]	
Variable	**Number**	**Per cent of GPs**	**Number**	**Per cent of GPs**
Sex (χ^2 =.05, p = 0.975)	. .	. .	. .	. .
Males	683	68.4	11,730	68.0
Females	316	31.6	5,514	32.0
Age (χ^2 = 43.53; p < 0.001)	. .	. .	. .	. .
< 35	67	6.8	2,143	12.4
35–44	284	28.7	5,438	31.6
45–54	342	34.5	5,536	32.1
55+	297	30.0	4,112	23.9
Place of graduation (χ^2 = 2.17; p = 0.337)	. .	. .	. .	. .
Australia	723	73.2	12,928	75.0
Overseas	269	26.8	4,316	25.0
State (χ^2 = 17.08; p = 0.017)	. .	. .	. .	. .
New South Wales	386	38.6	5,849	34.1
Victoria	239	23.9	4,170	24.3
Queensland	145	14.5	3,136	18.3
South Australia	78	7.8	1,521	8.9
Western Australia	88	8.8	1,590	9.3
Tasmania	33	3.3	485	2.8
Australian Capital Territory	22	2.2	282	1.6
Northern Territory	8	0.8	137	0.8
RRMA (χ^2 = 5.38; p = 0.497)	. .	. .	. .	. .
Capital city	680	68.1	11,454	66.4
Other metropolitan	69	6.9	1,287	7.5
Large rural	55	5.5	1,055	6.1
Small rural	56	5.6	1,148	6.7
Other rural	122	12.2	1,953	11.3
Remote centre	10	1.0	151	0.9
Other remote	7	0.7	196	1.1

(a) Missing data removed.

(b) Data drawn from the BEACH GP profile completed by each participating GP.

(c) Data provided by GP Branch, DHAC.

(d) All GPs who claimed at least 375 A1 Medicare items during the most recent 3-month HIC data period.

The data were weighted only for factors thought to have an important effect on morbidity and management. Although there were differences between the sample and the Medical Benefits Schedule (MBS) data in terms of the proportion of GPs from each State, there was no difference in their distribution across RRMA categories. It was assumed that the morbidity and management profile of GPs was similar across States and therefore weighting by State was not undertaken. The raw data were, however, assigned sample weights according to GP

age (stratified by sex) to adjust for the slight under-representation of younger GPs in the sample, and this age weighting was multiplied by the activity level of the participating GPs.

GP age

We have shown (Table 4.1) that there was a difference in GP age between BEACH GPs and all GPs in Australia and this may influence any national estimates made from unweighted data. Therefore, post-stratification weights were calculated for the BEACH GPs to match the age distribution of all GPs in Australia. Simply, the GPs aged less then 35 years were given greater weighting than GPs of other age groups. This increases the contribution of the encounters from these GPs to any national estimate. Weightings for age were stratified by sex, age weights being calculated separately for male and female GPs.

GP activity level

The BEACH process requires that each GP provide details of 100 consecutive encounters. The assumption based on previous research is that 100 encounters provide a reliable sample of the GP's patients and practice style (Meza et al. 1995). However, there is considerable variation in the number of services provided by different GPs in a given year. This may affect the reliability of any estimate due to the differences in the sampling fraction for each GP, as a GP who provides 6,000 services in a given year should make a greater contribution to any national estimate than a GP who provides 3,000 services. Therefore, it was also necessary to calculate post-stratification weights reflecting the different sampling fractions. This means that the BEACH encounter details from the GP who had claimed 6,000 Medicare services in the previous 12 months should have greater weighting than those encounters from the GP who had claimed 3,000 services, when estimating national activity in general practice. It was therefore possible to calculate sample weighting that reflected the contribution that each GP made to the total number of services for the sample.

The values of the weighted data were a multiplicative function of the raw data values, GP age weighting and GP sampling fraction of services in the previous 12 months. Table 4.2 shows the precision ratio calculated after weighting the data. As can be seen the fit of the MBS and BEACH age and sex distribution has improved somewhat after weighting, especially when encounters claimable from the Department of Veterans' Affairs are excluded from the BEACH distribution.

4.3 Comparison of BEACH consultations and all GP consultations in Australia

The aim of this study is to gain a representative sample of GP–patient encounters. Representativeness of the GP sample is used to weight the encounters, based on the assumption that characteristics of the patient encounter are related to the characteristics of the GP. It is therefore important to compare the distribution of the sample patient encounters with the population of general practice encounters in Australia to assess the representativeness of the sample encounters. The GP Branch of the Department of Health and Aged Care provided the age–sex distribution of all A1 general practice items claimed from Medicare during 2000, with which the age–sex distribution of the BEACH sample of encounters was compared.

Table 4.2: Comparison of the age–sex distribution of the patients: BEACH and all MBS A1 items

	BEACH [a]		Australia[b]	Precision ratios		
Variable	Number	Per cent	Per cent	Raw[a]	Weighted[c]	No Veterans' Affairs[d]
Male	32,292	40.9	41.6	1.02	0.97	0.99
< 1 year	911	1.2	1.2	1.06	1.05	1.02
1–4 years	2,228	2.8	3.1	1.09	1.01	0.98
5–14 years	2,546	3.2	3.9	1.21	1.10	1.06
15–24 years	2,876	3.6	3.8	1.03	0.95	0.92
25–44 years	7,292	9.2	9.8	1.05	0.99	0.96
45–64 years	8,411	10.7	11.0	1.03	0.98	0.97
65–74 years	4,211	5.3	5.5	1.02	1.00	1.03
75+ years	3,817	4.8	3.4	0.71	0.76	1.07
Female	46,623	59.1	58.4	0.99	1.02	1.01
< 1 year	823	1.0	1.1	1.01	0.99	0.96
1–4 years	1,959	2.5	2.7	1.10	1.04	1.00
5–14 years	2,579	3.3	3.8	1.15	1.05	1.02
15–24 years	5,077	6.4	6.3	0.98	1.00	0.97
25–44 years	12,706	16.1	15.9	0.99	1.00	0.97
45–64 years	11,950	15.1	14.6	0.96	1.01	0.98
65–74 years	5,460	6.9	6.4	0.93	0.99	1.01
75+ years	6,069	7.7	7.6	0.99	1.12	1.23

(a) Unweighted BEACH data, A1 items only (whether claimable from the Medical Benefits Scheme or the Department of Veterans' Affairs), missing data removed.

(b) Data provided by GP Branch, DHAC, A1 items of service claimed from the Medical Benefits Scheme by the GP source population.

(c) Calculated from BEACH weighted data, *including* encounters claimable from the Department of Veterans' Affairs.

(d) Calculated from BEACH weighted data, *excluding* encounters claimable from the Department of Veterans' Affairs.

Note: A1 services include MBS item numbers: 1, 2, 3, 4, 13, 19, 20, 23, 24, 25, 33, 35, 36, 37, 38, 40, 43, 44, 47, 48, 50, 51, 601, 602, 720, 722, 724, 726, 728, 730, 734, 738, 740, 742, 744, 746, 749, 757, 759, 762, 765, 768, 771, 773, 775, 778, 779, 801, 803, 805, 807, 809, 811, 813, 815.

Only encounters with a valid age and sex are included in the comparison (about 1% of data for each variable was missing). The BEACH data include patient encounters that are paid by funding sources other than the MBS and include indirect (and some direct) encounters that cannot be or are not (by GP choice) claimed against any funding body. Further, the BEACH data count only a single Medicare item number for each encounter covered by the MBS whereas, in reality, more than one Medicare claim can result from a single encounter. To make the BEACH encounters equivalent to the Medicare data, only those BEACH encounters where a Medicare A1 item was claimed were included in the age and sex distributions in Table 4.2.

Due to the large size of the data sets, any statistical comparison (e.g. χ^2) would generate statistical significance for even the most minor differences between the two sources of data. Therefore, it is necessary to consider whether any difference is likely to have a strong influence on the results and whether the precision of any estimate from BEACH complies with statistical standards. In determining whether any estimate is reliable, power calculations use a precision of 0.2 or 20% of the true proportion (or value). For example, if the

true value were 15% then it would be desirable for any estimate to be in the range of 12% to 18% if it is to be considered to have 20% precision.

Creating precision ratios (HIC%/BEACH%) for the age–sex distribution data contained in Table 4.2 revealed that the precision of the BEACH age–sex distribution was outside the acceptable range of 0.8–1.2 only for males 75 years and older. Simply, BEACH A1 item encounters contained proportionally more encounters with men 75 years and older than did the national MBS A1 item data. It is possible that this was the result of having a greater proportion of older GPs in BEACH than for the national MBS GP data. However, it may also be influenced by the inclusion in BEACH but not in the MBS data of encounters not covered by the MBS (e.g. Department of Veterans' Affairs). To investigate the effect of including A1 item encounters claimed through the Department of Veterans' Affairs on the comparison of BEACH A1 item encounters with MBS A1 item encounters, the distributions were compared both with and without BEACH Veterans' Affairs encounters. The precision ratios are reported for both comparisons in Table 4.2. After removing the encounters payable by the Department of Veterans' Affairs, the precision ratio for men 75 years and over improved to within the 20% precision range, suggesting that the inclusion of Veterans' Affairs encounters affected the distribution of encounters. However, this affected a slight over-representation of elderly women in the BEACH subset of encounters claimable through Medicare as A1 items of service.

The precision ratios indicate that the BEACH sample of encounters is a good representation of Australian general practice encounters. The precision of the raw data is a testament to the value of random sampling.

4.4 The weighted data set

The final unweighted data set from the third year of collection is presented in Table 4.3. It contained 99,900 encounters, 151,347 reasons for encounters, 147,518 problems managed and 108,179 medications. After weighting, the apparent number of encounters, reasons for encounter, problems managed, medications, the numbers of referrals, imaging and pathology all decreased.

Table 4.3: The BEACH data set

Variable	Raw	Weighted
GPs	999	999
Encounters	99,900	99,307
Reasons for encounter	151,347	149,962
Problems managed	147,518	143,528
Medications	108,179	107,400
Other treatments	50,618	49,072
Referrals	11,032	10,366
Imaging	8,493	8,227
Pathology	31,364	29,225

5 The encounters

5.1 Overview of the data set

Using weighted data there were 99,307 encounters from 999 GPs. On average, 151 patient reasons for encounter were described per 100 encounters. Of the 143,528 problems managed, 32.8% were problems new to the patient. Problems regarded by the GP as likely to be work-related (irrespective of whether the encounter was covered by workers compensation) occurred at a rate of 3.3 per 100 encounters.

Medications were prescribed, advised or supplied at a rate of 108.2 per 100 encounters. The prescription rate (92.3 per 100 encounters) does not take into account the number of repeats provided as part of a prescription. GPs advised patients to use over-the-counter medications at a slightly higher rate (9.0 per 100 encounters) than they gave medications directly to the patient (6.9 per 100 encounters), although these rates were not significantly different.

Non-pharmacological treatments were recorded less frequently than medications, with clinical treatments (e.g. counselling, advice or psychotherapy) being recorded at a higher rate (37.2 per 100 encounters) than procedural treatments (12.2 per 100 encounters) such as excisions and physical therapies.

Approximately 10 referrals per 100 encounters were made to a specialist, allied health service, hospital or emergency department. Specialist referrals were the most common (7.4 per 100 encounters), followed by those to allied health professionals (2.3 per 100 encounters). Referrals to hospitals and emergency departments were relatively rare.

Orders for a pathology test (or batch of tests, e.g. FBC, HIV) were recorded more frequently (29.4 per 100 encounters) than were referrals, and orders for imaging (e.g. x-rays, scans) occurred less frequently (8.3 per 100 encounters) (Table 5.1).

Comparison of BEACH data from 1998–99 and from 1999–00 (the first 2 years of BEACH) with this year's data suggest that there has been an upward trend in some areas over the 3 years. These increasing trends have become apparent in the level of other non-pharmacological treatments (particularly clinical treatments), pathology and imaging rates, both as a rate per 100 encounters and as a rate per 100 problems.

5.2 Encounter type

The distribution of encounter types shows the varied nature of general practice (Table 5.2). The funding of Australian general practice reflects this variety, with a mixture of patient contribution, government rebate scheme (MBS) through Medicare, payment by other government programs (e.g. Department of Veterans' Affairs, Correctional Services) and insurance schemes (e.g. workers compensation).

Encounters can be direct consultations (the patient was seen by the GP) or indirect consultations (the patient was not seen but a clinical service was provided). Direct consultations represented 98.1% of all encounters for which direct/indirect status was apparent. These direct consultations could result in no charge, a claim to Medicare or to the Department of Veterans' Affairs, a workers compensation claim, or a charge to another government funding program. By far the majority (94.6%) of consultations and 96.4% of

direct consultations were claimable through Medicare. This is not to say that in all cases the Medicare claim was 'bulk billed', nor does it mean that no additional amount (above the Medicare rebate) was paid by the patient.

Table 5.1: Summary of morbidity and management

Variable	Number	Rate per 100 encounters	95% LCL	95% UCL	Rate per 100 problems	95% LCL	95% UCL
General practitioners	999	. .	. .	. .	. .	. .	. .
Encounters	99,307	. .	. .	. .	. .	. .	. .
Reasons for encounter	149,962	151.0	149.2	152.8	. .	. .	. .
Problems managed	143,528	144.5	142.8	146.3	. .	. .	. .
New problems	47,019	47.4	45.7	49.0	32.8	31.6	33.9
Old problems	96,509	97.2	95.0	99.4	67.2	66.1	68.4
Work-related	3,292	3.3	3.1	3.6	2.3	2.1	2.5
Medications	107,400	108.2	105.7	110.6	74.8	73.3	76.3
Prescribed	91,647	92.3	89.9	94.7	63.9	62.4	65.4
Advised OTC	8,906	9.0	8.1	9.8	6.2	5.6	6.8
GP supplied	6,847	6.9	5.7	8.1	4.8	3.9	5.6
Other treatments	49,072	49.4	47.1	51.7	34.2	32.7	35.7
Clinical	36,978	37.2	35.1	39.3	25.8	24.4	27.1
Procedural	12,094	12.2	11.6	12.8	8.4	8.0	8.9
Referrals	10,366	10.7	10.0	10.8	7.2	7.0	7.5
Specialist	7,326	7.4	7.1	7.7	5.1	4.9	5.3
Allied health services*	2,313	2.3	2.1	2.5	1.6	1.5	1.7
Hospital	499	0.5	0.3	0.7	0.4	0.2	0.5
Emergency department	92	0.1	0.0	0.4	0.1	0.0	0.3
Other referral*	137	0.1	0.0	0.6	0.1	0.0	0.4
Pathology	29,225	29.4	28.2	30.7	20.4	19.6	21.2
Imaging	8,227	8.3	7.9	8.7	5.7	5.5	6.0

* In General Practice Activity in Australia 1998–99 and General Practice Activity in Australia 1999–00 the AHS figure included 'other referrals'.

Note: LCL—lower confidence limit, UCL—upper confidence limit, OTC—over the counter.

At least 95% of consultations designated an MBS item number (89.9% of total consultations) took place in the GP's consultation rooms. Note that some items grouped under 'other items' could also have taken place in the GP's rooms and that case conferences can occur in places other than the GP's rooms, e.g. nursing homes or offices of other health care professionals. Standard surgery consultations were the most frequent Medicare item recorded (79.4% of total encounters and 83.9% of Medicare-claimable encounters). Hospital, nursing home and home visits were relatively rare and accounted for only 2.3% of all encounters and 2.4% of MBS item encounters. Workers compensation claims represented 2.1% of all recorded encounters. This is lower than the rate of work-related problems (3.3 per 100 encounters and 2.3 per 100 problems), indicating that not all were paid by workers compensation (Table 5.1).

Of the 85,148 encounter records designated an MBS item number 1,640 encounters (1.9%) were to be claimed through the Commonwealth Department of Veterans' Affairs (DVA) rather than through the Medicare Benefits Scheme (MBS). The distribution of these DVA claimable encounters was similar to that of all encounters with an MBS item number

specified, though nursing home consultations were slightly more common (2.0% of DVA claimable encounters) as were home visits (3.1). However, the small sample size rendered these difference not statistically (results not presented).

Indirect consultations (1.9 per 100 encounters) are those at which the patient is not seen by the GP but which generate a prescription, a referral, a certificate or other service. They are often the result of a phone call by a patient. Most indirect consultations are a free service provided by the GP (as they do not qualify for payment by Medicare), although they clearly generate costs to the health sector (prescriptions, referrals, etc.) and contribute to patient care and problem management.

These results suggest that GP services provided free to patients (no charge and indirect consultations) made up approximately 3.1% of total clinical services provided by GPs in Australia. Further, they suggest that any count of A1 general practice item numbers from Medicare data would understate the true number of GP clinical services in Australia. However, this figure is significantly different from the 2 previous years of BEACH data (5% in 1998–99 and 4.5% in 1999–00) and may be a reflection of the large amount of missing data on type of encounter (12.6% from this year's encounters compared with 3.9% and 5.3% in the previous 2 years respectively). A change in the layout of the data collection form in this third year of BEACH, to allow for the recording of indirect consultations now claimable through Medicare (e.g. case conferences) may account for these larger amounts of missing data.

Table 5.2: Type of encounter

Variable	Number	Rate per 100 encs[a]	95% LCL	95% UCL	Per cent of direct encs	Per cent of Medicare-paid
General practitioners	999	. .	. .	. .	. .	. .
Direct consultations	85,148	98.1	97.8	98.4	100.0	. .
No charge	554	0.6	0.0	1.5	0.7	. .
MBS items of service[b]	82,113	94.6	94.2	95.0	96.4	100.0
Short surgery consultations	1,336	1.5	0.5	2.5	. .	1.6
Standard surgery consultations	68,872	79.4	78.4	80.3	. .	83.9
Long surgery consultations	7,262	8.4	7.7	9.0	. .	8.8
Prolonged surgery consultations	534	0.6	0.0	1.2	. .	0.7
Home visits	1,257	1.5	0.5	2.4	. .	1.5
Hospital	147	0.2	0.0	1.7	. .	0.2
Nursing home	599	0.7	0.0	2.1	. .	0.7
Case conference*	11	0.0	0.0	2.0		0.0
Other items	2,094	2.4	1.3	3.5	. .	2.5
Workers compensation	1,808	2.1	1.8	2.4	2.1	. .
Other paid (hospital, State, etc.)	677	0.8	0.0	1.6	0.8	. .
Indirect consultations	1,647	1.9	1.2	2.6	. .	. .
Missing	12,512	. .	. .	. .	. .	. .
Total encounters	99,307	. .	. .	. .	. .	. .

(a) Missing data for 12,512 encounters removed. Per cent base (N) = 86,795.

(b) Includes 1,640 encounters that were recorded as claimable for the Commonwealth Department of Veterans' Affairs.

* Includes 3 indirect consultations.

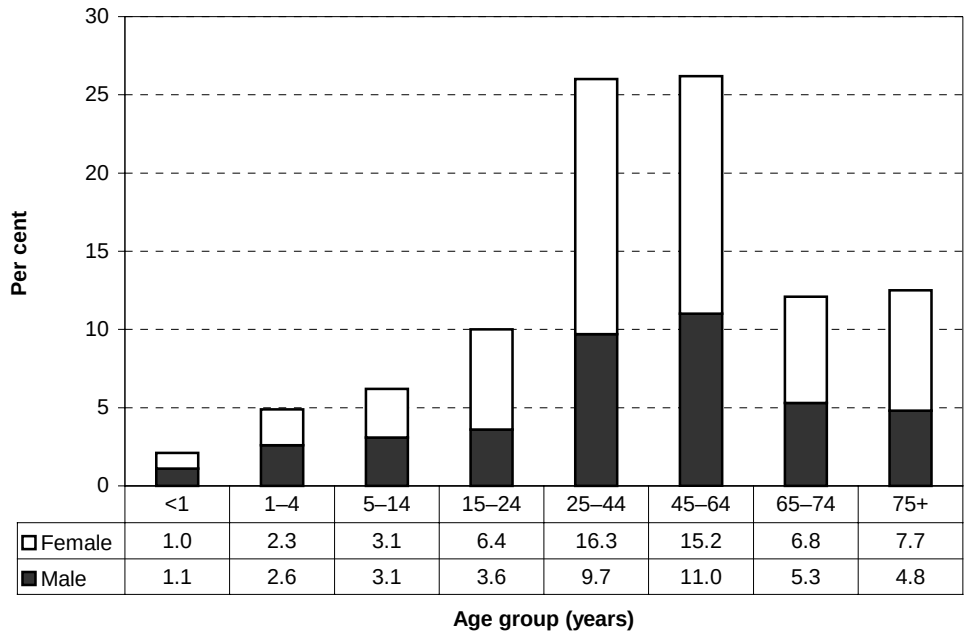
Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

6 The patients

6.1 Patient characteristics

Age–sex distribution of patients

Figure 6.1 shows the age–sex distribution of patients at the encounters recorded in the survey. Age was not recorded at 0.9% of encounters and sex was not recorded at 1.1% of encounters (Table 6.1). Approximately one in seven encounters were with children aged less than 15 years (14.3%), one in ten were with young adults aged 15–24 years (10.3%), and approximately one in four were with patients in each of the following age groups; 25–44 years (26.3%), 45–64 years (26.1%), and 65 years and older (23.0%).



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Female	1.0	2.3	3.1	6.4	16.3	15.2	6.8	7.7
Male	1.1	2.6	3.1	3.6	9.7	11.0	5.3	4.8

Figure 6.1: Age-sex distribution of patients at encounter

Note: Missing data removed. The distributions will not agree perfectly with those in Table 6.1 due to missing data in either age or sex fields.

Overall there were more female than male patient encounters (57.1% compared with 42.9%). This was reflected across all age groups except for patients aged 1–4 years where there were slightly more male than female encounters. Gender differences were greatest in the reproductive years (25–44 years), and in the middle ages (45–64 years).

Other patient characteristics

The patient was new to the practice at 8.0% of encounters. More than one-third of the encounters were with patients who held a health care card (36.7%) and 3.1% were with persons who held a Department of Veterans' Affairs card. At 7.1% of encounters the patient was from a non-English-speaking background, and at 0.8% the patient was an Aboriginal person and / or a Torres Strait Islander.

Table 6.1: Characteristics of the patients at encounters

Patient variable	Number	Per cent of encounters (*n* = 99,307)[a]	95% UCL	95% UCL
Sex	. .	. .	. .	. .
Males	42,132	42.9	42.2	43.6
Females	56,065	57.1	56.4	57.8
Missing sex	1,111	. .	. .	. .
Age group	. .	. .	. .	. .
< 1 year	2,098	2.1	1.9	2.4
1–4 years	5,310	5.4	5.1	5.7
5–14 years	6,695	6.8	6.4	7.2
15–24 years	10,104	10.3	9.8	10.7
25–44 years	25,917	26.3	25.6	27.0
45–64 years	25,683	26.1	25.5	26.7
65–74 years	11,506	11.7	11.2	12.2
75+ years	11,147	11.3	10.7	12.0
Missing age	846	. .	. .	. .
Other characteristics	. .	. .	. .	. .
New patient to practice	7,903	8.0	7.1	8.8
Health care card	36,456	36.7	35.1	38.3
Veterans' Affairs Card	3,099	3.1	2.8	3.4
Non-English-speaking background	7,074	7.1	3.0	11.2
Aboriginal person[b]	702	0.7	0.0	2.5
Torres Strait Islander[b]	73	0.1	0.0	1.3

(a) Missing data removed in calculation of rates.

(b) One patient identified him/herself as both and Aboriginal person and a Torres Strait Islander.

Note: LCL—Lower confidence limit, UCL—Upper confidence limit.

6.2 Number of patient reasons for encounter

Reasons for encounter (RFEs) are those concerns and expectations which patients bring to the GP and reflect the patient's view of the reasons for consulting the GP. Participating GPs were asked to record at least one and up to three patient RFEs in words as close as possible to those used by the patients, before the diagnostic or management process had begun. RFEs can be expressed in terms of one or more symptoms (e.g. 'itchy eyes'), in diagnostic terms (e.g. 'about my diabetes', 'for my hypertension'), a request for a service ('I need more scripts', 'I want a referral'), an expressed fear of disease, or a need for a check-up.

Patient RFEs have a many-to-many relationship to problems managed. That is, the patient may describe two symptoms that relate to a single problem managed at the encounter or may describe one RFE that relates to multiple problems.

International interest in RFEs has been developing over the past two decades. They reflect the patient's demand for care and can provide an indication of service utilisation patterns which may benefit from intervention on a population level (McWhinney 1986).

Number of RFEs at encounter

There were 149,962 patient RFEs recorded at a rate of 151.0 per 100 encounters. For three out of five encounters (60.4%) only one RFE was recorded, whereas at 11.4% of encounters the maximum (3 RFEs) was recorded (Table 6.2).

Table 6.2: Number of patient reasons for encounter

Number of RFEs at encounter	Number of encounters	Per cent of encounters	95% LCL	95% UCL
One RFE	59,954	60.4	59.2	61.6
Two RFEs	28,051	28.2	27.6	28.9
Three RFEs	11,302	11.4	10.7	12.1
Total	99,307	**100.0**	**. .**	**. .**

Note: LCL—lower confidence limit, UCL—upper confidence limit.

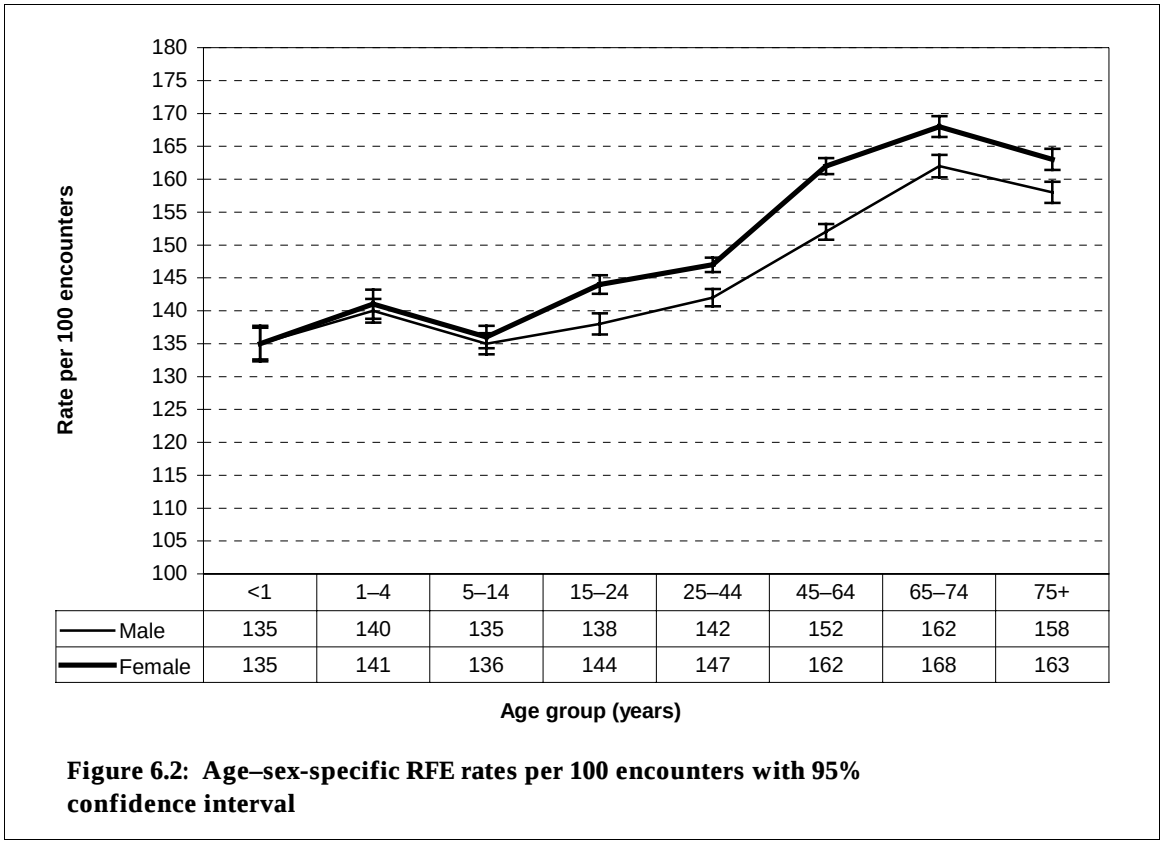


Figure 6.2: Age–sex-specific RFE rates per 100 encounters with 95% confidence interval

Note: Missing data removed.

Age–sex specific rates of RFEs

Significantly higher rates of RFEs were recorded at encounters with female patients (153.6, 95% CI: 151.7–155.5) than at encounters with male patients (147.8, 95% CI: 145.8–149.7).

Figure 6.2 shows the number of RFEs per 100 encounters for male and female patients in each age group, with their 95% confidence intervals. For encounters with children aged less than 15 years, the age–sex-specific rate of RFEs per 100 encounters was 135–141. The number of RFEs gradually increased with patient age group for both males and females. The highest rate of RFEs (168 per 100 encounters) was recorded at encounters with women of 65–74 years, but the rates were somewhat lower at encounters with males and females aged 75 years or more. Women in all the adult age groups had significantly more RFEs recorded than their male counterparts.

6.3 Nature of patient reasons for encounter

Reasons for encounter by ICPC–2 chapter

The distribution of patient RFEs by ICPC–2 chapter and the most common RFEs within each chapter are presented in Table 6.3. Each chapter and individual RFE is expressed as a percentage of all RFEs and as a rate per 100 encounters with 95% confidence limits.

More than half the RFEs related to the respiratory, musculoskeletal, skin, circulatory and digestive systems. Less common were RFEs of a psychological or social nature and reasons related to the blood, ear, eye, urological, endocrine and genital systems.

Almost one in five RFEs (18.7%, 28.3 per 100 encounters) were classified in the general chapter, not being associated with any particular body system. Of these, the most common were requests for a prescription, a check-up or test results. However, there were also some general symptoms frequently described such as fever and chest pain (of unspecified origin).

Respiratory problems arose at a rate of 24.6 per 100 encounters, the most common being cough, throat complaints and upper respiratory tract infection (URTI) (often expressed as a ‘cold’). Requests for influenza vaccination presented at a rate of 1.9 per 100 encounters and asthma and nasal congestion were also relatively common.

RFEs related to the musculoskeletal system were described at a rate of 17.7 per 100 encounters and were most commonly for symptoms and complaints of specific skeletal body parts. Complaints related to the back were by far the most common (3.8 per 100 encounters), followed by those related to the knee, foot / toe, neck, leg and shoulder.

Reasons associated with the skin were described at a rate of 15.5 per 100 encounters, rash being the most frequent problem followed by skin complaints (not otherwise classified). Requests for a skin check-up were also in the most frequent list of RFEs related to the skin.

Requests for a cardiovascular check-up accounted for almost half of all RFEs associated with the circulatory system which arose at a rate of 11.7 per 100 encounters. Patients also frequently presented for their hypertension or ‘high blood pressure’ problem.

Digestive system problems accounted for 7.3% of all reasons described, arising at a rate of 11.1 per 100 encounters. Abdominal pain was most common, followed by diarrhoea and vomiting Together these three symptoms represented approximately half of all RFEs related to the digestive system.

RFEs of a psychological nature were recorded at a rate of 8.1 per 100 encounters and these were frequently described in terms of depression, insomnia and anxiety. The relative

frequencies of the remaining ICPC–2 chapters for patient reasons for encounter are presented in Table 6.3.

Table 6.3: Distribution of patient reasons for encounter by ICPC–2 chapter and most frequent individual reasons for encounter within chapter

Patients reasons for encounter	Number	Per cent of total RFEs	Rate per 100 encounters[(a)]	95% LCL	95% UCL
General & unspecified	**28,101**	**18.7**	**28.3**	**27.5**	**29.1**
Prescription NOS	5,397	3.6	5.4	5.1	5.8
Check-up NOS*	2,838	1.9	2.9	2.6	3.1
Results tests/procedures NOS	2,462	1.6	2.5	2.2	2.8
Fever	2,241	1.5	2.3	1.9	2.6
Immunisation/vaccination—general	2,081	1.4	2.1	1.8	2.3
Weakness/tiredness	1,637	1.1	1.7	1.5	1.8
Chest pain NOS	1,303	0.9	1.3	1.2	1.4
Administrative procedure NOS	983	0.7	1.0	0.8	1.2
Trauma/injury NOS	898	0.6	0.9	0.7	1.1
Blood test NOS	836	0.6	0.8	0.6	1.1
Respiratory	**24,391**	**16.3**	**24.6**	**23.7**	**25.4**
Cough	6,900	4.6	7.0	6.5	7.4
Throat symptom/complaint	4,007	2.7	4.0	3.7	4.4
Upper respiratory infection, acute	2,593	1.7	2.6	2.2	3.0
Immunisation/vaccination—respiratory	1,906	1.3	1.9	1.1	2.7
Nasal congestion/sneeze	1,592	1.1	1.6	1.2	2.0
Asthma	1,101	0.7	1.1	1.0	1.3
Shortness of breath, dyspnoea	927	0.6	0.9	0.8	1.1
Musculoskeletal	**17,551**	**11.7**	**17.7**	**17.1**	**18.2**
Back complaint*	3,726	2.5	3.8	3.5	4.0
Knee complaint	1,423	1.0	1.4	1.3	1.6
Foot/toe complaint	1,213	0.8	1.2	1.1	1.3
Neck complaint	1,194	0.8	1.2	1.1	1.3
Leg/thigh complaint	1,151	0.8	1.2	1.0	1.3
Shoulder complaint	1,134	0.8	1.1	1.0	1.3
Skin	**15,371**	**10.3**	**15.5**	**15.0**	**16.0**
Rash*	2,896	1.9	2.9	2.8	3.1
Skin complaint	1,487	1.0	1.5	1.3	1.7
Swelling*	1,056	0.7	1.1	0.9	1.2
Skin check-up*	794	0.5	0.8	0.6	1.0

(continued)

Table 6.3 (continued): Distribution of patient reasons for encounter by ICPC–2 chapter and most frequent individual reasons for encounter within chapter

Patients reasons for encounter	Number	Per cent of total RFEs	Rate per 100 encounters[(a)]	95% LCL	95% UCL

Circulatory	**11,565**	**7.7**	**11.7**	**11.1**	**12.2**
Cardiovascular check-up*	5,449	3.6	5.5	5.0	5.9
Hypertension/high BP*	2,142	1.4	2.2	1.7	2.6
Digestive	**11,000**	**7.3**	**11.1**	**10.7**	**11.5**
Abdominal pain*	2,236	1.5	2.3	2.1	2.4
Diarrhoea	1,475	1.0	1.5	1.3	1.6
Vomiting	1,210	0.8	1.2	1.0	1.4
Psychological	**8,047**	**5.4**	**8.1**	**7.7**	**8.6**
Depression*	2,122	1.4	2.1	1.9	2.3
Insomnia	1,289	0.9	1.3	1.1	1.5
Anxiety*	1,062	0.7	1.1	0.9	1.2
Endocrine & metabolic	**6,142**	**4.1**	**6.2**	**5.9**	**6.5**
Diabetes*	946	0.6	1.0	0.7	1.2
Blood test—endocrine/metabolic	722	0.5	0.7	0.6	0.9
Prescription—endocrine/metabolic	701	0.5	0.7	0.5	0.9
Lipid disorder	675	0.5	0.7	0.4	1.0
Neurological	**5,717**	**3.8**	**5.8**	**5.5**	**6.0**
Headache	2,146	1.4	2.2	2.0	2.4
Vertigo/dizziness	1,265	0.8	1.3	1.1	1.4
Female genital system	**5,462**	**3.6**	**5.5**	**5.1**	**5.9**
Check-up/Pap smear*	1,581	1.1	1.6	1.3	1.9
Menstrual problems*	900	0.6	0.9	0.8	1.1
Ear	**4,117**	**2.8**	**4.2**	**4.0**	**4.3**
Ear pain	1,790	1.2	1.8	1.7	1.9
Pregnancy & family planning	3,445	2.3	3.5	3.2	3.8
Pre-postnatal check-up*	950	0.6	1.0	0.6	1.3
Oral contraception*	899	0.6	0.9	0.7	1.1
Eye	**2,659**	**1.8**	**2.7**	**2.5**	**2.8**
Urology	**2,388**	**1.6**	**2.4**	**2.3**	**2.6**
Blood	**2,005**	**1.3**	**2.0**	**1.8**	**2.2**
Male genital system	**1,118**	**0.8**	**1.1**	**1.0**	**1.3**
Social	**882**	**0.6**	**0.9**	**0.7**	**1.1**
Total RFEs	**149,962**	**100.0**	**151.0**	**149.2**	**152.8**

(a) Figures do not total 100 as more than one RFE can be recorded at each encounter.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence limit, UCL—upper confidence limit, NOS—not otherwise specified.

Table 6.4: Most frequent patient reasons for encounter

Patient reason for encounter	Number	Per cent of total RFEs	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Check-up—all*	13,121	8.8	13.2	12.5	13.9
Prescription—all*	9,161	6.1	9.2	8.7	9.8
Cough	6,900	4.6	7.0	6.5	7.4
Immunisation/vaccination—all*	4,369	2.9	4.4	4.0	4.8
Test results*	4,219	2.8	4.3	3.9	4.6
Throat complaint	4,007	2.7	4.0	3.7	4.4
Back complaint*	3,726	2.5	3.8	3.5	4.0
Rash*	2,896	1.9	2.9	2.8	3.1
Upper respiratory infection, acute	2,593	1.7	2.6	2.2	3.0
Fever	2,241	1.5	2.3	1.9	2.6
Abdominal pain*	2,236	1.5	2.3	2.1	2.4
Headache	2,146	1.4	2.2	2.0	2.4
Hypertension/high blood pressure*	2,142	1.4	2.2	1.7	2.6
Depression*	2,122	1.4	2.1	1.9	2.3
Ear pain	1,790	1.2	1.8	1.7	1.9
Weakness/tiredness general	1,637	1.1	1.7	1.5	1.8
Nasal congestion/sneeze	1,592	1.1	1.6	1.2	2.0
Skin complaint	1,487	1.0	1.5	1.3	1.7
Diarrhoea	1,475	1.0	1.5	1.3	1.6
Knee complaint	1,423	1.0	1.4	1.3	1.6
Chest pain NOS	1,303	0.9	1.3	1.2	1.4
Insomnia	1,289	0.9	1.3	1.1	1.5
Vertigo/dizziness	1,265	0.8	1.3	1.1	1.4
Foot & toe symptom/complaint	1,213	0.8	1.2	1.1	1.3
Vomiting	1,210	0.8	1.2	1.0	1.4
Neck complaint	1,194	0.8	1.2	1.1	1.3
Leg/thigh complaint	1,151	0.8	1.2	1.0	1.3
Shoulder complaint	1,134	0.8	1.1	1.0	1.3
Asthma	1,101	0.7	1.1	1.0	1.3
Anxiety*	1,062	0.7	1.1	0.9	1.2
Subtotal	*83,204*	*55.5*	. .	. .	. .
Total RFEs	**149,962**	**100.0**	**151.0**	**149.2**	**152.8**

(a) Figures do not total 100 as more than one RFE can be recorded at each encounter.

* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).

Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit, NOS—not otherwise specified.

Most frequent patient reasons for encounter

The thirty most commonly recorded individual RFEs are listed in order of frequency in Table 6.4 and accounted for over 50% of all RFEs. In this analysis the specific ICPC–2 chapter to which an across-chapter RFE concept belongs is disregarded, such that 'check-up—all' includes all check-ups from all body systems irrespective of whether the type was specified (e.g. 'BP check') or whether the request was very general. Equally, 'immunisation / vaccination—all' includes influenza vaccination requests as well as those for childhood immunisation, hepatitis etc.

A request for a check-up was by far the most common RFE, accounting for 8.8% of all RFEs recorded at a rate of 13.2 per 100 encounters. Requests for medication were also frequent (9.2 per 100 encounters). It is notable that RFEs described as 'hypertension' or 'high blood pressure' arose at a rate of 2.2 per 100 encounters and these are likely to be closely associated with the need for a check-up and / or medication. Immunisation / vaccination was the fourth most often expressed RFE (4.4 per 100 encounters), highlighting the patients' use of GPs as a source of such preventive care.

The remaining RFEs in the top 30 were largely symptom-based, led by cough (7.0 per 100 encounters) and throat complaints (4.0 per 100 encounters), back complaints, rash, and URTI (often described as 'a cold'). Undifferentiated symptoms such as fever, abdominal pain, headache, ear pain, weakness, and nasal congestion were also common. Many musculoskeletal symptoms also appeared in the top thirty RFEs. It is notable that chronic conditions such as depression, insomnia, asthma and anxiety were frequently described in diagnostic terms by patients when reporting their reasons for encounter.

6.4 Significant changes over the years 1998–99, 1999–00 and 2000–01

In the 2000–01 BEACH year, there was a significant increase in the proportion of encounters with patients aged between 45 and 64 years when compared with earlier BEACH data. Encounters with this patient age group represented 26.1% of all encounters (95% CI: 25.5–26.7%) compared with 24.5% (95% CI: 24.0–25.0%) in 1999–00, and 24.4% (95% CI: 23.8–25.0%) in 1998–99. This reflects a parallel increase in the proportion of total A1 items of service claimed through Medicare, accounted for by patients of 45–64 years of age. The MBS data shown in Table 4.2 demonstrated that in 2000–01, patients in this age group accounted for 25.6% of total A1 MBS items of service, compared with 24.1% in 1998–99 (Britt et al. 1999c, Table 4.2 p.19).

When compared with the results from the first two BEACH years, there were some marginal differences in the distribution of the patient RFEs by ICPC–2 chapter in 2000–01. However, no clear trends emerged over the 3 years.

7 Problems managed

A problem managed is a formal statement of the provider's understanding of a health problem presented by the patient, family or community. It can be described in terms of a disease, symptom or complaint, social problem or ill-defined condition managed at the encounter. As GPs were instructed to record each problem to the most specific level possible from the information available, the problem managed may at times be limited to the level of presenting signs and symptoms.

At each patient encounter up to four problems could be recorded by the GP, a minimum of one problem being compulsory. The status of each problem to the patient—new (first presentation to a medical practitioner) or old (follow-up of previous problem)—was also indicated. The concept of a principal diagnosis, which is often used in hospital statistics, is not adopted in studies of general practice where multiple problem management is the norm rather than the exception. Further, the range of problems managed at the encounter often crosses multiple systems and may include undiagnosed symptoms, psychosocial problems or chronic disease which make the designation of a principal diagnosis difficult. Thus, the order in which the problems were recorded by the GP is not regarded as significant.

Problems were classified using the International Classification of Primary Care—2nd Edition (ICPC–2). ICPC–2 has a bi-axial structure with 17 chapters on one axis and seven components on the other. Chapters are based on body systems, with an additional chapter for psychological problems and one for social problems (see Chapter 2, 'Methods').

The relative frequency of problems managed can be described in two ways: as a percentage of all problems managed in the study, or as a rate of problems managed per 100 encounters. Where groups of problems are reported (e.g. circulatory problems), note that more than one type of problem (e.g. hypertension and oedema) could have been managed at a single encounter. In considering these results the reader must be mindful that although a rate per 100 encounters for a single ungrouped problem (e.g. asthma, 2.8 per 100 encounters) can be regarded as equivalent to 'asthma is managed at 2.8% of encounters', such a statement cannot be made for grouped concepts.

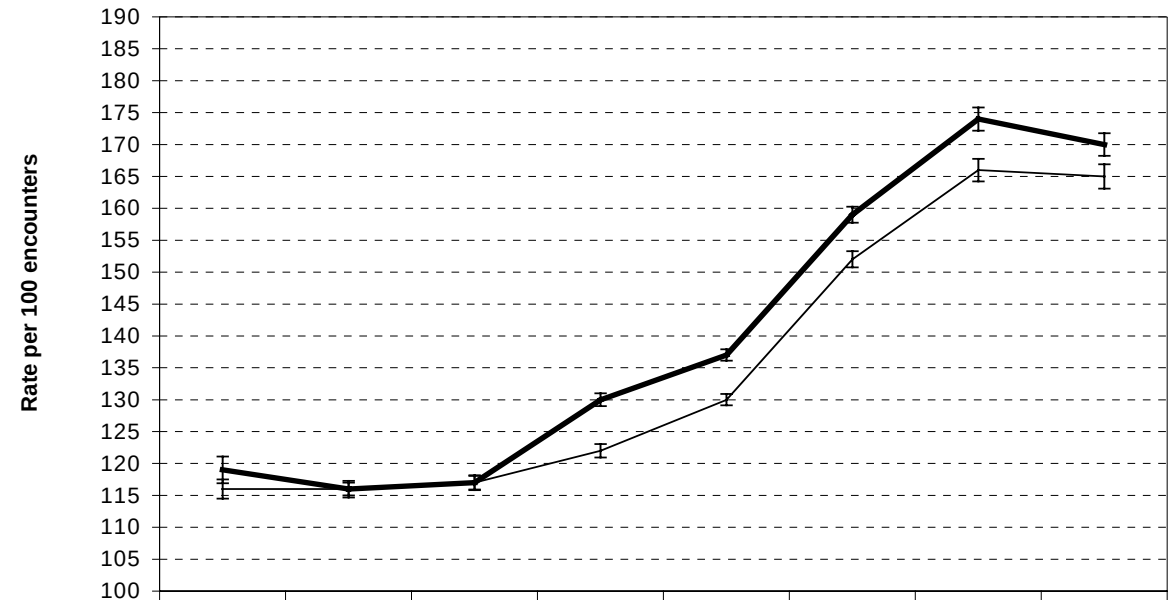
7.1 Number of problems managed at encounter

There were 143,528 problems managed at the 99,307 patient encounters, at an average rate of 144.5 problems per 100 encounters. In 66.5% of encounters, only one problem was managed, whereas three or more problems were managed at 9.1% of encounters (Table 7.1).

Table 7.1: Number of problems managed at an encounter

Number of problems managed at encounter	Number of encounters	Per cent	95% LCL	95% UCL
One problem	65,990	66.5	65.4	67.5
Two problems	24,255	24.4	23.8	25.1
Three problems	7,221	7.3	6.9	7.7
Four problems	1,841	1.9	1.5	2.2
Total	**99,307**	**100.0**	**. .**	**. .**

Note: LCL—lower confidence limit, UCL—upper confidence limit.



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Male %	116	116	117	122	130	152	166	165
Female %	119	116	117	130	137	159	174	170

Age group (years)

Figure 7.1: Age–sex-specific problem rates per 100 encounters with 95% confidence intervals

Age-specific rates of problems managed

The average number of problems managed at the encounter increased with each patient age-group (Figure 7.1). For children aged less than 15 years the rates were steady at around 115 problems managed per 100 encounters and rates were similar for boys and girls. After age 15 the rates increased for both males and females with each patient age-band, but the number of problems managed at an encounter was significantly higher for females than for males in all the adult age groups. The largest difference in rates was in the 65–74 age group, where women had an average 174 problems managed per 100 encounters compared with 168 per 100 for their male counterparts.

7.2 Nature of morbidity

Problems managed by ICPC–2 chapter

Table 7.2 presents (in decreasing order of frequency) the frequency and distribution of problems managed by ICPC–2 chapter. Individual problem types most frequently recorded within each chapter are also included where they represented more than 0.5% of all problems managed. Each ICPC–2 chapter and problem managed is expressed as a percentage of all problems managed and as a rate per 100 encounters with 95% confidence intervals.

Table 7.2: Distribution of problems managed by ICPC–2 chapter and most frequent individual problems within chapter

Problem managed	Number	Per cent total problems	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Respiratory	**22,387**	**15.6**	**22.5**	**21.9**	**23.2**
Upper respiratory tract infection	6,861	4.8	6.9	6.5	7.4
Asthma	2,821	2.0	2.8	2.7	3.0
Acute bronchitis/bronchiolitis	2,724	1.9	2.7	2.5	3.0
Immunisation/vaccination—respiratory	1,871	1.3	1.9	1.2	2.6
Sinusitis acute/chronic	1,490	1.0	1.5	1.3	1.7
Tonsillitis*	1,226	0.9	1.2	1.1	1.4
Allergic rhinitis	987	0.7	1.0	0.7	1.3
Chronic obstructive pulmonary disease	708	0.5	0.7	0.5	0.9
Musculoskeletal	**17,323**	**12.1**	**17.4**	**16.9**	**18.0**
Back complaint*	2,568	1.8	2.6	2.4	2.8
Osteoarthritis*	2,499	1.7	2.5	2.3	2.7
Sprain/strain*	2,020	1.4	2.0	1.8	2.2
Fracture*	1,059	0.7	1.1	0.9	1.2
Arthritis*	846	0.6	0.9	0.6	1.1
Skin	**16,622**	**11.6**	**16.7**	**16.2**	**17.3**
Contact dermatitis	2,068	1.4	2.1	1.9	2.2
Solar keratosis/sunburn	1,075	0.8	1.1	0.9	1.3
Malignant neoplasm skin	840	0.6	0.9	0.6	1.1
Laceration/cut	758	0.5	0.8	0.6	0.9
Circulatory	**15,869**	**11.1**	**16.0**	**15.3**	**16.7**
Hypertension*	8,560	6.0	8.6	8.2	9.1
Cardiac check-up*	1,339	0.9	1.4	1.0	1.7
Ischaemic heart disease*	1,279	0.9	1.3	1.1	1.5
Heart failure	669	0.5	0.7	0.5	0.8
General & unspecified	**14,087**	**9.8**	**14.2**	**13.7**	**14.7**
General immunisation/vaccination	2,233	1.6	2.3	2.0	2.5
General check-up*	1,610	1.1	1.6	1.4	1.8
Viral disease, other/NOS	1,614	1.1	1.6	1.3	1.9
Medication/request/renew/inject NOS	1,103	0.8	1.1	0.8	1.4

(continued)

Table 7.2 (continued): Distribution of problems managed by ICPC–2 chapter and most frequent individual problems within chapter

Problem managed	Number	Per cent total problems	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Psychological	**10,690**	**7.5**	**10.8**	**10.2**	**11.3**
Depression*	3,624	2.5	3.7	3.4	3.9
Anxiety*	1,645	1.2	1.7	1.5	1.8
Sleep disturbance	1,548	1.1	1.6	1.4	1.7
Digestive	**9,855**	**6.9**	**9.9**	**9.6**	**10.2**
Oesophageal disease	1,469	1.0	1.5	1.3	1.6
Gastroenteritis, presumed infection	1,090	0.8	1.1	0.9	1.3
Endocrine & metabolic	**9,706**	**6.8**	**9.8**	**9.3**	**10.2**
Diabetes, non-gestational*	2,768	1.9	2.8	2.6	3.0
Lipid disorder	2,889	2.0	2.9	2.7	3.1
Female genital system	**6,040**	**4.2**	**6.1**	**5.7**	**6.4**
Female genital check-up/Pap smear*	1,448	1.0	1.5	1.2	1.7
Menopausal complaint	1,388	1.0	1.4	1.3	1.5
Menstrual problems*	770	0.5	0.8	0.6	0.9
Ear	**4,357**	**3.0**	**4.4**	**4.2**	**4.6**
Acute otitis media/myringitis	1,493	1.0	1.5	1.3	1.7
Pregnancy & family planning	**3,863**	**2.7**	**3.9**	**3.6**	**4.2**
Oral contraception*	835	0.6	0.8	0.6	1.0
Pre-postnatal check-up*	741	0.5	0.8	0.3	1.2
Neurological	**3,728**	**2.6**	**3.8**	**3.6**	**3.9**
Migraine	918	0.6	0.9	0.8	1.0
Urology	**2,652**	**1.9**	**2.7**	**2.5**	**2.8**
Urinary tract infection*	1,534	1.1	1.5	1.4	1.7
Eye	**2,558**	**1.8**	**2.6**	**2.5**	**2.7**
Infectious conjunctivitis	716	0.5	0.7	0.6	0.8
Blood	**1,652**	**1.2**	**1.7**	**1.5**	**1.8**
Male genital system	**1,447**	**1.0**	**1.5**	**1.3**	**1.6**
Social	**692**	**0.5**	**0.7**	**0.5**	**0.9**
Total problems	**143,528**	**100.0**	**144.5**	**142.8**	**146.3**

(a) Figures do not total 100 as more than one problem can be managed at each encounter. Only frequencies > 0.5 included.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence limit, UCL—upper confidence limit.

Overall, half of the problems managed in general practice related to four major body systems—the respiratory, skin, musculoskeletal and circulatory systems. Psychological problems were also common, as were problems related to the digestive or endocrine and metabolic systems. Problems least frequently presented related to the blood and blood-forming organs and the male genital system or were of a social nature. Ten per cent of problems managed were not simply related to a single body system and were classified in the general and unspecified chapter.

At the chapter level, respiratory problems were the most frequently managed at a rate of 22.5 per 100 encounters, accounting for 15.6% of all problems managed. The high occurrence of asthma, URTI and bronchitis contributed to this result. Other common respiratory problems included influenza vaccination, sinusitis and tonsillitis.

The relative rates of problems related to the musculoskeletal system (17.4 per 100 encounters) and to the skin (16.7 per 100 encounters) were similar. For skin problems, contact dermatitis (including non-specific dermatitis and eczema) was most common (2.1 per 100 encounters), followed by solar keratosis, malignant skin neoplasms, then injuries to the skin (such as lacerations and cuts).

For problems related to the musculoskeletal system, back complaints (back pain and symptoms) were the most frequent (2.6 per 100 encounters). Other common musculoskeletal problems included osteoarthritis and injuries such as sprains / strains and fractures.

Hypertension (8.6 per 100 encounters) constituted over half of all circulatory problems (16.0 per 100 encounters) and was the most frequently managed individual problem overall, accounting for 6.0% of all problems. Cardiac-related check-ups, ischaemic heart disease and heart failure were other circulatory conditions arising at a relatively high frequency.

The most common problem managed in the general and unspecified chapter was general immunisation / vaccination, followed by general check-ups and ill-defined or unspecified viral illnesses. Medication provision for an unspecified diagnosis / problem was also commonly recorded by GPs.

Problems managed by ICPC–2 component

Examination of problems managed across ICPC–2 components provides an alternative way of viewing the types of matters dealt with at general practice consultations (Table 7.3).

GPs were instructed to record problems managed in the most specific terms possible at the time of the encounter. In an ideal world we could therefore predict that problems managed should fall into three components of ICPC–2, namely the diagnosis / disease, symptoms and complaints, and diagnostic and preventive procedures (e.g. check-up). Although these components were the most frequently recorded, there were a small number of problems described in terms of a prescription, referral, test result or administrative procedure. In these circumstances the lack of clinical description of the underlying problem required the label to be coded in terms of the process described (e.g. diagnosis was recorded as referral to dermatologist).

The majority of problems (65.8%) were described in terms of a diagnosis or disease (e.g. hypertension, depression, asthma) at an average rate of 95.2 per 100 encounters. Problems described in terms of a symptom or complaint (e.g. febrile) represented one-fifth of all problems managed and were recorded at a rate of 31.6 per 100 encounters. Diagnostic screening and preventive procedures occurred at a rate of 12.6 per 100 encounters and were most commonly check-ups and vaccinations / immunisations.

Problems related to the provision of medication and other treatments where no other diagnostic information was given were recorded at a rate of 2.9 per 100 encounters, while problems described in terms of a referral, test result, or administrative procedure were relatively few (less than 2% of all problems).

Table 7.3: Distribution of problems managed by ICPC–2 component

ICPC–2 component	Number	Per cent of total problems	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Diagnosis, diseases	94,487	65.8	95.2	93.6	96.7
Symptoms & complaints	31,416	21.9	31.6	30.8	32.4
Diagnostic & preventive procedures	12,517	8.7	12.6	12.0	13.2
Medications, treatments & therapeutics	2,888	2.0	2.9	2.7	3.2
Referral & other	1,100	0.8	1.1	0.9	1.3
Results	764	0.5	0.8	0.6	1.0
Administrative	356	0.3	0.4	0.2	0.5
Total problems	**143,528**	**100.0**	**144.5**	**142.8**	**146.3**

(a) Figures do not total 100 as more than one problem can be managed at each encounter.

Note: LCL—lower confidence limit, UCL—upper confidence limit.

Most frequently managed problems

The 30 most commonly recorded problems are listed in descending order of frequency in Table 7.4. In this analysis the specific chapter to which 'across-chapter concepts' (immunisation / vaccination, and prescriptions) apply is ignored and the concept is grouped to all other similar concepts. For example, immunisation / vaccination includes influenza vaccinations (from the respiratory chapter) as well as those for childhood immunisation (the general chapter), hepatitis immunisation (the digestive chapter) and neurological immunisations such as for polio.

The 30 most frequently managed problems accounted for almost half of all problems managed. Hypertension was the most common, accounting for 6.0% of all problems, managed at a rate of 8.6 per 100 encounters. This was followed by acute upper respiratory tract infection, which was recorded at a rate of 6.9 per 100 encounters, and immunisation / vaccination (4.6 per 100 encounters). Together, these top three problems accounted for 13.9% of all problems managed.

Depression was the fourth most commonly managed problem (3.7 per 100 encounters). Lipid disorder (2.9 per 100 encounters) moved to the fifth most common problem managed, up from ninth position in previous years. Asthma, non-gestational diabetes, acute bronchitis, back complaint and osteoarthritis were all managed at similar rates (2.8, 2.8, 2.7, 2.6 and 2.5 per 100 encounters respectively).

The remaining problems in the top 30 included some problems from body systems that were relatively low in frequency. Although all problems related to the ear chapter accounted for only 3.0% of problems overall (Table 7.2), otitis media was among the top 30 problems managed. Similarly, while urological problems were relatively infrequent overall (only 1.9% of total problems—Table 7.2), urinary tract infections were among the most frequent individual problems.

It is also notable that a number of non-diagnostic problem labels fell into the top 30 problems most frequently managed by general practitioners. These included preventive care (immunisations / vaccinations), general and body system specific check-ups (female genital, and circulatory chapters) and medication provision or review.

Table 7.4: Most frequently managed problems

Problem managed	Number	Per cent of total problems	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Hypertension*	8,560	6.0	8.6	8.2	9.1
Upper respiratory tract infection	6,861	4.8	6.9	6.5	7.4
Immunisation/vaccination—all*	4,543	3.2	4.6	4.2	5.0
Depression*	3,624	2.5	3.7	3.4	3.9
Lipid disorder	2,889	2.0	2.9	2.7	3.1
Asthma	2,821	2.0	2.8	2.7	3.0
Diabetes*	2,785	1.9	2.8	2.6	3.0
Acute bronchitis/bronchiolitis	2,724	1.9	2.7	2.5	3.0
Back complaint*	2,568	1.8	2.6	2.4	2.8
Osteoarthritis*	2,499	1.7	2.5	2.3	2.7
Dermatitis, contact/allergic	2,068	1.4	2.1	1.9	2.2
Sprain/strain*	2,020	1.4	2.0	1.8	2.2
Anxiety*	1,645	1.2	1.7	1.5	1.8
Prescription all*	1,639	1.1	1.7	1.4	1.9
Viral disease, other/NOS	1,614	1.1	1.6	1.3	1.9
General check-up*	1,610	1.1	1.6	1.4	1.8
Sleep disturbance	1,548	1.1	1.6	1.4	1.7
UTI*	1,534	1.1	1.5	1.4	1.7
Acute otitis media/myringitis	1,493	1.0	1.5	1.3	1.7
Sinusitis acute/chronic	1,490	1.0	1.5	1.3	1.7
Oesophageal disease	1,469	1.0	1.5	1.3	1.6
Female genital check-up/Pap smear*	1,448	1.0	1.5	1.2	1.7
Menopausal symptom/complaint	1,388	1.0	1.4	1.3	1.5
Cardiac check-up*	1,339	0.9	1.4	1.0	1.7
Ischaemic heart disease*	1,279	0.9	1.3	1.1	1.5
Tonsillitis*	1,226	0.9	1.2	1.1	1.4
Gastroenteritis, presumed infection	1,090	0.8	1.1	0.9	1.3
Solar keratosis/sunburn	1,075	0.8	1.1	0.9	1.3
Fracture*	1,059	0.7	1.1	0.9	1.2
Allergic rhinitis	987	0.7	1.0	0.7	1.3
Subtotal	*68,896*	*48.0*	. .	. .	. .
Total problems	**143,528**	**100.0**	**144.5**	**142.8**	**146.3**

(a) Figures do not total 100 as more than one problem can be managed at each encounter. Also only frequencies > 0.5% are included.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix3).

Note: LCL—lower confidence limit, UCL—upper confidence limit.

Most common new problems

The 30 most common new problems managed are listed in Table 7.5. The order of new problems differed from the order of most common problems overall and many of the top 30 were acute rather than chronic in nature (Table 7.4).

Acute respiratory conditions (upper respiratory tract infection and bronchitis) were the most common new problems managed representing more than 12% of all new problems managed. New presentations of URTI were managed at a rate of 4.4 per 100 encounters, and new bronchitis problems at a rate of 1.6 per 100 encounters.

Table 7.5: Most frequently managed new problems

Problem managed	Number	Per cent of total problems	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Upper respiratory tract infection	4,412	9.4	4.4	4.1	4.8
Acute bronchitis/bronchiolitis	1,591	3.4	1.6	1.4	1.8
Immunisation—all*	1,531	3.3	1.5	1.1	2.0
Viral disease, other/NOS	1,051	2.2	1.1	0.7	1.4
Sprain/strain*	1,038	2.2	1.1	0.9	1.2
Acute otitis media/myringitis	884	1.9	0.9	0.7	1.1
Dermatitis, contact/allergic	830	1.8	0.8	0.7	1.0
Sinusitis acute/chronic	811	1.7	0.8	0.7	1.0
Urinary tract infection*	778	1.7	0.8	0.7	0.9
Tonsillitis*	766	1.6	0.8	0.6	0.9
Gastroenteritis, presumed infection	702	1.5	0.7	0.5	0.9
Depression*	643	1.4	0.7	0.5	0.8
Back complaint*	527	1.1	0.5	0.4	0.7
Conjunctivitis, infectious	462	1.0	0.5	0.3	0.6
Asthma	456	1.0	0.5	0.2	0.7
Hypertension*	449	1.0	0.5	0.3	0.6
Fracture*	447	1.0	0.5	0.3	0.6
Respiratory infection, other	445	1.0	0.5	0.0	1.2
Solar keratosis/sunburn	429	0.9	0.4	0.2	0.6
Osteoarthritis*	421	0.9	0.4	0.3	0.6
Menstrual problems*	406	0.9	0.4	0.3	0.6
Otitis externa	409	0.9	0.4	0.2	0.6
General check-up*	399	0.9	0.4	0.2	0.6
Bursitis/tendonitis/synovitis NOS	392	0.8	0.4	0.2	0.6
Gastrointestinal infection	381	0.8	0.4	0.1	0.7
Malignant neoplasm skin	382	0.8	0.4	0.2	0.6
Laceration/cut	354	0.8	0.4	0.2	0.5
Injury skin, other	358	0.8	0.4	0.1	0.6
Lipid disorder	349	0.7	0.4	0.2	0.5
Anxiety*	336	0.7	0.3	0.1	0.6
Subtotal	*22,439*	*47.7*	. .	. .	. .
Total problems	**47,019**	**100.0**	**47.4**	**45.7**	**49.0**

(a) Figures do not total 100 as more than one problem can be managed at each encounter. Also only new problems > 0.5% are included.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence interval, UCL—upper confidence interval, NOS—not otherwise specified.

Immunisation was the third most common new problem (1.5 per 100 encounters). Unspecified viral disease and sprain/strain were the next most common new problems. Depression which was the fourth most common problem managed overall, was only the twelfth most common new problem (0.7 per 100 encounters). New cases of hypertension and lipid disorder were even less common, managed at a rate of 0.5 and 0.4 per 100 encounters respectively.

7.3 Changes in annual rates of problems managed over the years 1998–99, 1999–00 and 2000–01

Changes over time in problem management rates per 100 encounters were analysed using linear regression.

The Taylor linearisation method was used to calculate robust standard errors that allow for the design effect of the cluster sampling (SAS Institute Inc. 1999). Test statistics and p-values based on the robust standard error are more conservative than those that are calculated without taking the design effect into account. Thus the robust standard error provides a more stringent test of significant changes over time.

Where there was a change over time in the management rates of problems the analysis was performed again, adjusting for patient age and sex to examine whether demographic differences across the samples were confounding the estimates.

First, changes over time were 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 rubric level (some of which include multiple ICPC–2 or ICPC–2 PLUS codes).

Table 7.6 (p. 39) summarises the changes in management rates over time at the ICPC chapter level, and lists those problems within chapters for which there was a significant change in management rates over time. Some of the problems for which a significant change in rates of management were here identified, have been selected for more detailed investigation of the relationship between changes in management rates and changes in medication rates (see Chapter 9, Section 9.5). These analyses are reported in Chapter 14.

No changes in management rates over time

At the ICPC chapter level, rates of problems related to the blood, skin, digestive, cardiovascular, and musculoskeletal systems, male genital systems, female genital and reproductive systems and rates of psychological and social problems remained steady over the 3-year period.

Increased management rates over time

There was a significant increase over time in the management rates of problems related to the endocrine and metabolic systems, from 8.8 problems per 100 encounters in 1998–99 to 9.8 per 100 encounters in 2000–01 ($p = 0.0017$). The average increase per year was 0.48 per 100 encounters. By simple extrapolation this equates to an estimated increase of 500,000 GP contacts with endocrine and metabolic problems nationally per year.

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 ($p = 0.0019$). This is equivalent to an estimated annual national increase of 410,000 in the number of occasions that GPs managed endocrine and metabolic problems.

The increase in management rates of endocrine and metabolic problems was partly explained by an increase in the management rates of lipid disorders, from 2.5 per 100 encounters in 1998–99 to 2.9 per 100 encounters in 2000–01 ($p = 0.0015$). This represents an average annual increase of 0.2 problems per 100 encounters, equivalent to an estimated national annual increase of 230,000 GP contacts with lipid disorders. The increase in the management rates of lipid disorders remained after adjusting for patient age and sex ($p = 0.0032$).

The rates of new cases of lipid disorder remained steady over the 3 years at around 0.32 per 100 encounters ($p = 0.40$). The overall increase in GP contacts with lipid disorders reflects therefore an increasing workload in the ongoing management of lipid disorders rather than an increase of new cases presenting to general practice.

A small increase over the 3 years in the management rates of diabetes did not reach statistical significance ($p = 0.08$).

The rates of management of general and unspecified problems increased significantly over time from 13.2 per 100 encounters in 1998–99 to 14.2 per 100 encounters in 2000–01 ($p = 0.006$). This represents an average annual increase of 0.50 in management rates of these problems per 100 encounters, equivalent to an estimated national increase of 500,000 GP contacts per year with general and unspecified problems. This increase remained after adjusting for age and sex ($p = 0.0024$). It is possible that this merely represents a trend over the 3 years towards less specific labelling of problems by GPs.

Decreased management rates over time

There was a significant decrease in the management rate of respiratory problems, from 24.3 problems per 100 encounters in 1998–99 to 22.5 problems per 100 encounters in 2000–01 ($p = 0.0003$). This apparent trend was entirely explained by the decrease that occurred between 1999–00 (24.2 problems per 100 encounters) and 2000–01, when a drop of 1.8 respiratory problem contacts per 100 encounters occurred, representing an estimated reduction of 1,800,000 respiratory contacts for that year. The estimated reduction in respiratory problems remained after adjusting for age and sex ($p = 0.0007$).

The decrease over time in the management rate of respiratory problems was largely explained by a decrease in the management rates for asthma ($p = 0.007$) and acute bronchitis ($p = 0.0006$). The management rate of acute upper respiratory tract infections remained steady over time ($p = 0.73$).

The management rates for asthma decreased from 3.2 problems per 100 encounters in 1998–99 to 2.8 problems per 100 encounters in 2000–01. This apparent trend was entirely explained by a reduction between 1999–00 (3.2 problems per 100 encounters) and 2000–01 (2.8 per 100 encounters), of 0.35 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. However, there was no change in the rate of presentation of new asthma problems, which remained steady at around 0.45 per 100 encounters ($p = 0.93$). It appears, therefore, that in the last 12 months of the study, patients with asthma were returning less frequently to their GP for ongoing management.

Acute bronchitis management rates decreased from 3.3 per 100 encounters in 1998–99 to 2.7 per 100 encounters in 2000–01, an estimated average annual decrease of 0.27 bronchitis problems per 100 encounters, equivalent to an estimated annual decrease of 280,000 GP contacts with acute bronchitis nationally. After adjusting for age and sex the reduction in the management rates of asthma and bronchitis remained.

There was a small but significant decrease in the management of ear problems from 4.9 per 100 encounters in 1998–99 to 4.4 per 100 encounters in 2000–01 ($p = 0.001$). The average annual decrease was 0.26 problems per 100 encounters, equating to an estimated annual reduction of 280,000 GP contacts with ear problems nationally. The decrease in management of ear problems remained after adjusting for patient age and sex ($p = 0.002$).

There was a marginal decrease over time in the management rates of neurological problems, from 4.0 per 100 encounters in 1998–99 to 3.8 per 100 encounters in 2000–01 ($p = 0.043$). The average annual decrease was 0.13 problems per 100 encounters, equating to an estimated annual reduction of 140,000 GP contacts with neurological problems nationally. The reduction in rates of neurological problems over time remained after adjusting for age and sex, with an adjusted estimated average annual decrease of 0.16 per 100 encounters ($p = 0.015$), equivalent to an estimated 160,000 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 rates of any specific neurological problem.

There was also a marginal decrease in the management rate of eye problems from 2.8 per 100 encounters in 1998–99 to 2.6 per 100 encounters in 2000–01 ($p = 0.018$). This apparent change remained marginal after adjusting for patient age and sex (0.033).

Fluctuations in management rates over time

There was a significant fluctuation in the management rates of urological problems over the 3-year period. Management of urological problems decreased significantly from 1999–00 (3.0 per 100 encounters, 95% CI: 2.9–3.2) to 2000–01 (2.7 per 100 encounters, 95% CI: 2.5–2.8). However, there was no significant systematic trend in the management of urological problems over the 3-year period ($p = 0.090$). The decrease observed in 2000–01 was a return to the management rates of urological problems seen in 1998–99 (2.8 per 100 encounters, 95% CI: 2.7–3.0) rather than a systematic decrease over time in the management rate of urological problems.

Table 7.6: Changes in problem management over the 3-year period

ICPC chapter ICPC rubric	Trend over time	1998–99 Problems per 100 encounters[(a)]	2000–01 Problems per 100 encounters[(a)]	p-value for linear trend
Respiratory	Decreased management rate	24.3	22.5	0.0003
Asthma	Decreased management rate	3.2	2	0.007
Acute bronchitis	Decreased management rate	3.3	2.7	0.0006
Musculoskeletal	No change	. .	. .	. .
Skin	No change	. .	. .	. .
Circulatory	No change	. .	. .	. .
General & unspecified	Increased management rate	13.2	14.2	0.006
Psychological	No change	. .	. .	. .
Digestive	No change	. .	. .	. .
Endocrine & metabolic	Increased management rate	8.8	9.8	0.0017
Lipid disorder	Increased management rate	2.5	2.9	0.0015
Female genital system	No change	. .	. .	. .
Ear	Decreased management rate	4.9	4.4	0.001
Pregnancy & family planning	No change	. .	. .	. .
Neurological	Decreased management rate	4.0	3.8	0.043
Urological	No change	. .	. .	. .
Eye	Decreased management rate	2.8	2.6	0.018
Blood	No change	. .	. .	. .
Male genital system	No change	. .	. .	. .
Social	No change	. .	. .	. .

(a) Unadjusted rate per 100 encounters.

8 Overview of management

The BEACH survey form allowed GPs to record several aspects of patient management for each problem managed at each encounter. Pharmaceutical management was recorded in detail and linked to a patient problem. Other modes of treatment including clinical treatments (e.g. counselling) and procedures were recorded briefly in the GP's own words and were also related to a single problem. Provision was made on the form for referrals and hospital admissions, and for pathology and imaging orders to be related to multiple problems.

GPs undertook a total of 204,290 management activities at a rate of 205 per 100 encounters and 142 per 100 problems. The most common management activity was medication prescribed, advised or supplied, at a rate of 108.2 per 100 encounters or 74.8 per 100 problems. Other treatments took place at the rate of 49.4 per 100 encounters, referrals at a rate of 10.4, pathology orders at a rate of 29.4 and imaging at a rate of 8.3 per 100 encounters (Table 8.1).

Table 8.1: Summary of management

Management type	Number	Rate per 100 encounters (*n* = 99,307)	95% LCL	95% UCL	Rate per 100 problems (*n* = 143,528)	95% LCL	95% UCL
Medications	107,400	108.2	105.7	110.6	74.8	73.3	76.3
Prescribed	91,647	92.3	89.9	94.7	63.9	62.4	65.4
Advised OTC	8,906	9.0	8.1	9.8	6.2	5.6	6.8
GP supplied	6,847	6.9	5.7	8.1	4.8	3.9	5.6
Other treatments	49,072	49.4	47.1	51.7	34.2	32.7	35.7
Clinical	36,978	37.2	35.1	39.3	25.8	24.4	27.1
Procedural	12,094	12.2	11.6	12.8	8.4	8.0	8.9
Referrals	10,366	10.4	10.0	10.8	7.2	7.0	7.5
Specialist	7,326	7.4	7.1	7.7	5.1	4.9	5.3
Allied health	2,313	2.3	2.1	2.5	1.6	1.5	1.7
Hospital	499	0.5	0.3	0.7	0.3	0.2	0.5
Emergency dept	92	0.1	0.0	0.4	0.1	0.0	0.3
Referral NOS	137	0.1	0.0	0.6	0.1	0.0	0.4
Pathology	29,225	29.4	28.2	30.7	20.4	19.6	21.2
Imaging	8,227	8.3	7.9	8.7	5.7	5.5	6.0
Total management activities	**204,290**	**205.7**	**. .**	**. .**	**142.3**	**. .**	**. .**

Note: LCL—lower confidence limit, UCL—upper confidence limit.

Another perspective emerges in analysis of the number of encounters or problems for which at least one form of management was recorded by the GP. At least one management action was recorded at 91.6% of encounters and for 86.4% of problems managed. At least one medication was given at more than two-thirds (68.0%) of encounters and for 58.7% of problems.

At least one non-pharmacological treatment was given at 37.6% of encounters and for 29.7% of problems, a clinical treatment being more likely than a procedure. A referral was made at 9,862 encounters (9.9%) and for 7.2% of problems. At least one test or investigation was ordered at 19.3% of encounters and for 14.9% of problems. These were most commonly pathology orders, which were reported at 13.8% of encounters (for 10.6% of problems). Imaging orders were placed less frequently at 7.2% of encounters and for 5.2% of problems (Table 8.2).

Table 8.2: Encounters and problems in which management was recorded

Management type	Number of encounters	Per cent of total encounters[(a)] (*n* = 99,307)	Number of problems	Per cent of total problems[(a)] (*n* = 143,528)
At least one management type	**90,987**	**91.6**	**123,963**	**86.4**
At least one medication or non-pharmacological treatment	**82,911**	**83.5**	**109,061**	**76.0**
At least one medication	**67,553**	**68.0**	**84,205**	**58.7**
At least one prescription	59,352	59.8	73,558	51.3
At least one OTC advised	7,899	8.0	8,053	5.6
At least one GP supplied	5,076	5.1	5,417	3.8
At least one non-pharmacological treatment	**37,367**	**37.6**	**42,601**	**29.7**
At least one clinical treatment	28,795	29.0	32,600	22.7
At least one procedure	11,042	11.1	11,411	8.0
At least one referral	**9,862**	**9.9**	**10,332**	**7.2**
At least one referral to a specialist	7,058	7.1	7,342	5.1
At least one referral to allied health	2,254	2.3	2,327	1.6
At least one referral to hospital	499	0.5	527	0.4
At least one referral to emergency dept	92	0.1	94	0.1
At least one referral NOS	137	0.1	141	0.1
At least one investigation	**19,174**	**19.3**	**21,355**	**14.9**
At least one pathology order	13,672	13.8	15,201	10.6
At least one imaging order	7,162	7.2	7,426	5.2

(a) Figures will not total 100 as multiple events may occur in one encounter or in the management of one problem at encounter.

The combinations of management types related to each problem were then investigated. There were 19,565 problems (13.65) for which no specific management was recorded by the GP. Check-ups (either partial or full) (11.7%), hypertension (7.7%) and upper respiratory tract infections (4.0%) together accounted for almost one-quarter of these. The majority of treatments occurred either as a single component or in combination with one other component. Single component management was provided for 63.9% of problems, and double component for 17.5%. More than two components were provided in the management of less than 5% of problems.

Table 8.3 provides a list of the most common problem management combinations. The most common management choice was medication alone (for 40.9% of problems) followed by clinical treatment alone (9.6%) but the combination of medication and clinical treatment was also relatively frequently recorded (8.6%).

Table 8.3: Most common management combinations for problems

Management type	Number of problems	Per cent of total problems[(a)] (*n* = 143,528)
No recorded management	**19,565**	**13.6**
Management recorded	**123,963**	**86.4**
Medication only	58,649	40.9
Clinical treatment only	13,789	9.6
Medication + clinical	12,411	8.6
Pathology order only	5,811	4.0
Therapeutic procedure only	5,602	3.9
Referral only	5,109	3.6
Medication + pathology	3,730	2.6
Imaging order only	2,774	1.9
Medication + procedure	2,159	1.5
Medication + referral	1,886	1.3
Medication + imaging	1,556	1.1
Clinical + pathology	1,420	1.0
Procedure + pathology	1,032	0.7
Clinical treatment + referral	1,008	0.7

(a) Within the top 15 management combinations there were none containing more than 2 management components.

9 Medications

9.1 Source of medications

The survey form allowed the recording of up to four medications for each problem managed. Each medication could be recorded as prescribed (the default), recommended for over-the-counter purchase or supplied by the GP from surgery stocks or samples. GPs were requested to enter the brand or generic name, the strength, regimen and number of repeats ordered for each medication and to designate if this was a new or continued medication for that patient for this problem. This structure allowed analysis of the medications prescribed, advised by GPs for over-the-counter purchase and medications supplied by the GP, and the prescribed daily dose (PDD) of medications. Generic or brand names were entered into the database in the form recorded by the GP. Medications were classified using the CAPS system developed by the Family Medicine Research Centre from which they were also mapped to the ATC classification (World Health Organization Collaborating Centre for Drug Statistics Methodology (WHO) 1997), (see Chapter 2, 'Methods'). Although analysis can be conducted at brand name level, results in this chapter are reported only at the generic level.

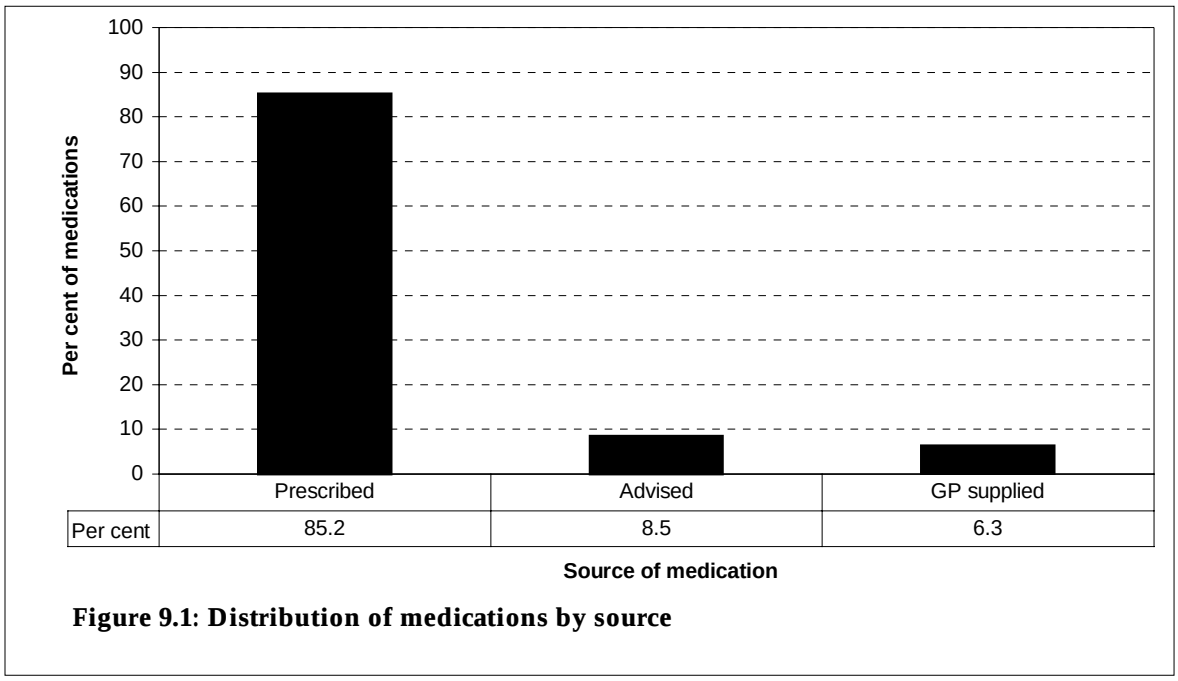


Figure 9.1: Distribution of medications by source

A total of 107,400 medications were recorded during this year of the BEACH survey, at a rate of 108 per 100 encounters and 75 per 100 problems managed. Most medications (85.3%) were prescribed. However, 8.3% of medications were recommended by the GP for purchase over-the-counter and 6.4% supplied to the patient by the GP (Figure 9.1). Extrapolated to the whole general practice population, this represents 8.3 million encounters per annum at which GPs recommended more than 9 million medications to their patients for purchase over-the-counter. At 6.4 million encounters GPs would have supplied 7 million medications directly to the patient.

9.2 Prescribed medications

There were 91,647 prescriptions recorded, at a rate of 92.3 per 100 encounters and 63.9 per 100 problems managed. At least one prescription was recorded at 59.8% of encounters and for over half (51.2%) of the problems managed.

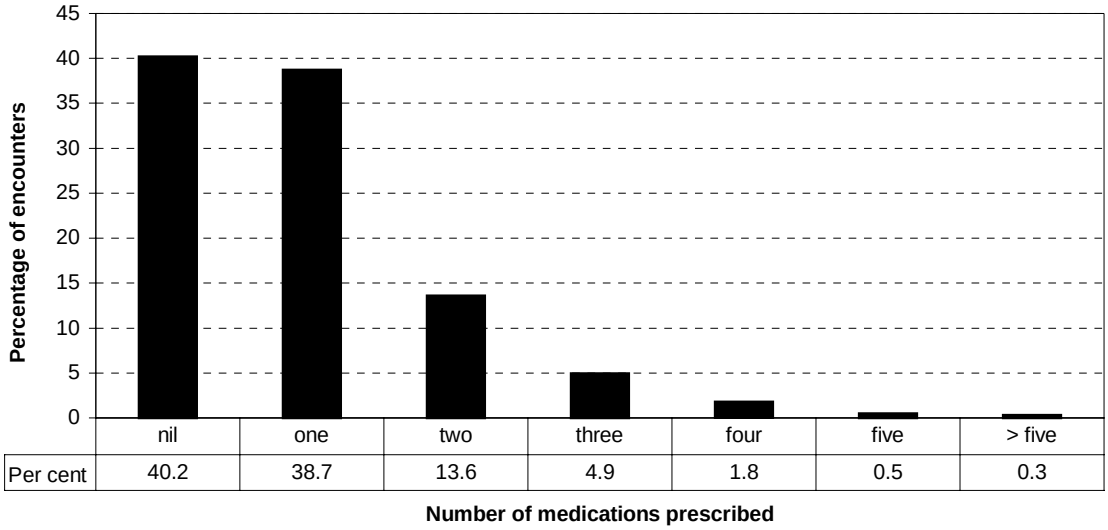


Figure 9.2: Number of medications prescribed per encounter

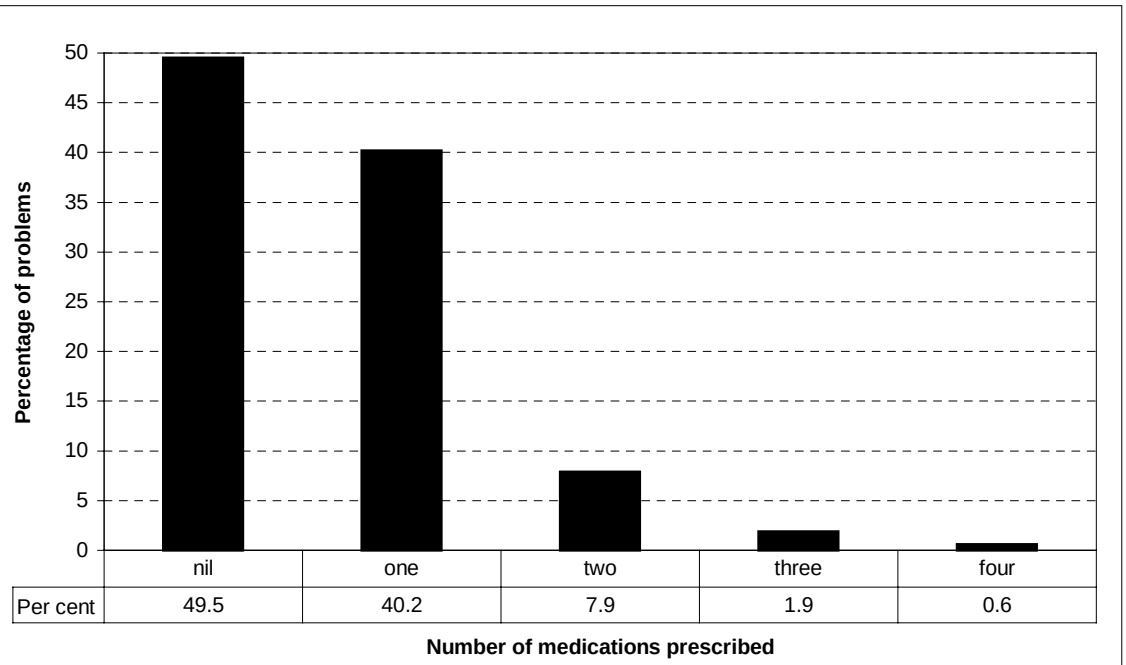


Figure 9.3: Number of medications prescribed per problem

The survey form allowed GPs to record up to four medications for each of four problems. A maximum of 16 medications could therefore be recorded at each encounter. These could be a mixture of medications prescribed, supplied or advised for over-the-counter purchase.

No medications were prescribed at 40.2% of encounters, one medication at 38.7% of encounters, two at 13.6% and three at 4.9%. Four or more medications were prescribed at only 2.6% of encounters (Figure 9.2). No prescription was given for almost half (48.8%) of all problems managed, one for 41.3%, two for 7.7% and three or more for 2.2% (Figure 9.3).

Number of repeats

GPs were also asked to record the number of repeat prescriptions ordered for each prescribed medication. There was a very high level of missing data in this field. For 43,142 prescriptions (47.1%) there was nothing recorded. For the remaining 48,504 prescriptions the distribution of the specified number of repeats (from specified zero to 6+) is provided in Figure 9.4. For one-third of these prescriptions the GP specified that no repeats had been prescribed and for 26.9% of prescriptions five repeats were ordered. The latter proportion reflects the PBS provision of one month's supply and five repeats for many medications used for chronic conditions such as hypertension. Ordering two repeats was not unusual (15.2%) but ordering three repeats, or six or more repeats, was relatively rare.

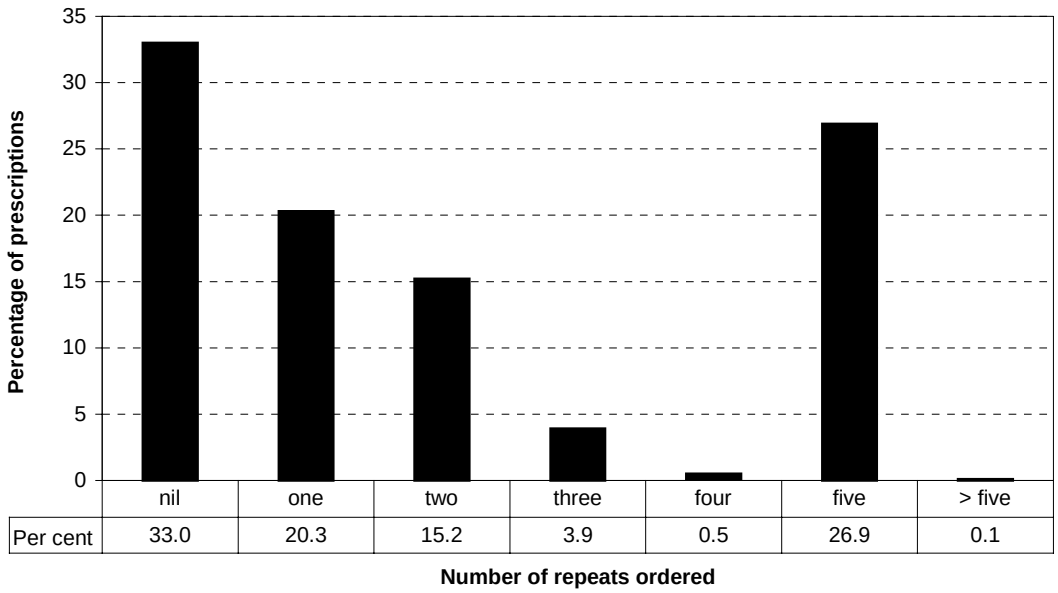


Figure 9.4: Number of repeats ordered per prescription

The level of missing data makes it difficult to extrapolate reliably to the total number of intended prescriptions (i.e. original plus repeats). However, if it is assumed that the missing data are random and distributed across all medication types in a similar manner to those for which repeat status was recorded, this would suggest that the participating GPs intended a total 219,662 medications to be dispensed as a result of these prescriptions. This extrapolates to about 230 million orders by recognised GPs in Australia per year.

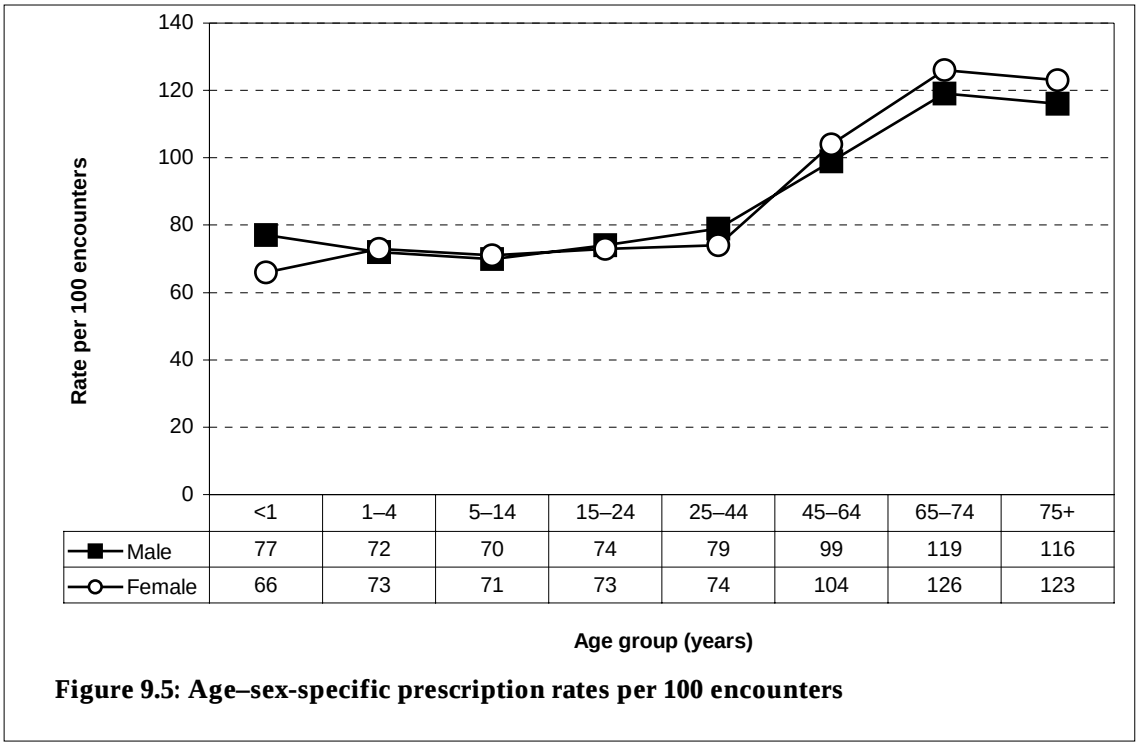
However, in the 2000 calendar year 130,223,517 dispensed prescriptions from recognised GPs were recorded in the PBS data (personal communication John Dudley, DHAC from HIC data). While it could be expected that some prescriptions are not presented for dispensing, the non-redemption rates for prescriptions in overseas studies have varied between 5.2% in the United Kingdom (Beardon et al. 1993) and 13% in a more comparable health system in New Zealand (Gardner et al. 1996). These non-redemption rates would not be sufficient to explain the difference here. The main cause of this discrepancy appears to be the lack of recording in the Pharmaceutical Benefits Scheme (PBS) data of medications that fall below the subsidy threshold and the lack of data on private prescriptions. This suggests that PBS data should not be used alone to monitor significant areas of general practice medication management.

The high level of missing repeat data in the second and third years of BEACH is disappointing. The research team has developed some better examples and more explicit instructions for participating GPs in an attempt to improve the response rate to this question in the current BEACH year.

Age–sex-specific rates of prescribed medications

Age–sex-specific charts show the prescription rate per 100 encounters for all the male or female patients respectively in the age group under consideration. Figure 9.5 shows that the prescription rate per 100 encounters was similar for males and females. It also shows the well described tendency for the number of prescriptions written at each encounter to rise with advancing age of the patient.

Figure 9.6, however, demonstrates that the age-based increase almost disappears if the prescription rate is related to problems. This suggests that the increased prescription rate in older patients is largely accounted for by the increased number of health problems that they have managed in general practice.



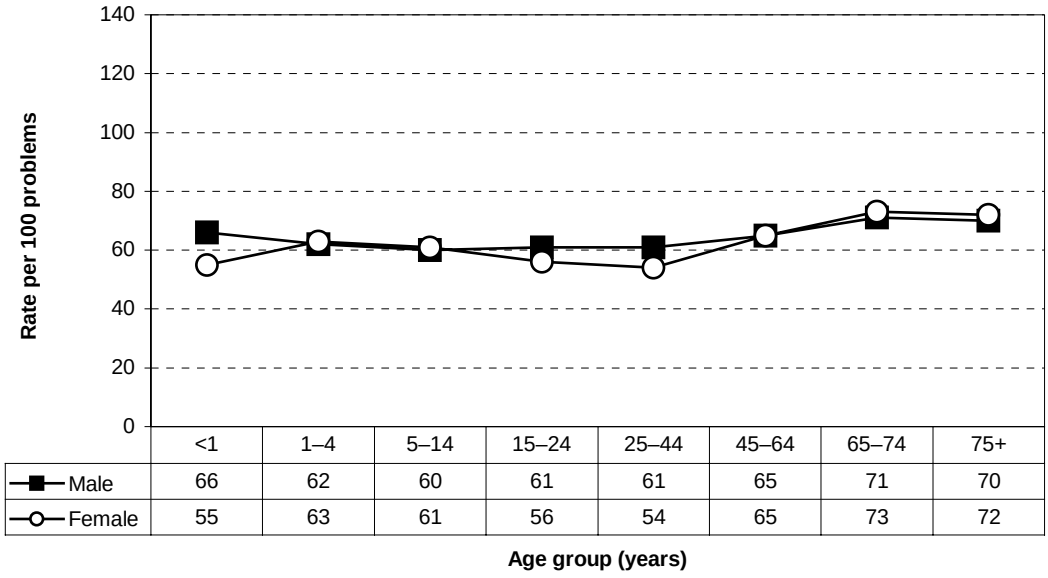
	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Male	77	72	70	74	79	99	119	116
Female	66	73	71	73	74	104	126	123

Figure 9.5: Age–sex-specific prescription rates per 100 encounters

Types of medications prescribed

Medications prescribed by major groups

The distribution of prescribed medications by major groups is presented graphically in Figure 9.7. Antibiotics were the most commonly prescribed group, representing 17.2% of all prescriptions. These were followed by cardiovascular (14.7%), central nervous system (12.0%), psychological (8.1%), musculoskeletal (7.3%) and respiratory (7.3%) medications.



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Male	66	62	60	61	61	65	71	70
Female	55	63	61	56	54	65	73	72

Figure 9.6: Age–sex-specific prescription rates per 100 problems

Table 9.1 shows the distribution of medications commonly prescribed by group, subgroup and generic name in order of medication group and subgroup frequency. In the antibiotic group, broad-spectrum penicillins were prescribed at a rate of 4.9 per 100 encounters. Amoxycillin and amoxycillin + potassium clavulanate were the most frequently prescribed generic drugs in that subgroup**.** Cephalosporins were prescribed almost as frequently at a rate of 4.0 per 100 encounters.

Within cardiovascular medications, antihypertensives accounted for more than half the prescriptions (7.3 per 100 encounters). Other cardiovascular medications, principally lipid-lowering agents, contributed 2.4 prescriptions per 100 encounters. Beta-blockers and anti-angina medications were also frequently recorded.

Prescribed central nervous system medications were mainly analgesics (8.9 per 100 encounters) and anti-emetics (1.5). Compound analgesics containing codeine continue to be a frequent choice. The psychological medications most frequently prescribed were anti-depressants.

Musculoskeletal drugs were frequently prescribed, at a rate of 6.8 per 100 encounters. These were mainly non-steroidal anti-inflammatory drugs, in particular the new coxib, Celecoxib.

Bronchodilators (3.2) and asthma preventives (2.2) made up the majority of respiratory medications prescribed, and in other groups, vaccines were prescribed at a rate of 3.9, topical steroid skin medications at a rate of 3.1, and digestive anti-ulcerants at a rate of 2.2 per 100 encounters.

The wide range of medications prescribed reflects the extensive variety of problems managed in general practice.

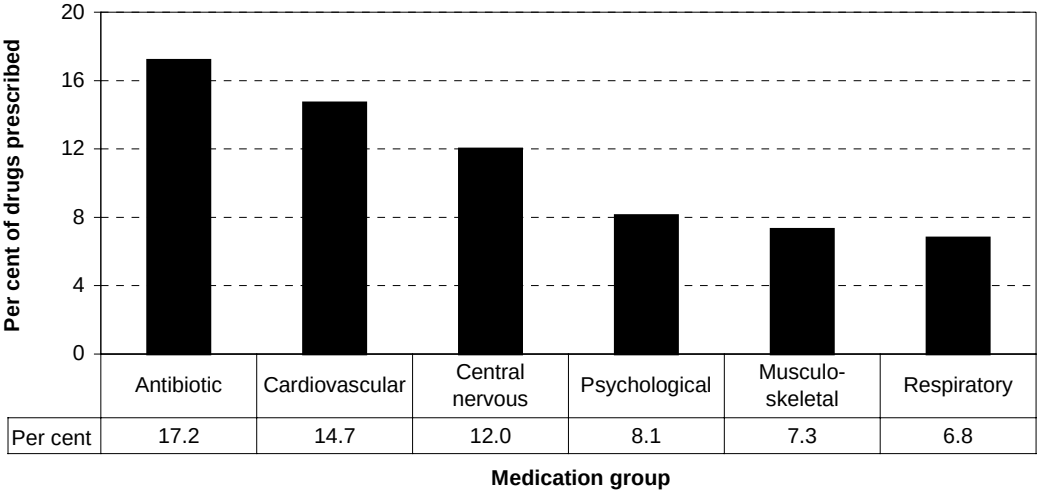


Figure 9.7: Distribution of prescribed medications by group

Table 9.1: Distribution of medications prescribed by group, subgroup, and generic medication

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs[(a)]	95% LCL	95% UCL
Antibiotics			15,790	17.2	15.9	15.3	16.5
	Broad spectrum penicillin		4,876	5.3	4.9	4.6	5.2
		Amoxycillin	3,189	3.5	3.2	2.9	3.5
		Amoxycillin+potassium clavulanate	1,680	1.8	1.7	1.4	1.9
	Cephalosporins		3,928	4.3	4.0	3.6	4.3
		Cephalexin	2,174	2.4	2.2	2.0	2.4
		Cefaclor monohydrate	1,631	1.8	1.6	1.3	2.0
	Other antibiotics		3,286	3.6	3.3	3.1	3.6
		Roxithromycin	1,593	1.7	1.6	1.4	1.8
		Erythromycin	810	0.9	0.8	0.6	1.0
	Penicillin		1,252	1.4	1.3	1.1	1.4
	Tetracycline		1,136	1.2	1.1	1.0	1.3
		Doxycycline	914	1.0	0.9	0.7	1.1
	Anti-viral		681	0.7	0.7	0.5	0.9

(continued)

Table 9.1 (continued): Distribution of medications prescribed by group, subgroup, and generic medication

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs[a]	95% LCL	95% UCL
Cardiovascular			13,509	14.7	13.6	12.8	14.4
	Antihypertensive		7,248	7.9	7.3	6.9	7.7
		Irbesartan	760	0.8	0.8	0.6	0.9
		Amlodipine	695	0.8	0.7	0.5	0.9
		Perindopril	626	0.7	0.6	0.4	0.8
		Indapamide	557	0.6	0.6	0.4	0.7
		Enalapril maleate	539	0.6	0.5	0.4	0.7
		Felodipine	523	0.6	0.5	0.4	0.7
	Other CVS drugs		2,620	2.9	2.6	2.4	2.8
		Atorvastatin	899	1.0	0.9	0.8	1.0
		Simvastatin	887	1.0	0.9	0.7	1.1
	Beta-blockers		1,592	1.7	1.6	1.4	1.8
		Atenolol	929	1.0	0.9	0.7	1.1
	Anti-angina		1,091	1.2	1.1	0.9	1.3
Cental nervous system			10,997	12.0	11.1	10.5	11.7
	Simple analgesic		4,723	5.2	4.8	4.3	5.2
		Paracetamol	3,890	4.2	3.9	3.5	4.4
		Aspirin	781	0.9	0.8	0.6	1.0
	Compound analgesic		2,708	3.0	2.7	2.5	2.9
		Paracetamol+codeine	2,171	2.4	2.2	2.0	2.4
	Anti-emetic/anti-nausea		1,473	1.6	1.5	1.3	1.6
		Prochlorperazine	738	0.8	0.7	0.6	0.9
		Metoclopramide	639	0.7	0.6	0.5	0.8
	Narcotic analgesic		1,370	1.5	1.4	1.0	1.8
	Anti-convulsant		540	0.6	0.5	0.4	0.7
Psychological			7,455	8.1	7.5	7.1	7.9
	Anti-depressant		3,029	3.3	3.1	2.8	3.3
		Sertraline	688	0.8	0.7	0.5	0.9
	Anti-anxiety		1,964	2.1	2.0	1.8	2.2
		Diazepam	1,034	1.1	1.0	0.9	1.2
		Oxazepam	710	0.8	0.7	0.6	0.9
		Phenothiazine	594	0.6	0.6	0.4	0.8
	Sedative hypnotics		1,867	2.0	1.9	1.7	2.1
		Temazepam	1,422	1.6	1.4	1.3	1.6

(continued)

Table 9.1 (continued): Distribution of medications prescribed by group, subgroup, and generic medication

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs[(a)]	95% LCL	95% UCL
Musculoskeletal			6,704	7.3	6.8	6.4	7.1
	NSAID/anti-rheumatoid		5,668	6.2	5.7	5.4	6.0
		Celecoxib	2,121	2.3	2.1	1.9	2.4
		Diclofenac sodium systemic	1,151	1.3	1.2	0.9	1.4
		Naproxen	544	0.6	0.5	0.3	0.7
		Ibuprofen	500	0.5	0.5	0.3	0.8
Respiratory			6,234	6.8	6.3	5.9	6.7
	Bronchodilator		3,169	3.5	3.2	2.9	3.4
		Salbutamol	2,067	2.3	2.1	1.9	2.3
		Terbutaline	607	0.7	0.6	0.4	0.8
		Ipratropium inhaled	491	0.5	0.5	0.3	0.7
	Asthma preventives		2,186	2.4	2.2	2.0	2.4
		Budesonide	545	0.6	0.5	0.4	0.7
		Fluticasone propionate	526	0.6	0.5	0.3	0.7
		Beclomethasone	635	0.6	0.6	0.4	0.8
		Fluticasone propionate	533	0.5	0.5	0.3	0.7
Hormones			5,820	6.4	5.9	5.6	6.2
	Sex hormones		2,049	2.2	2.1	1.9	2.2
		Medroxyprogesterone	527	0.6	0.5	0.4	0.7
	Hypoglycaemic		1,960	2.1	2.0	1.7	2.3
		Metformin	817	0.9	0.8	0.6	1.0
		Gliclazide	515	0.6	0.5	0.2	0.8
	Corticosteroids		1,209	1.3	1.2	1.1	1.4
	Other hormone		598	0.7	0.6	0.5	0.7
		Thyroxine	485	0.5	0.5	0.3	0.6
Skin			4,807	5.2	4.8	4.5	5.2
	Topical steroid		3,039	3.3	3.1	2.8	3.3
		Betamethasone topical	1,038	1.1	1.0	0.9	1.2
		Mometasone	657	0.7	0.7	0.5	0.8
		Hydrocortisone topical	564	0.6	0.6	0.4	0.7
	Anti-infection skin		914	1.0	0.9	0.7	1.1
	Other skin		848	0.9	0.9	0.6	1.1
Allergy, immune system			4,575	5.0	4.6	4.2	5.0
	Vaccine		3,839	4.2	3.9	3.4	4.3
		Influenza virus vaccine	1,491	1.6	1.5	0.8	2.2
	Anti-histamine		614	0.7	0.6	0.4	0.8

(continued)

Table 9.1 (continued): Distribution of medications prescribed by group, subgroup, and generic medication

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs[(a)]	95% LCL	95% UCL
Digestive			4,038	4.4	4.1	3.8	4.3
	Anti-ulcerants		2,159	2.4	2.2	2.0	2.3
		Ranitidine	1,015	1.1	1.0	0.9	1.2
	Anti-diarrhoeals		542	0.6	0.5	0.3	0.8
Ear, nose topical			2,304	2.5	2.3	2.2	2.5
	Topical nasal		1,326	1.4	1.3	1.2	1.5
		Budesonide topical nasal	876	1.0	0.9	0.7	1.1
	Topical otic		975	1.1	1.0	0.8	1.1
		Dexamethasone+framycetin	498	0.5	0.5	0.3	0.7
Blood			1,832	2.0	1.8	1.7	2.0
	Other blood		916	1.0	0.9	0.7	1.1
		Warfarin sodium	782	0.9	0.8	0.6	1.0
	Haemopoietic		915	1.0	0.9	0.8	1.1
Urogenital			1,812	2.0	1.8	1.7	2.0
	Diuretic		1,277	1.4	1.3	1.1	1.4
		Frusemide (Furosemide)	694	0.8	0.7	0.5	0.9
Contraceptives			1,634	1.8	1.6	1.5	1.8
	Oral contraception		1,634	1.8	1.6	1.5	1.8
		Levonorgestrel+ethinyloestradiol	1,202	1.3	1.2	1.1	1.4
Eye medications			1,633	1.8	1.6	1.5	1.8
	Anti-infectives eye		1,036	1.1	1.0	0.9	1.2
		Chloramphenicol eye	854	0.9	0.9	0.7	1.0
Nutrition, metabolism			1,364	1.5	1.4	1.2	1.5
	Mineral tonic		540	0.6	0.5	0.4	0.7
Miscellaneous			590	0.6	0.6	0.4	0.8
Anti-neoplastics			365	0.4	0.4	0.2	0.5
Surgical preparations			117	0.1	0.1	0.0	1.2
Diagnostic agents			67	0.1	0.1	0.0	0.4

(a) Column will not add to 100 because multiple prescriptions could be written at each encounter.

Note: Scripts—prescriptions, encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

Most frequently prescribed generic medications

The 30 most frequently prescribed individual generic medications are listed in Table 9.2. Together these accounted for almost half (44.2%) of all prescribed medications. Antibiotics accounted for five of the top ten medications while simple analgesics were also frequently prescribed.

Celecoxib was the fifth most frequently prescribed medication even though it had been available on the Pharmaceutical Benefits Scheme for only two-thirds of the recording period.

Table 9.2: Most frequently prescribed medications

Generic drug	Number	Per cent of prescriptions	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Paracetamol	3,890	4.2	3.9	3.5	4.4
Amoxycillin	3,189	3.5	3.2	2.9	3.5
Cephalexin	2,174	2.4	2.2	2.0	2.4
Paracetamol+codeine	2,171	2.4	2.2	2.0	2.4
Celecoxib	2,121	2.3	2.1	1.9	2.4
Salbutamol	2,067	2.3	2.1	1.9	2.3
Amoxycillin+potassium clavulanate	1,680	1.8	1.7	1.4	1.9
Cefaclor monohydrate	1,631	1.8	1.6	1.3	2.0
Roxithromycin	1,593	1.7	1.6	1.4	1.8
Influenza virus vaccine	1,491	1.6	1.5	0.8	2.2
Temazepam	1,422	1.6	1.4	1.3	1.6
Levonorgestrel+ethinyloestradiol	1,202	1.3	1.2	1.1	1.4
Diclofenac sodium systemic	1,151	1.3	1.2	0.9	1.4
Betamethasone topical	1,038	1.1	1.0	0.9	1.2
Diazepam	1,034	1.1	1.0	0.9	1.2
Ranitidine	1,015	1.1	1.0	0.9	1.2
Atenolol	929	1.0	0.9	0.7	1.1
Doxycycline	914	1.0	0.9	0.7	1.1
Atorvastatin	899	1.0	0.9	0.8	1.0
Simvastatin	887	1.0	0.9	0.7	1.1
Budesonide topical nasal	876	1.0	0.9	0.7	1.1
Chloramphenicol eye	854	0.9	0.9	0.7	1.0
Metformin	817	0.9	0.8	0.6	1.0
Erythromycin	810	0.9	0.8	0.6	1.0
Warfarin sodium	782	0.9	0.8	0.6	1.0
Aspirin	781	0.9	0.8	0.6	1.0
Irbesartan	760	0.8	0.8	0.6	0.9
Prochlorperazine	738	0.8	0.7	0.6	0.9
Oxazepam	710	0.8	0.7	0.6	0.9
Amlodipine	695	0.8	0.7	0.5	0.9
Subtotal	*40,321*	*44.2*	*. .*	*. .*	*. .*
Total prescribed medications	**91,647**	**100.0**	**92.3**	**89.9**	**94.7**

(a) Column will not add to 100 because multiple prescriptions could be written at each encounter.

Note: LCL—lower confidence limit, UCL—upper confidence limit.

Distribution of medications prescribed by ATC medication group

Table 9.3 shows the distribution of prescribed medications using the WHO ATC classification (World Health Organization Collaborating Centre for Drug Statistics Methodology (WHO) 1997) as an alternative method of grouping. This allows comparison with other data classified in ATC such as those produced by the HIC.

With this classification analgesics were the most frequently prescribed group, followed by penicillins and non-steroidal anti-inflammatory drugs. Other beta-lactam antibacterials, principally cephalosporins, were fourth, followed by inhaled adrenergics and anti-depressants.

Table 9.3: Distribution of medications prescribed by ATC medication group

ATC medication group	Number	Per cent of prescriptions	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Other analgesics & antipyretics	7,059	7.7	7.1	6.6	7.6
Beta-lactam antibacterials penicillins	6,102	6.7	6.1	5.8	6.5
Anti-inflammatory/antirheumatic non-steroid	5,651	6.2	5.7	5.4	6.0
Other beta-lactam antibacterials	3,928	4.3	4.0	3.6	4.3
Adrenergics inhalants	3,080	3.4	3.1	2.9	3.3
Anti-depressants	3,029	3.3	3.1	2.8	3.3
ACE inhibitors–plain	2,900	3.2	2.9	2.7	3.1
Macrolides & lincosamides	2,734	3.0	2.8	2.5	3.0
Corticosteroids–plain	2,601	2.8	2.6	2.4	2.9
Viral vaccines	2,598	2.8	2.6	2.2	3.0
Cholesterol & triglyceride reducers	2,338	2.6	2.4	2.2	2.5
Other anti-asthmatic inhalants	2,317	2.5	2.3	2.1	2.5
Drugs for treatment of peptic ulcer	2,159	2.4	2.2	2.0	2.3
Anxiolytics	1,964	2.1	2.0	1.8	2.2
Hypnotics & sedatives	1,862	2.0	1.9	1.7	2.1
Hormonal contraceptives systemic	1,817	2.0	1.8	1.7	2.0
Beta blocking agents–plain	1,679	1.8	1.7	1.5	1.9
Oral blood glucose lowering drugs	1,648	1.8	1.7	1.4	1.9
Selective calcium channel blockers	1,563	1.7	1.6	1.4	1.8
Opioids	1,401	1.5	1.4	1.2	1.6
Antipsychotics	1,334	1.5	1.3	1.2	1.5
Decongestants & other nasal preparations	1,285	1.4	1.3	1.1	1.5
Corticosteroids for systemic use—plain	1,204	1.3	1.2	1.1	1.4
Angiotensin II antagonists—plain	1,186	1.3	1.2	1.0	1.3
Anti-infectives	1,154	1.3	1.2	1.0	1.3

(continued)

Table 9.3 (continued): Distribution of medications prescribed by ATC medication group

ATC medication group	Number	Per cent of prescriptions	Rate per 100 encounters[(a)]	95% LCL	95% UCL
Tetracyclines	1,136	1.2	1.1	1.0	1.3
Antithrombotic agents	962	1.0	1.0	0.8	1.2
Oestrogens	951	1.0	1.0	0.8	1.1
Propulsives	806	0.9	0.8	0.6	1.0
Corticosteroids & anti-infectives	755	0.8	0.8	0.6	0.9
Subtotal	*69,204*	*75.5*	*. .*	*. .*	*. .*
Total medications prescribed	**91,647**	**100.0**	**92.3**	**89.9**	**94.7**

(a) Column will not add to 100 because multiple prescriptions could be written at each encounter.

Note: UCL—upper confidence limit, LCL—lower confidence limit.

9.3 Medications advised for over-the-counter purchase

The total number of medications recorded as recommended by the GP for over-the-counter purchase was 8,906, a rate of 9.0 per 100 encounters and 6.2 per 100 problems managed. At least one medication was recorded as advised at 8.0% of encounters and for 5.6% of problems.

Types of medications advised

Medications advised by major groups

Central nervous system medications predominated in those advised to patients, with almost one-third of the advised medications being in this group. They were followed by respiratory medications and those in the skin and digestive medication groups (Figure 9.8).

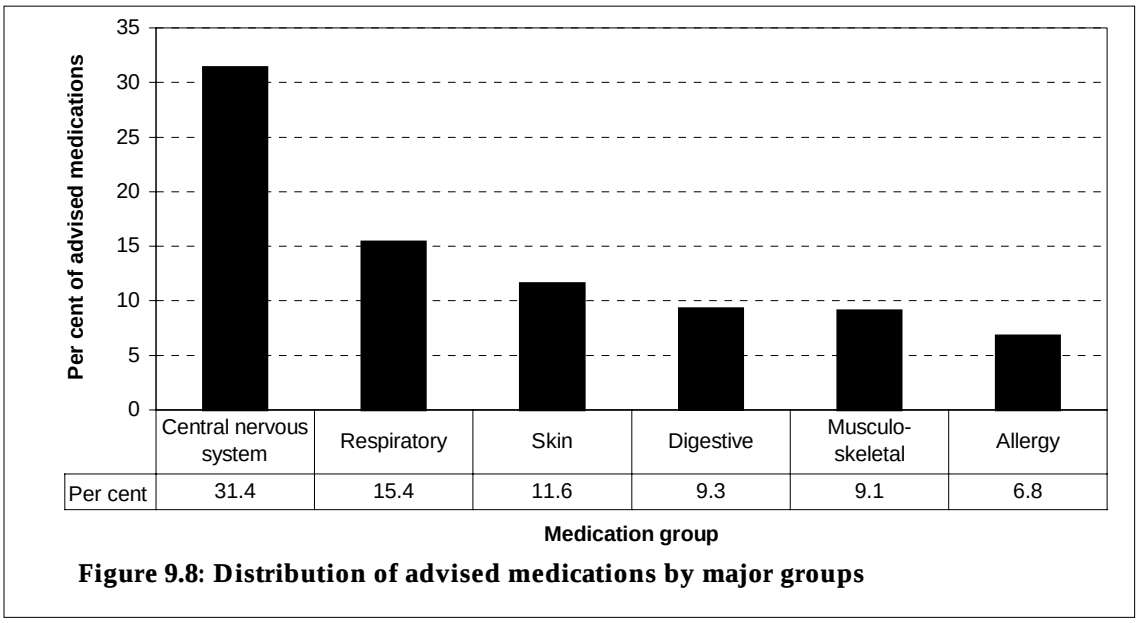


Figure 9.8: Distribution of advised medications by major groups

The distribution of the most frequently advised medications by generic name shows that paracetamol was the most common, accounting for 26.3% of all advised over-the-counter medications (Table 9.4). Although other medications were advised in relatively small numbers, the range of medications was wide. Most frequent of these included analgesics, cold relievers, anti-histamines and skin preparations. The 30 medications listed in this table accounted for two-thirds of all over-the-counter medications advised.

Table 9.4: Most frequently advised over-the-counter medications

Generic medication	Number	Per cent of OTCs	Rate per 100 encounters	95% LCL	95% UCL
Paracetamol	2,338	26.3	2.4	1.8	2.9
Ibuprofen	470	5.3	0.5	0.2	0.8
Loratadine	244	2.7	0.2	0.0	0.6
Clotrimazole topical	215	2.4	0.2	0.0	0.5
Chlorpheniramine+pseudoephidrine	205	2.3	0.2	0.0	0.7
Paracetamol+codeine	186	2.1	0.2	0.0	0.5
Brompheniramine+phenylephrine	184	2.1	0.2	0.0	0.7
Diclofenac diethyl topical	165	1.9	0.2	0.0	0.6
Pseudoephedrine	156	1.7	0.2	0.0	0.6
Aspirin	146	1.6	0.1	0.0	0.5
Fexofenadine	138	1.5	0.1	0.0	0.5
Clotrimazole vaginal	133	1.5	0.1	0.0	0.4
Sodium+potassium+citric-glucose	117	1.3	0.1	0.0	0.6
Pholcodine	117	1.3	0.1	0.0	0.6
Sorbolene+glycerol+cetomac	103	1.2	0.1	0.0	0.5
Chlorpheniramin+phenylephrine	101	1.1	0.1	0.0	0.5
Cetirzine	71	0.8	0.1	0.0	0.5
Bromhexine	70	0.8	0.1	0.0	0.6
Sodium citrotartrate+tartaric acid	69	0.8	0.1	0.0	0.4
Promethazine hydrochloride	66	0.7	0.1	0.0	0.4
Loperamide	65	0.7	0.1	0.0	0.5
Cinchocaine+hydrocortisone	64	0.7	0.1	0.0	0.4
Sodium chloride topical nasal	62	0.7	0.1	0.0	0.9
Vitamin C (ascorbic acid)	58	0.6	0.1	0.0	1.2
Hyoscine butylbromide	58	0.6	0.1	0.0	0.6
Cream/ointment/lotion NEC	57	0.6	0.1	0.0	0.4
Calamine lotion	57	0.6	0.1	0.0	0.4
Codeine+paracetamol+pseudoephedrine	56	0.6	0.1	0.0	0.6
Simethicone+magnesium+aluminium hydroxide	55	0.6	0.1	0.0	0.4
Subtotal	*5,826*	*65.1*	. .	. .	. .
Total medications advised	**8,906**	**100.0**	**9.0**	**8.1**	**9.8**

Note: OTCs—over the counter medications, LCL—lower confidence limit, UCL—upper confidence limit, NEC—not elsewhere classified.

9.4 Medications supplied by general practitioners

General practitioners supplied their patients with a total of 6,847 medications in this study, at a rate of 6.9 medications per 100 encounters and 4.7 per 100 problems. At least one medication was supplied at 5.1% of encounters and for 3.8% of problems.

Types of medications supplied by GPs

Medications supplied by GPs by major groups

The distribution of supplied medications by group showed that those acting on the allergy / immune system constituted almost one-third of all medications supplied. This result probably reflects the direct GP supply of childhood vaccines in most parts of Australia. Central nervous system medications made up 11.5% and cardiovascular medications 9.1% of GP-supplied medications (Figure 9.9).

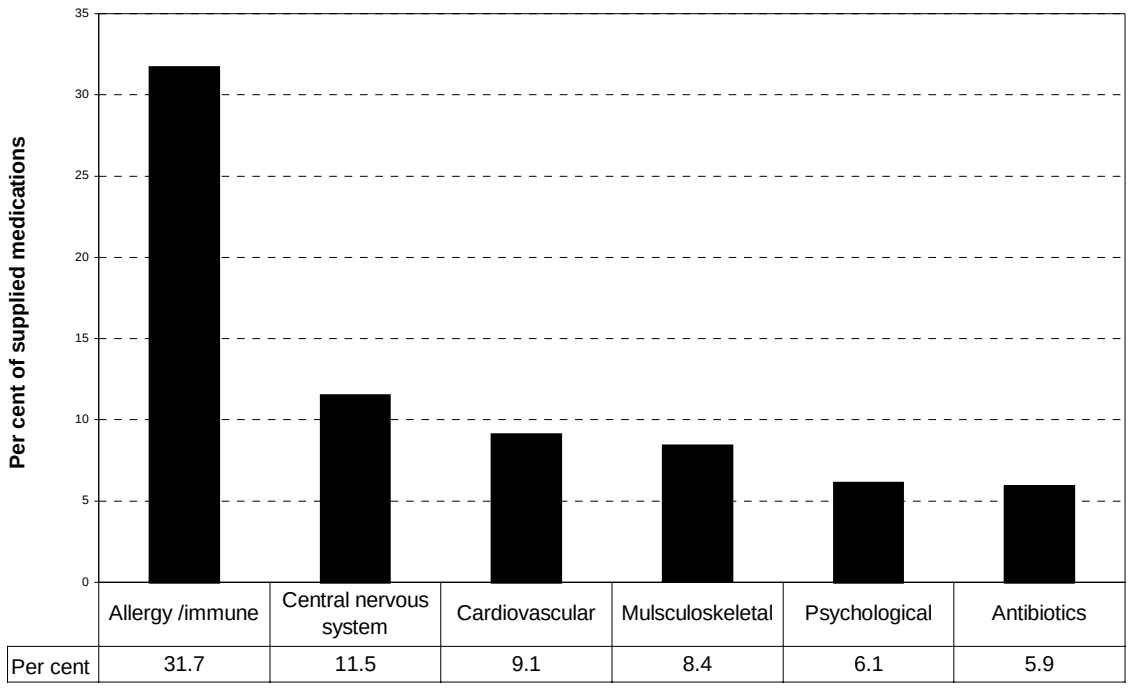


Figure 9.9: Distribution of GP-supplied medications by major groups

Of the top five most common medications supplied by the GP, four were vaccines, principally influenza virus vaccine, which accounted for 8.6% of GP-supplied medications (Table 9.5). There was a wide spread of other medications supplied, mostly prescription medications, presumably from manufacturers' sample packs. They reflect a range of medications which may be needed acutely in a situation (such as out of pharmacy hours) where prescription medications cannot be obtained from other sources or where cost is an issue. The most common of these was the recently released non-steroidal anti-inflammatory drug (NSAID) Celecoxib, accounting for 4.8% of all medications supplied.

Table 9.5: Medications most frequently supplied by GPs

Generic medication	Number	Per cent of GP-supplied	Rate per 100 encounters	95% LCL	95% UCL
Influenza virus vaccine	587	8.6	0.6	0.0	1.4
Celecoxib	328	4.8	0.3	0.0	0.7
Polio vaccine oral sabin/injection	258	3.8	0.3	0.0	0.6
Triple antigen(diphtheria+pertussis+tetanus)	227	3.3	0.2	0.0	0.7
Haemophilus b vaccine	210	3.1	0.2	0.0	0.6
Metoclopramide	163	2.4	0.2	0.0	0.8
ADT/CDT (diphtheria+tetanus) vaccine	156	2.3	0.2	0.0	0.4
Mumps+measles+rubella vaccine	153	2.2	0.2	0.0	0.5
Hepatitis B vaccine	152	2.2	0.2	0.0	0.5
Paracetamol	121	1.8	0.1	0.0	1.1
Prochlorperazine	119	1.7	0.1	0.0	0.9
Salbutamol	98	1.4	0.1	0.0	0.8
Paracetamol+codeine	95	1.4	0.1	0.0	0.9
Pethidine hydrochloride	95	1.4	0.1	0.0	0.5
Levonorgestrel+ethinyloestradiol	76	1.1	0.1	0.0	0.6
Rofecoxib	71	1.0	0.1	0.0	0.8
Promethazine hydrochloride	65	1.0	0.1	0.0	0.8
Amoxycillin	64	0.9	0.1	0.0	2.1
Sertraline	64	0.9	0.1	0.0	0.5
Vitamin B12 (Cyanocobalamin)	62	0.9	0.1	0.0	0.7
Diphtheria+pertussis+tetanus+hepatitis B	59	0.9	0.1	0.0	0.6
Diazepam	58	0.9	0.1	0.0	1.0
Morphine sulphate	56	0.8	0.1	0.0	0.8
Cephalexin	55	0.8	0.1	0.0	0.9
Omeprazole	50	0.7	0.1	0.0	0.6
Diclofenac sodium systemic	47	0.7	0.0	0.0	1.1
Hepatitis A vaccine	45	0.7	0.0	0.0	0.8
Irbesartan	44	0.6	0.0	0.0	0.6
Fluticasone propionate	41	0.6	0.0	0.0	0.7
Methylprednisolone	40	0.6	0.0	0.0	0.5
Subtotal	*3,659*	*53.5*	. .	. .	. .
Total medications supplied	**6,847**	**100.0**	**6.9**	**5.7**	**8.1**

Note: LCL—lower confidence limit, UCL—upper confidence limit.

9.5 Changes in medication rates between 1998–99, 1999–00 and 2000–01

Changes over time in medication rates per 100 encounters were investigated. The medications were grouped according to recommended use (e.g. medications for treating hypertension, medications for treating depression). Within these broad therapeutic groups the specific medications were further divided into pharmaceutical classes according to ATC classification (e.g. ACE inhibitors, calcium channel blockers). Trends over time in the use of each medication class within each therapeutic group of drugs were analysed using linear regression. All medications whether prescribed, advised for over-the-counter purchase, or supplied by the GP, were included.

The Taylor linearisation method was used to calculate robust standard errors that allow for the design effect of the cluster sampling (SAS Institute Inc. 1999). Test statistics and p-values based on the robust standard error are more conservative than those that are calculated without taking the design effect into account. Thus the robust standard error provides a more stringent test of significant changes over time.

Where there was a significant increase over time in the medication rates the analysis was performed again, adjusting for age and sex of encounters to examine whether demographic differences across the 3 years were confounding the estimates.

In the following analyses, changes in rates of selected medications are extrapolated to provide an estimate of the Australia-wide increase in the annual number of times the medication would have been prescribed, supplied or advised (where applicable). Note that this extrapolation does not provide an estimate of the increase in the number of prescriptions that cross the pharmacist's counter, as the number of repeats ordered by the GP has not been considered in these estimates.

Some of the medication types for which a significant change in prescribing rates are identified here, have been selected for more detailed investigation of the relationship between changes in and changes in medication rates, and changes problems management rates (see Chapter 7, Section 7.3). These analyses are reported in Chapter 14.

Medications for treatment of hypertension

Medications included in the analysis of pharmacological treatment of hypertension included the antihypertensives (ATC class C02), calcium channel blockers (C08), angiotensin II antagonists (C09C, C09D), ACE inhibitors (C09A, C09B) and beta-blocking agents (C07).

Although the medication rates for the hypertension medications listed above (combined) remained steady over time at around 9.2 medications per 100 encounters, there were significant trends in the rates of particular classes of hypertension medications.

There was a significant increase over time in the rates of angiotensin II antagonists, from 0.68 medications per 100 patient encounters in 1998–99 to 1.56 medications per 100 encounters in 2000–01 ($p < 0.0001$). This represents an estimated increase per year of 450,000 extra angiotensin II antagonist medications prescribed or supplied by GPs in Australia. This increase was offset by slight decreases in the rates of calcium channel blockers ($p < 0.0009$), ACE inhibitors ($p = 0.046$) and antihypertensives ($p < 0.0001$). Rates for beta-blockers remained steady over time. Adjusting for age and sex did not alter these results.

Medications for treatment of depression

Medications included in the analysis of the pharmacological treatment of depression were the serotonin reuptake inhibitors (SSRIs) (ATC code N06AB), tricyclic anti-depressants (N06AA) and the monoamine oxidase inhibitors (N06AF, N06AG).

The overall rate of these depression medications remained steady over time at around 3.1 medications per 100 encounters. There was a significant increase in the rate of SSRI medications, from 1.49 per 100 encounters in 1998–99 to 1.87 per 100 encounters in 2000–01 ($p < 0.0001$). This represented an estimated annual increase of 185,000 additional times on which SSRI medications were prescribed or supplied in general practice in Australia. The increase in rates of SSRIs was offset by significant decreases in the rates for tricyclic anti-depressants ($p < 0.0001$) and monoamine oxidase inhibitors ($p = 0.003$). Adjusting for age and sex did not alter the effect of time on rates of the anti-depressant medications.

Medications for treatment of peptic ulcer

The trend analysis for medications designed for the treatment of peptic ulcer included plain proton pump inhibitors (ATC group A02BC), proton pump inhibitor combinations for the treatment of helicobacter pylori (A02BD), and the H_2-receptor antagonists (A02BA).

The overall rates for medications designed for the treatment of peptic ulcer remained steady over time at around 2.3 medications per 100 encounters. Rates of PPIs and H_2-receptor antagonists remained unchanged over time at 0.7 and 1.6 per 100 encounters respectively.

Non-steroidal anti-inflammatory drugs (NSAIDs)

The analysis for non-steroidal anti-inflammatory drugs was based on the ATC group M01A, including the coxibs (M01AH) and all other NSAIDs (the remainder of M01A). There was a significant increase in the overall rate of prescription or supply of NSAIDs (as a group) over time, from 5.0 per 100 encounters in 1998–99 to 6.8 per 100 encounters in 2000–01, an average increase of 0.9 medications per 100 encounters per year ($p < 0.0001$). The Cox–2 inhibitors were not available in 1998–99. In 1999-00 they were available on private prescription and they came on to the PBS in the middle of the third BEACH data year. The increase in Cox–2 inhibitors was explained by this wider availability. Their rate of prescription / supply in 1999–00 was 0.3 per 100 encounters. This rate rose to 2.7 per 100 encounters in 2000–01 ($p < 0.0001$). The increase in the coxib annual medication rate is therefore likely to be an underestimate of the total increase had these medications been available on the PBS for the full year.

There was evidence of some substitution of coxibs for other NSAIDs, as the rate of non-specific NSAIDs decreased significantly from 5.0 per 100 encounters in 1998–99 to 4.1 per 100 encounters in 2000–01 ($p < 0.0001$). Note that these data include only eight months of availability of coxibs on the PBS.

Blood serum lipid-lowering agents

Analysis of medication rates for the blood serum lipid-lowering agents centred on the cholesterol and triglyceride reducers (ATC group C10A), in particular the HMG CoA reductase inhibitors or ‘statins’ (C10AA).

There was a significant increase over time in the rates of lipid-lowering medications, from 2.0 per 100 encounters in 1998–99 to 2.4 per 100 encounters in 2000–01 ($p = 0.0007$). This increase was accounted for by an increase in the rate of statin medications which rose from 1.9 per 100 encounters in 1998–99 to 2.3 per 100 encounters in 2000–01 ($p = 0.0001$). This represented an estimated national annual increase of 412,000 times that the GP prescribed one of these medications.

Asthma inhalants

The investigation of changes over time for asthma medications concentrated on the adrenergic and other inhalants (ATC codes R03A, R03B). The inhalants were classified as either preventive inhalants or as bronchodilaters / spasm relaxants according to CAPS (see Chapter 2, Section 2.6).

There was a significant decrease in overall asthma inhalant medication rates over time, from 6.2 medications per 100 encounters in 1998–99 to 5.7 per 100 encounters in 2000–01 ($p = 0.02$). All of this decrease occurred in the period 1999–00 to 2000–01. The decrease was accounted for by a decrease in medication rates for bronchodilaters from 3.9 per 100 encounters in 1998–99 to 3.4 per 100 encounters in 2000–01 ($p = 0.002$). Medication rates for asthma preventive inhalants have remained steady at around 2.4 per 100 encounters.

A more detailed investigation of the relationship between some of these changes in medication rates and the associated morbidity management rates is provided in Chapter 14.

10 Non-pharmacological management

For each problem managed, GPs could record up to two non-pharmacological treatments provided at the encounter. These were divided into two categories:

- clinical treatments: including general and specific advice, counselling or education, family planning and administrative processes. Non-pharmacological treatments classified as 'clinical' are listed in Appendix 4.
- procedural treatments, which encompassed all procedures carried out by general practitioners such as excision of skin lesion or application / removal of plaster cast.

Observations of the patient such as measurements of blood pressure, regarded as routine clinical measurements, were not included in the data collection program.

Non-pharmacological treatments were often provided by general practitioners to manage patient morbidity. A total of 49,072 were recorded for the year, a rate of 49.4 per 100 encounters and 34.2 per 100 problems managed. A breakdown of the non-pharmacological treatments showed that clinical treatments were three times more common than procedures (Table 10.1).

Table 10.2 shows the proportion of problems for which at least one non-pharmacological treatment was given. Pharmacological and non-pharmacological treatments were often combined to manage the presenting problem. However, for more than half of the problems that were managed with at least one non-pharmacological treatment (30% of problems), no pharmacological treatment was provided.

One in five problems was managed with a clinical treatment and for less than one in ten problems, the GP used a procedural treatment. The results presented in Table 10.2 indicate that problems managed with a clinical treatment were more likely to have concomitant pharmacological treatment than were problems managed a procedure (69.8% compared with 54.2%).

The rate of total non-pharmacological treatments per 100 encounters has significantly increased since the first year of BEACH (April 1998 to March 1999) from a rate of 43.2 per 100 encounters to 47.1 per 100 in 1999–00 ($p < 0.001$).

Table 10.1: Summary of non-pharmacological treatments

	Number	Rate per 100 encs	95% LCL	95% UCL	Rate per 100 problems	95% LCL	95% UCL
Non-pharmacological treatments	49,072	49.4	47.1	51.7	34.2	32.7	35.7
Clinical treatments	36,978	37.2	35.1	39.3	25.8	24.4	27.1
Procedural treatments	12,094	12.2	11.6	12.8	8.4	8.0	8.9

Note: Encs—encounters, UCL—upper confidence limit, LCL—lower confidence limit.

Table 10.2: Relationship of non-pharmacological management with pharmacological treatments

Co-management of problems with non-pharmacological treatments	Number of problems	Per cent within class	Per cent of problems (*n* = 143,528)	95% LCL	95% UCL
At least one non-pharmacological treatment	42,601	100.0	29.7	28.5	30.9
without pharmacological treatment	24,856	58.3	17.3	16.6	18.0
At least one clinical treatment	32,600	100.0	22.7	21.6	23.8
without pharmacological treatment	17,667	54.2	12.3	11.7	12.9
At least one procedural treatment	11,411	100.0	8.0	7.6	8.4
without pharmacological treatment	7,969	69.8	5.6	5.2	5.9

Note: LCL—lower confidence limit, UCL—upper confidence limit.

10.1 Clinical treatments

Number of clinical treatments at encounter

The total number of clinical treatments provided by GPs was 36,978, at a rate of 37.2 per 100 encounters (Table 10.1). GPs were more likely to provide 'clinical' treatments than 'procedural' in managing problems presented by patients.

Use of clinical treatment increased significantly from the 1998–99 rate of 31.4 per 100 encounters to 35.1 per 100 encounters in 1999–00 ($p < 0.001$).

Most frequent clinical treatments

There were three clinical treatments that were commonly provided by GPs. These were advice and education regarding the treatment of the patient's problem (11.9% of total non-pharmacological treatments), advice and education in general (11.7%) and advice/counselling pertaining to nutrition and weight (11.3%). Together this group accounted for one-third (34.9%) of all non-pharmacological treatments.

Treatment advice was provided at a rate of 5.9 per 100 encounters, and general advice/education was given at a rate of 5.8 and nutrition advice at a rate of 5.6 per 100 encounters. Counselling about the problem being managed (3.4 per 100 encounters) psychological counselling (2.8) and advice/education concerning medication (2.6) were also provided frequently. Table 10.3 lists a range of clinical treatments provided in order of decreasing frequency. These relate to various aspects of health such as medication and alcohol use, smoking, exercise, lifestyle, and occupational and relationship issues.

Problems managed with clinical treatments

A total of 32,600 problems included a clinical treatment as part of their management. The ten most common accounted for almost one-third (30.7%) of all problems for which a clinical treatment was provided.

Table 10.3: Problems most frequently managed with clinical treatment

Treatment	Number	Per cent of non-pharmacological treatments	Rate per 100 encounters (*n* = 99,307)	95% LCL	95% UCL
Advice/education—treatment*	5,839	11.9	5.9	5.1	6.6
Advice/education*	5,749	11.7	5.8	5.1	6.5
Counsel/advice—nutrition/weight*	5,531	11.3	5.6	4.9	6.2
Counselling—problem*	3,346	6.8	3.4	2.8	3.9
Counselling—psychological*	2,823	5.8	2.8	2.5	3.2
Advice/education—medication*	2,569	5.2	2.6	2.2	3.0
Counsel/advice—exercise*	2,139	4.4	2.2	1.7	2.6
Reassurance, support	1,523	3.1	1.5	1.1	2.0
Other admin/document*	1,442	2.9	1.5	1.2	1.7
Sickness certificate	1,078	2.2	1.1	0.4	1.8
Counsel/advice—smoking*	796	1.6	0.8	0.6	1.0
Observe/wait*	656	1.3	0.7	0.0	2.0
Counsel/advice—alcohol*	434	0.9	0.4	0.2	0.7
Counsel/advice—health/body*	431	0.9	0.4	0.0	0.8
Counsel/advice—relaxation*	351	0.7	0.4	0.1	0.6
Family planning*	318	0.7	0.3	0.1	0.6
Counsel/advice—lifestyle*	315	0.6	0.3	0.0	0.9
Counsel/advice—drug abuse*	314	0.6	0.3	0.0	1.5
Counsel/advice—prevention*	304	0.6	0.3	0.0	0.6
Counsel/advice—relationship*	285	0.6	0.3	0.0	0.6
Subtotal	*36,242*	*73.9*	. .	. .	. .
Total clinical treatments	**36,978**	**75.4**	**37.2**	**35.1**	**39.3**
Total non-pharmacological treatment	**49,072**	**100.0**	**49.4**	**47.1**	**51.7**

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 4).

Note: LCL—lower confidence limit, UCL—upper confidence limit.

The problem most often managed with a clinical treatment was depression (5.6% of problems managed with a clinical treatment), followed by URTI (5.2%), hypertension (4.4%) and lipid disorder (3.1%) (Table 10.4).

The two right-hand columns in Table 10.4 show the extent to which a clinical treatment was used for that problem and the relationship between the use of a clinical treatment and a medication. It can be seen that almost 50.0% of depression contacts were managed with a clinical treatment (usually psychological counselling) and, of these, 44.2% were not given a prescription as part of the treatment. Likewise, 47.7% of anxiety was managed with a clinical treatment and 60.0% of these did not receive a medication. Asthma was less likely to be managed with a clinical treatment (20.3%) and less likely to be managed with a clinical treatment and no prescription (23.8%).

Table 10.4: The ten problems most frequently managed with a clinical treatment

Problem managed	Number	Per cent of problems with clinical treatment	Rate per 100 encounters[a] (*n* = 99,307)	95% LCL	95% UCL	Per cent this problem[b]	Per cent of treated problems no meds[c]
Depression*	1,808	5.5	1.8	1.6	2.1	49.9	44.2
Acute upper respiratory infection	1,699	5.2	1.7	1.4	2.1	24.8	41.5
Hypertension*	1,419	4.4	1.4	1.0	1.8	16.6	41.3
Lipid disorder	1,017	3.1	1.0	0.8	1.3	35.2	62.5
Diabetes*	885	2.7	0.9	0.7	1.1	31.8	55.5
Anxiety*	785	2.4	0.8	0.6	1.0	47.7	60.0
Sprain/strain*	630	1.9	0.6	0.4	0.9	31.2	53.9
Back complaint*	598	1.8	0.6	0.4	0.8	23.3	46.9
Gastroenteritis, presumed infection	595	1.8	0.6	0.3	0.9	54.6	57.1
Asthma	573	1.8	0.6	0.4	0.8	20.3	23.8
Subtotal	*10,009*	*30.7*	*. .*	*. .*	*. .*	*. .*	*. .*
Total problems	**32,600**	**100.0**	**32.8**	**31.1**	**34.5**	**22.7**	**64.6**

(a) Rate of provision of clinical treatment for selected problem per 100 total encounters.

(b) Per cent of contacts with this problem that generated at least one clinical treatment.

(c) Per cent of contacts with problems that generated at least one clinical treatment without the provision of pharmacological treatment.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence limit, UCL—upper confidence limit, meds–medications.

10.2 Procedures

Number of procedures at encounter

Procedures included therapeutic actions and diagnostic procedures undertaken by the GP. ICPC–2 codes were grouped across ICPC–2 chapters for this analysis due to small numbers within each chapter. There were 12,094 procedures recorded, at a rate of 12.2 per 100 encounters (Table 10.1). The procedural codes and groupings are listed in Appendix 5.

Most frequent procedures

Table 10.5 lists the most frequent procedures. The most common procedure was the excision or removal of tissue (including destruction, debridement or cauterisation). It accounted for 5.3% of all non-pharmacological treatments and occurred at a rate of 2.6 per 100 encounters. This was followed by physical medicine or rehabilitation (including physiotherapy, massage and therapeutic exercises) which occurred at a rate of 2.0 per 100 encounters, and accounted for 4.1% of all non-pharmacological treatments.

Diagnostic procedures included taking Pap smears, physical function tests such as peak flow readings, and electrical tracings. These results do not reflect the true rate of, for example, Pap smears because most diagnostic tests were recorded in the Investigation section of the recording form and are therefore described in Chapter 12, 'Investigations'.

Problems managed with a procedure

A total of 11,411 problems involved a procedure in their management. The top 10 problems accounted for 40.0% of all problems for which a procedure was reported. These problems were commonly associated with skin complaints, injuries of various types, musculoskeletal problems and female genital check-ups / Pap smears (Table 10.6).

The individual problems most frequently managed with a procedure were solar keratosis / sunburn (6.5% of problems managed by a procedure), followed by lacerations and cuts (5.7%), warts (4.6%), excessive ear wax (4.2%) and female genital check-ups / Pap smears (4.2%) (Table 10.5).

Again, the two columns on the right side of the table show the proportion of the problem that was treated with a procedure and the likelihood of the patient receiving a concomitant medication. Many of the problems that were managed with a procedure did not have a medication prescribed, advised or given. Sixty-five per cent of solar keratosis were managed with a procedure and of these 97.3% did not have a medication associated with them.

Table 10.5: Most frequent procedures

Treatment	Number	Per cent of non-pharmacological treatments	Rate per 100 encounters (*n* = 99,307)	95% LCL	95% UCL
Excision/removal tissue/biopsy/destruction/ debridement/cauterisation*	2,621	5.3	2.6	2.4	2.9
Physical medicine/rehabilitation*	1,993	4.1	2.0	1.6	2.4
Dressing/pressure/compression/tamponade*	1,764	3.6	1.8	1.6	2.0
Other procedures/surgery NEC*	1,115	2.3	1.1	0.4	1.9
Incise/drain/flush/aspirate/remove body fluid*	1,047	2.1	1.1	0.9	1.2
Repair/fixation–suture/cast/prosthetic device (apply/remove)*	956	2.0	1.0	0.8	1.1
Pap smear	828	1.7	0.8	0.6	1.1
Physical function test*	457	0.9	0.5	0.0	1.0
Electrical tracings*	349	0.7	0.4	0.1	0.6
Subtotal	*11,128*	*22.7*	*. .*	*. .*	*. .*
Total procedures	**12,094**	**24.7**	**12.2**	**11.6**	**12.8**
Total non-pharmacological treatments	**49,072**	**100.0**	**49.4**	**47.1**	**51.7**

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 5).

Note: LCL—lower confidence limit, UCL—upper confidence limit, NEC–Not elsewhere classified.

Table 10.6: The ten problems most frequently managed with a procedure

Problem managed	Number	Per cent of problems with procedure	Rate per 100 encounters[a] (*n* = 99,307)	95% LCL	95% UCL	Per cent of this problem[b]	Per cent of treated problems no meds[c]
Solar keratosis/sunburn	699	6.1	0.7	0.4	1.0	65.0	97.3
Female genital check-up/Pap smear*	532	4.7	0.5	0.3	0.8	36.7	96.6
Sprain/strain*	518	4.5	0.5	0.2	0.8	25.6	55.5
Laceration/cut	507	4.4	0.5	0.4	0.7	66.8	77.0
Excessive ear wax	490	4.3	0.5	0.3	0.6	75.4	92.4
Warts	472	4.1	0.5	0.3	0.7	68.4	96.3
Back complaint*	393	3.5	0.4	0.1	0.7	15.3	52.9
Malignant neoplasm skin	352	3.1	0.4	0.1	0.6	42.0	96.5
Chronic ulcer skin (incl. varicose ulcer)	327	2.9	0.3	0.1	0.5	62.9	79.5
Fracture*	276	2.4	0.3	0.1	0.5	26.0	73.6
Subtotal	*4,565*	*40.0*	. .	. .	. .	. .	. .
Total problems	**11,411**	**100.0**	**11.5**	**10.9**	**12.1**	**8.0**	**69.8**

(a) Rate of provision of procedural treatment for selected problem per 100 total encounters.

(b) Per cent of contacts with this problem that generated at least one procedural treatment.

(c) Per cent of contacts with problems that generated at least one procedural treatment, without the provision of pharmacological treatment.

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence limit, UCL—upper confidence limit, meds–medications.

11 Referrals and admissions

A referral is defined as the process by which the responsibility for part or all of the care of a patient is temporarily transferred to another health care provider. Only new referrals arising at the encounter were included (i.e. continuations were not recorded). For each problem managed, GPs could record up to two referrals. These included referrals to specialists, to allied health professionals, to hospitals for admission or to an emergency department. Referrals to hospital outpatient clinics were classified as specialist referrals.

11.1 Number of referrals and admissions

The patient was given at least one referral at 9.9% of all and for 6.9% of all problems managed. More than one referral could be recorded at an encounter. As a result, there were 10,366 referrals made at a rate of 10.4 per 100 encounters. The most frequent were referrals to a medical specialist (7.4 per 100 encounters), followed by referrals to allied health services (2.3 per 100). Very few patients were referred to hospital for admission (0.5 per 100 encounters) or to the emergency department of a hospital (0.1 per 100). For every 100 problems managed, 5.1 referrals to a specialist were made, and 1.6 were made to an allied health professional (Table 11.1).

Table 11.1: Summary of referrals and admissions

	Number	Rate per 100 encounters	95% LCI	95% UCI	Rate per 100 problems	95% LCL	95% UCL
At least one referral	9,862	9.9	9.6	10.3	6.9	6.6	7.1
Referrals	10,366	10.4	10.0	10.8	7.2	7.0	7.5
Specialist	7,326	7.4	7.1	7.7	5.1	4.9	5.3
Allied health service	2,313	2.3	2.1	2.5	1.6	1.5	1.7
Hospital	499	0.5	0.3	0.7	0.4	0.2	0.5
Emergency department	92	0.1	0.0	0.4	0.1	0.0	0.3
Other referrals	137	0.1	0.0	0.6	0.1	0.0	0.4

Note: LCL—lower confidence limit, UCL—upper confidence limit.

11.2 Most frequent referrals

Of the 10,366 referrals, 98.6% (*n* = 9,639) were referrals to specialists or allied health services. The top ten provider types in each category accounted for 67.3% of all referrals to medical specialists and 78.6% of those to allied health services respectively (Table 11.2). Note that this table does not show referrals where the GP did not specify the type of provider—e.g. *'referral to specialist'* (2.9% of all referrals) and *'referral health professional'* (1.4%).

Table 11.2: Most frequent referrals to specialists and allied health professionals

Professional to whom patient referred	Number	Per cent of all referrals	Per cent of referral group	Rate per 100 encounters (*n* = 104,856)	95% LCL	95% UCL
Medical specialist	**7,326**	**74.9**	**100.0**	**7.4**	**7.1**	**7.7**
Referral; surgeon	714	7.3	9.7	0.7	0.6	0.8
Referral; orthopaedic surgeon	670	6.9	9.1	0.7	0.5	0.8
Referral; ophthalmologist	642	6.6	8.8	0.7	0.5	0.8
Referral; dermatologist	594	6.1	8.1	0.6	0.5	0.7
Referral; gynaecologist	544	5.6	7.4	0.6	0.4	0.7
Referral; ENT	513	5.2	7.0	0.5	0.4	0.6
Referral; cardiologist	368	3.8	5.0	0.4	0.2	0.5
Referral; gastroenterologist	321	3.3	4.4	0.3	0.2	0.5
Referral; urologist	283	2.9	3.9	0.3	0.1	0.4
Referral; psychiatrist	267	2.8	3.6	0.3	0.1	0.5
Subtotal: top ten specialist referrals	*4,927*	*51.1*	*67.3*	*. .*	*. .*	*. .*
Allied health and other professionals	**2,313**	**23.7**	**100.0**	**2.3**	**2.1**	**2.5**
Referral; physiotherapy	946	9.7	40.9	1.0	0.8	1.1
Referral; dentist	156	1.6	6.7	0.2	0.0	0.4
Referral; psychologist	152	1.6	6.6	0.2	0.0	0.4
Referral; podiatrist/chiropodist	132	1.4	5.7	0.1	0.0	0.4
Referral; acoustic testing	108	1.1	4.7	0.1	0.0	0.3
Referral; dietitian/nutrition	103	1.1	4.5	0.1	0.0	0.4
Referral; optometrist	74	0.8	3.2	0.1	0.0	0.5
Referral; drug & alcohol	57	0.6	2.5	0.1	0.0	0.6
Referral; counsellor	46	0.5	2.0	0.1	0.0	0.4
Referral; chiropractor	43	0.5	1.9	0.0	0.0	0.5
Subtotal: top ten allied health referrals	*1,817*	*18.9*	*78.6*	*. .*	*. .*	*. .*
Total specialist & allied health referrals	**9,639**	**100.0**	**. .**	**9.7**	**9.3**	**10.1**

Note: LCL—lower confidence limit, UCL—upper confidence limit.

The most frequent referrals made to specialist medical practitioners were to surgeons (9.7% of all referrals to medical specialists), orthopaedic surgeons (9.1%), ophthalmologists (8.8%) and dermatologists (8.1%).

The majority of referrals to allied health services were to physiotherapists, which accounted for 40.9% of referrals of this type, and 9.7% of all referrals, followed by referrals to dentists (1.6% of all referrals), psychologists (1.6%), and podiatrists and chiropodists (1.4%) (Table 11.2).

11.3 Problems that were referred

A referral to a medical specialist was provided for a total of 7,460 problems managed. The ten problems most commonly associated with a referral to a medical specialist accounted for 18.5% of all problems associated with specialist referrals. The problems most often referred to a specialist were malignant neoplasms of the skin, pregnancy, and depression (Table 11.3). Each one of these accounted for 2.3% of all problems associated with a specialist referral.

Table 11.3: The ten problems most frequently referred to a medical specialist

Problem managed	Number	Per cent of problems referred	Rate per 100 encounters (*n* = 99,307)	95% LCL	95% UCL
Malignant neoplasm skin	172	2.3	0.2	0.0	0.4
Pregnancy*	171	2.3	0.2	0.0	0.4
Depression*	170	2.3	0.2	0.0	0.4
Diabetes*	147	2.0	0.2	0.0	0.4
Back complaint*	146	2.0	0.2	0.0	0.4
Osteoarthritis*	126	1.7	0.1	0.0	0.4
Oesophageal disease	122	1.6	0.1	0.0	0.4
Ischaemic heart disease*	117	1.6	0.1	0.0	0.3
Menstrual problems*	108	1.5	0.1	0.0	0.4
Acute internal damage knee	102	1.4	0.1	0.0	0.4
Subtotal: top ten problems referred to a medical specialist	1,381	18.5	. .	. .	. .
Total problems	**7,460**	**100.0**	**7.5**	**7.2**	**7.8**

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: UCL—upper confidence limit, LCL—lower confidence limit.

Referrals to allied health services were fewer in number (2,313), possibly because formal referrals to such services are not always required. There were 2,362 problems referred to an allied health professional or service. Table 11.4 shows the ten problems most commonly referred, which accounted for 40.6% of all problems referred to allied health services.

Sprains and strains were the problem type most frequently referred to allied health services (9.6% of problems referred), followed by back complaint (8.5%). Depression (4.6%), teeth / gum disease (3.8%) and diabetes (3.1%) also featured in the top ten problems referred to allied health and other services. Note that depression, diabetes and back complaints were referred relatively frequently to both allied health professionals and to medical specialists.

Of the 527 referrals for hospital admission, the problems under management were often acute in nature. Although the numbers involved are very small, it is interesting to note the types of problems for which hospital admission was sought. These included fractures (6.0% of problems referred for admission), appendicitis (3.3%) and asthma (2.3%). Cardiovascular problems such as heart failure, stroke and ischaemic heart disease were also referred for hospital admission. Referrals to psychiatric units / hospitals were included in this category (2.2%) (Table 11.5). and these were often associated with depression.

11.4 Changes in referral rates over time

There was a significant decrease in the rate of referral to allied health professionals between 1998–99 (3.0 per 100 encounters, 95% CI: 2.8–3.2) and 2000–01 (2.3 95% CI: 2.1–2.5). However, this was probably due to a change in classification, which moved referral for ECG from referral to an allied health professional to imaging.

Table 11.4: The ten problems most frequently referred to allied health services

Problem managed	Number	Per cent of problems referred	Rate per 100 encounters (*n* = 99,307)	95% LCL	95% UCL
Sprain/strain*	226	9.6	0.2	0.0	0.4
Back complaint*	201	8.5	0.2	0.0	0.4
Depression*	108	4.6	0.1	0.0	0.3
Teeth/gum disease	89	3.8	0.1	0.0	0.4
Diabetes*	74	3.1	0.1	0.0	0.5
Osteoarthritis*	60	2.5	0.1	0.0	0.4
Injury musculoskeletal NOS	54	2.3	0.1	0.0	0.5
Neck syndrome (incl. osteoarthritis)	52	2.2	0.1	0.0	0.3
Shoulder syndrome (incl. arthritis, osteoarthritis)	50	2.1	0.1	0.0	0.4
Anxiety*	44	1.9	0.0	0.0	0.4
Subtotal: top ten problems referred to AHP	*958*	*40.6*	*. .*	*. .*	*. .*
Total problems	**2,362**	**100.0**	**2.4**	**2.2**	**2.6**

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: UCL—upper confidence limit, LCL—lower confidence limit, NOS—not otherwise specified

Table 11.5: The ten most common problems referred to hospital

Problem managed	Number	Per cent of problems managed	Rate per 100 encs (*n* = 99,307)	95% LCL	95% UCL
Fracture*	31	6.0	0.03	0.0	0.5
Appendicitis	17	3.3	0.02	0.0	0.6
Asthma	12	2.3	0.01	0.0	0.8
Heart failure	12	2.3	0.01	0.0	0.7
Depression*	12	2.2	0.01	0.0	0.9
Pneumonia	11	2.0	0.01	0.0	0.6
Abdominal pain*	10	1.9	0.01	0.0	0.7
Stroke/cerebrovascular accident	10	1.9	0.01	0.0	0.8
Ischaemic heart disease*	10	1.9	0.01	0.0	0.6
Skin infection, other	10	1.8	0.01	0.0	0.7
Subtotal top ten problems referred for admission	*135*	*25.6*	*. .*	*. .*	*. .*
Total problems	**527**	**100.0**	**0.53**	**0.3**	**0.7**

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).

Note: Encs—encounters, UCL—upper confidence limit, LCL—lower confidence limit.

12 Investigations

The GPs participating in the study were asked to record (in free text) any pathology, imaging or other tests ordered or undertaken at the encounter and to nominate the patient problem(s) associated with each test order placed. This allows the linkage of test orders to a single problem or multiple problems. Up to five orders for pathology and two for imaging and other tests could be recorded at each encounter. A single test may have been ordered for the management of multiple problems and multiple tests may have been used in the management of a single problem.

A pathology test order may be for a single test (e.g. Pap smear, HbA1C) or for a battery of tests (e.g. lipids, FBC). Where a battery of tests was ordered, the battery name was recorded rather than each individual test. GPs also recorded the body site for any imaging ordered (e.g. x-ray chest, CT head).

There were no tests recorded at the vast majority (80.7%) of encounters. At least one pathology order was recorded at 13.8% of encounters (for 10.6% of problems managed), at least one imaging test was ordered at 6.8% of encounters (for 4.8% of problems managed) and at least one other investigation was ordered at 0.6% of encounters (for 0.4% of problems managed) (Table 12.1).

Table 12.1: Number of encounters and problems where pathology, imaging or other tests ordered

	Number of encs	Per cent of encs	95% LCL	95% UCL	Number of problems	Per cent of problems	95% LCL	95% UCL
Pathology, imaging and other investigations ordered	1,659	1.7	1.5	1.8	1,271	0.9	0.8	1.0
Pathology only ordered	12,012	12.1	11.7	12.5	13,924	9.7	9.4	10.0
Imaging only ordered	5,391	5.4	5.2	5.7	6,856	4.8	4.6	5.0
Other investigations only ordered	380	0.4	0.2	0.6	565	0.4	0.3	0.5
No tests ordered	80,133	80.7	80.1	81.3	122,181	85.1	84.7	85.6
Total (N)	**99,307**	**100.0**	**. .**	**. .**	**143,528**	**100.0**	**. .**	**. .**
At least one pathology ordered	13,671	13.8	13.3	14.3	15,196	10.6	10.2	10.9
At least one imaging ordered	6,720	6.8	6.5	7.1	6930	4.8	4.6	5.0
At least one other investigation	568	0.6	0.4	0.8	616	0.4	0.3	0.5

Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

12.1 Pathology ordering

A comprehensive report on pathology ordering by general practitioners in Australia in 1998 written by the GP Statistics and Classification Unit using BEACH data was published on the Internet by the Diagnostics and Technology Branch of the Department of Health and Aged Care during 2000 (Britt et al. 1999a). For a more detailed study of pathology ordering, consult that publication; readers may wish to compare those results with the information presented below.

Nature of pathology orders at encounter

There were 29,225 orders for a pathology test (or battery of tests) and these were made at a rate of 29.4 per 100 encounters. Table 12.2 provides a summary of the different types of pathology tests that were ordered by the participating GPs.

The pathology tests recorded were grouped according to the categories set out in Appendix 7. The main pathology groups reflect those used in previous analyses of pathology tests recorded by the HIC (Health Insurance Commission (HIC) 2000).

The top four pathology test groups were Chemistry, Haematology, Microbiology and Cytology and together these accounted for over 90% of all pathology test orders. The fifth largest group was Other NEC (other pathology test orders that could not be classified elsewhere), which made up 3.7% of all pathology test orders. The size of this group was in part due to the non-specificity of the recording of some pathology orders by some GPs (e.g. blood test).

The largest of the groups, Chemistry, accounted for 52.3% of all tests and was recorded at a rate of 15.4 per 100 encounters. Within this group the most frequently ordered test was lipids (21.5%) followed by glucose (13.3%). Full blood count (67.4%) was the largest group within Haematology and urine, microscopy, culture and sensitivity (urine MC&S) (34.1%) was the largest in Microbiology.

The most frequently ordered test types were full blood count; lipids; glucose; liver function; electrolytes, urea and creatinine (EUC), urine MC&S, and Pap smear tests. Full blood counts accounted for 13.0% of tests and were ordered at a rate of 3.8 per 100 encounters. Pap smears accounted for 4.9% of all tests and made up the greater proportion of the Cytology group (96.6%). Lipid tests were ordered at a rate of 3.3 per 100 encounters (Table 12.2).

Problems associated with pathology tests

Table 12.3 describes, in decreasing order of frequency, the most common problems under management for which pathology was ordered.

There were 15,196 problems to which pathology tests were linked (Table 12.1). The three problems accounting for the highest number of pathology tests ordered were lipid disorder (6.4% of problems managed with a pathology order), hypertension (6.2%), diabetes (5.9%), weakness / tiredness general (4.2%), and female genital check-up (including Pap smear) (3.9%). This is not surprising given the distribution of pathology tests described in the previous table. However, the last two columns of the table provide some interesting contrasts. The second last column shows the per cent of contacts (with the selected problem) that resulted in an order for pathology. The last column shows the number of test orders placed when contact with the selected problem resulted in pathology tests.

Hypertension was the most common problem managed in general practice and there were 8,560 hypertension problems recorded in the data set (6.0% of problems). Diabetes problems (1.9% of problems) occurred far less frequently. However, diabetes problems accounted for almost as many pathology tests as did hypertension. There were 1,674 test orders (5.9%) associated with diabetes and 1,752 test orders (6.2%) associated with hypertension. This is explained by the fact that 26.5% of diabetes contacts resulted in a pathology test compared with 8.6% of contacts with hypertension.

Table 12.2: Distribution of pathology orders across pathology groups and most frequent individual test orders within group

Pathology test ordered	Number	Per cent of all pathology	Per cent of group	Rate per 100 encs (*n* = 99,307)	95% LCL	95% UCL
Chemistry	**15,292**	**52.3**	**100.0**	**15.4**	**14.6**	**16.2**
Lipids	3,292	11.3	21.5	3.3	3.0	3.6
Glucose—all*	2,033	7.0	13.3	2.1	1.8	2.3
Liver function	1,954	6.7	12.8	2.0	1.7	2.2
Electrolytes, urea & creatinine	1,879	6.4	12.3	1.9	1.6	2.2
Thyroid function	1,313	4.5	8.6	1.3	1.2	1.5
Multibiochemical analysis	1,168	4.0	7.6	1.2	0.7	1.7
Hormone assay	803	2.8	5.3	0.8	0.6	1.1
HbA1C	605	2.1	4.0	0.6	0.4	0.8
Ferritin	575	2.0	3.8	0.6	0.4	0.8
Prostate-specific antigen	460	1.6	3.0	0.5	0.3	0.6
Haematology	**5,628**	**19.3**	**100.0**	**5.7**	**5.3**	**6.0**
Full blood count	3,793	13.0	67.4	3.8	3.6	4.1
Erythrocyte sedimentation rate	849	2.9	15.1	0.9	0.7	1.1
Coagulation	758	2.6	13.5	0.8	0.6	0.9
Microbiology	**4,432**	**15.2**	**100.0**	**4.5**	**4.2**	**4.7**
Urine MC&S	1,513	5.2	34.1	1.5	1.4	1.7
Hepatitis serology	556	1.9	12.6	0.6	0.3	0.9
Microbiology; other	308	1.1	7.0	0.3	0.1	0.5
Vaginal swab and C&S	300	1.0	6.8	0.3	0.0	0.6
Faeces MC&S	278	1.0	6.3	0.3	0.1	0.5
HIV	260	0.9	5.9	0.3	0.1	0.4
Chlamydia	165	0.6	3.7	0.2	0.0	0.5
Cytology	**1,493**	**5.1**	**100.0**	**1.5**	**1.2**	**1.8**
Pap smear	1,442	4.9	96.6	1.5	1.2	1.7
Other NEC	**1,079**	**3.7**	**100.0**	**1.1**	**0.8**	**1.3**
Other NEC; other	445	1.5	41.2	0.5	0.2	0.6
Other NEC; blood test	412	1.4	38.2	0.4	0.0	1.0
Infertility/pregnancy	**270**	**0.9**	**100.0**	**0.3**	**0.0**	**0.6**
Histopathology	**444**	**1.5**	**100.0**	**0.5**	**0.2**	**0.7**
Histology; skin	351	1.2	79.1	0.4	0.1	0.6
Immunology	**539**	**1.9**	**100.0**	**0.5**	**0.3**	**0.8**
Immunology; other	216	0.7	40.0	0.2	0.0	0.5
Simple test; other	**46**	**0.2**	**100.0**	**0.1**	**0.0**	**0.5**
Total pathology tests	**29,225**	**100.0**	**100.0**	**29.4**	**28.2**	**30.7**

Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

Weakness / tiredness was not a problem label that ranked in the top thirty problems managed in general practice, yet it ranked fourth highest in the problems associated with pathology ordering. This is because the decision to order a pathology test for weakness / tiredness was relatively frequent (48.8% of contacts generating an order) and where such a decision was made, multiple pathology tests were likely (averaging 348.9 test orders per 100 problems). The problem label of female genital check-up / Pap smear, and the associated Pap smear test, provide a useful contrast as multiple tests were rarely ordered.

Table 12.3: The ten problems for which pathology was most frequently ordered

Problem managed	Number of problems	Number of problem/path combinations[(a)]	Per cent of problem/path combinations	Per cent of problems with test[(b)]	Rate of path orders per 100 problems with pathology[(c)]
Lipid disorder	2,889	1,800	6.4	30.4	204.7
Hypertension*	8,560	1,752	6.2	8.6	237.1
Diabetes*	2,785	1,674	5.9	26.5	226.6
Weakness/tiredness general	702	1,196	4.2	48.8	348.9
Female genital check-up/ Pap smear*	1,448	1,116	3.9	69.3	111.1
General check-up *	1,610	1,070	3.8	28.1	236.6
Urinary tract infection*	1,534	968	3.4	53.8	117.3
Blood test NOS	198	463	1.6	78.3	299.2
Pregnancy*	795	461	1.6	34.1	170.1
Anaemia*	609	450	1.6	32.8	224.9
Sub-total	21,131	10,950	36.5	. .	. .
Total	**143,528**	**29,972**	**100.0**	**10.6**	**192.3**

(a) A test was counted more than once if it was ordered for the management of more than one problem at an encounter. There were 29,225 pathology test orders and 29,972 problem/pathology combinations.

(b) The percentage of contacts with the problem which generated at least one order for pathology.

(c) The rate of pathology orders placed per 100 contacts with that problem generating at least one order for pathology.

* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).

Note: Path—pathology order, NOS—not otherwise specified.

12.2 Imaging ordering

A comprehensive report on imaging orders by general practitioners in Australia in 1999–00 written by the GP Statistics and Classification Unit using Beach data was published by the AIHW in 2001 (Britt et al. 2001). Readers wishing a more detailed study of imaging orders should consult that publication and may wish to compare those results with the information presented below.

Table 12.4: The most frequent imaging tests ordered

Imaging test ordered	Number	Per cent of tests	Per cent of group	Rate per 100 encs	95% LCL	95% UCL
Diagnostic radiology	**4,779**	**62.6**	**100.0**	**4.8**	**4.6**	**5.1**
X-ray; chest	979	12.8	20.5	1.0	0.9	1.1
X-ray; knee	424	5.6	8.9	0.4	0.3	0.6
Mammography	354	4.6	7.4	0.4	0.2	0.5
X-ray; foot/feet	222	2.9	4.6	0.2	0.1	0.4
X-ray; hip	211	2.8	4.4	0.2	0.0	0.4
X-ray; shoulder	202	2.6	4.2	0.2	0.0	0.4
X-ray; ankle	190	2.5	4.0	0.2	0.0	0.4
X-ray; spine; lumbosacral	177	2.3	3.7	0.2	0.0	0.4
X-ray; spine; cervical	149	1.9	3.1	0.2	0.0	0.4
X-ray; wrist	144	1.9	3.0	0.1	0.0	0.4
X-ray; hand	132	1.7	2.8	0.1	0.0	0.4
Test; densiometry	123	1.6	2.6	0.1	0.0	0.4
X-ray; spine; lumbar	112	1.5	2.3	0.1	0.0	0.4
X-ray; abdomen	98	1.3	2.1	0.1	0.0	0.4
X-ray; finger(s)/thumb	97	1.3	2.0	0.1	0.0	0.3
X-ray; spine; thoracic	77	1.0	1.6	0.1	0.0	0.4
Scan; bone(s)	74	1.0	1.6	0.1	0.0	0.4
X-ray; elbow	73	1.0	1.5	0.1	0.0	0.4
Ultrasound	**2,104**	**27.6**	**100.0**	**2.1**	**2.0**	**2.3**
Ultrasound; pelvis	414	5.4	19.7	0.4	0.2	0.6
Ultrasound; abdomen	241	3.2	11.5	0.2	0.1	0.4
Ultrasound; breast	193	2.5	9.2	0.2	0.0	0.4
Ultrasound; shoulder	155	2.0	7.4	0.2	0.0	0.4
Ultrasound; obstetric	124	1.6	5.9	0.1	0.0	0.5
Ultrasound; renal tract	118	1.6	5.6	0.1	0.0	0.4
Test; Doppler	107	1.4	5.1	0.1	0.0	0.3
Ultrasound	99	1.3	4.7	0.1	0.0	0.5
Ultrasound; abdomen upper	84	1.1	4.0	0.1	0.0	0.3
Computerised tomography	**675**	**8.8**	**100.0**	**0.7**	**0.6**	**0.8**
CT scan; brain	121	1.6	18.0	0.1	0.0	0.3
CT scan; head	94	1.2	13.9	0.1	0.0	0.4
CT scan; spine; lumbosacral	78	1.0	11.6	0.1	0.0	0.4
Nuclear medicine imaging	**41**	**0.5**	**100.0**	**0.0**	**0.0**	**0.4**
Magnetic resonance imaging	**33**	**0.4**	**100.0**	**0.0**	**0.0**	**0.4**
Total imaging tests	**7,632**	**100.0**	**. .**	**7.7**	**7.3**	**8.0**

Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

Nature of imaging orders at encounter

There were 7,632 orders for imaging and these were made at a rate of 7.7 per 100 encounters. At least one imaging test was ordered at 6.8% of encounters and for 4.8% of problems managed. The imaging tests recorded were grouped into one of five categories—Diagnostic radiology, Ultrasound, Computerised tomography, Nuclear medicine imaging and Magnetic resonance imaging (Appendix 8). Diagnostic radiology made up almost two thirds (62.6%) of all imaging tests, Ultrasound accounted for 27.6%, CT scanning 8.8%, Nuclear medicine 0.5% and MRI 0.4%.

Chest x-rays were by far the most common Diagnostic radiology (20.5%) while x-ray of the knee (8.9%) and mammography (7.4%) followed. Ultrasound was commonly of the pelvis (19.7%) abdomen (11.5%), or breast (9.2%). CT scans were most commonly performed on the brain (18.0%) or skull (13.9%) or on the lumbosacral spine (11.6%).

Overall the most frequently ordered imaging test was chest x-ray which accounted for 12.8% of all imaging and was ordered at a rate of 1.0 per 100 encounters. X-rays of the knee, the second most frequently ordered, accounted for 5.6% of all imaging tests and was ordered at a rate of 0.4 per 100 encounters (Table 12.4).

Problems associated with orders for imaging

Table 12.5 describes the problems for which an imaging test was most frequently ordered. They are presented in decreasing order of test frequency.

Table 12.5: The ten problems for which an imaging test was most frequently ordered

Problem managed	Number of problems	Number of problem/imaging combinations[(a)]	Per cent of problem/imaging combinations	Per cent of problems with test[(b)]	Rate of imaging orders per 100 tested problems[(c)]
Fracture*	1059	432	5.2	38.2	107.0
Back complaint*	2,568	402	4.8	13.9	112.7
Osteoarthritis*	2,499	370	4.5	13.3	111.6
Sprain/strain*	2,020	356	4.3	15.9	110.9
Abdominal pain*	590	183	2.2	29.2	106.2
Injury musculoskeletal NOS	677	168	2.0	22.6	109.5
Breast lump/mass (female)	168	161	1.9	66.8	143.5
Pain, chest NOS	256	134	1.6	41.6	125.7
Injury skin, other	655	132	1.6	17.8	113.1
Shoulder syndrome (incl. arthritis, osteoarthritis)	360	125	1.5	23.3	149.5
Subtotal	*10,852*	*2,463*	*29.6*	*. .*	*. .*
Total	**143,528**	**8,312**	**100.0**	**. .**	**. .**

(a) A test was counted more than once if it was ordered for the management of more than one problem at an encounter. There were 7,841 imaging test orders and 8,312 problem/imaging combinations.

(b) The percentage of contacts with the problem which generated at least one order for imaging.

(c) The rate of imaging orders placed per 100 contacts with that problem generating at least one order for imaging.

* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3). *Note:* NOS–Not otherwise specified.

There were 8,312 problem-imaging combinations. Six (including the top four) of the ten most common problems were related to the musculoskeletal system. The remaining problems were related to abdominal, breast, skin and chest problems.

Fracture, the most common problem for which imaging was ordered, accounted for 5.2% of all imaging and over one-third (38.2%) of contacts with a fracture resulted in an imaging order. Back complaint accounted for almost the same proportion of imaging orders (4.8%). However, only 13.9% of contacts with this problem resulted in an order for imaging.

The ordering of multiple imaging for a single problem was much less common than the ordering of multiple pathology. Breast lump / mass (female) had the highest rate of multiple test orders in the top ten problems, 143.5 tests being ordered for every 100 problems.

12.3 Other investigations ordered

There were 596 orders for other investigations and these were made at a rate of 0.6 per 100 encounters. At least one other investigation was ordered at 0.6% of encounters and for 0.4% of problems managed. Electrocardiograms were by far the most common investigation (58.3%) (ordered at a rate of 0.4 per 100 encounters), and stress test (6.0%), spirometry (5.8%) and Holter monitoring (5.7%) followed (Table 12.6).

Table 12.6: Most frequent other tests ordered

Test ordered	Number	Per cent of tests	Rate per 100 encs	95% LCL	95% UCL
Electrocardiogram	347	58.3	0.4	0.1	0.6
Electrocardiogram; stress test	36	6.0	0.0	0.0	0.4
Test; spirometry	35	5.8	0.0	0.0	0.5
Holter monitor	34	5.7	0.0	0.0	0.4
Test; audiometry	20	3.4	0.0	0.0	1.0
Subtotal	*472*	*79.2*	*. .*	*. .*	*. .*
Total other tests	**596**	**100.0**	**0.6**	**0.4**	**0.8**

Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

Problems associated with orders for other tests

Table 12.7 describes the problems most commonly under management when other investigations were ordered. They are presented in decreasing order of frequency of problem / test combinations. There were 608 problems to which other investigations were linked. Six of the ten most common problems were related to the cardiovascular system. The remaining problems were related to chest and psychological problems.

Chest pain, the most common problem for which other investigations were ordered, accounted for 10.7% of all tests. Nearly a quarter of contacts with this problem resulted in an investigation in this group. Ischaemic heart disease accounted for the almost the same proportion of test orders but only 3.8% of contacts with ischaemic heart disease resulted in a test order.

The ordering of multiple imaging for a single problem was very uncommon compared with the ordering of multiple pathology. Palpitations had the highest rate of multiple test orders in the top 10 problems, 114.2 tests being ordered for every 100 problems.

Table 12.7: The ten problems managed for which other tests were most frequently ordered

Problem managed	Number of problems	Number of problem/test combinations[(a)]	Per cent of problem/test combinations	Per cent of problems with test[(b)]	Rate of test orders per 100 tested problems[(c)]
Pain, chest NOS	256	65	10.7	24.3	104.5
Ischaemic heart disease*	1,279	49	8.0	3.8	100.0
General check-up*	1,610	42	6.9	2.4	107.7
Hypertension*	8,560	40	6.6	0.5	103.9
Palpitations/awareness of heart	121	23	3.9	16.9	114.2
Cardiac arrhythmia NOS	131	21	3.5	16.2	100.0
Chest symptom/complaint	188	21	3.5	11.2	100.0
Asthma	2,821	20	3.3	0.7	100.0
Atrial fibrillation/flutter	571	19	3.2	3.4	100.0
Anxiety*	1,645	16	2.6	0.9	110.6
Subtotal	*17,182*	*317*	*52.1*	*. .*	*. .*
Total	**143,528**	**608**	**100.0**	**. .**	**. .**

(a) A test was counted more than once if it was ordered for the management of more than one problem at an encounter. There were 596 other test orders and 608 problem/imaging combinations.

(b) The percentage of contacts with the problem which generated at least one order for other tests.

(c) The rate of other test orders placed per 100 contacts with that problem generating at least one order for other tests.

* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).

Note: NOS–Not otherwise specified

13 Patient risk factors

13.1 Background

General practice is commonly identified as a significant intervention point for health care and health promotion because general practitioners have considerable exposure to the health of the population. As about 80% of the population visit a GP in any one year (Commonwealth Department of Health and Aged Care (DHAC) 1996), general practice appears to provide a suitable basis from which to monitor many aspects of the health of the population.

Since BEACH began in April 1998 a section on the bottom of each encounter form has been allocated to investigate aspects of patient health or health care delivery not covered by general practice consultation-based information. These additional substudies are referred to as the SAND (Supplementary Analysis of Nominated Data). Each organisation supporting the BEACH program has access to a subsample of 6,000 encounter forms per year in which to insert a series of questions (or two sets of questions in two smaller samples) on a subject of their choice as the SAND questions.

13.2 Methods

The third annual BEACH data collection period was divided into ten blocks of 5 weeks. Each block included data from 100 GPs with 20 GPs recording per week. The recording pads of 100 forms were divided into three sections (40 A forms, 30 B forms and 30 C forms. Form A topic remained constant over the ten blocks, while Form B and Form C topics changed from block to block. The order of SAND sections in the GP recording pack is randomised, so that the 40 A forms may appear first, second or third in the pad. Randomised ordering of the components ensures that there is no order effect on the quality of the information collected.

The Form A topics contain questions about population risk factors including patient reported height and weight (for calculation of body mass index, BMI), alcohol use and smoking status. Patient self assessed wellbeing, collected and reported in the first 2 years of the BEACH study, was not collected in the current year.

The population risk factor questions for alcohol consumption, BMI and smoking status will remain constant in future years and these are now included in each annual report. Summaries of results for other topics covered in SAND are available to the general public on the FMRC web site www.fmrc.org.au\beach.htm.

13.3 Body mass index

The body mass index (BMI) for an individual is calculated by dividing weight (kilograms) by height (metres) squared. A person with a BMI that is less than 20 is considered underweight, 20–24 is normal, 25–29 overweight and more than 30 is considered to be obese.

The GPs were instructed to ask the patients (or their carer in the case of children):

- What is your height in centimetres?
- What is your weight in kilograms?

Metric conversion tables (feet and inches; stones and pounds) were provided to the GP.

There is considerable debate in the literature as to whether the standard BMI calculation described above is appropriate in the case of children. Cole et al. (2000) have developed a method which calculates age- and sex-specific BMI cut-off levels for overweight and obesity which are specific to children. The BEACH data on BMI is therefore presented separately for adults (aged 18 or over) and children. The standard BMI cut-offs have been applied for the adult population whereas the method described by Cole et al. (2000) has been used to calculate BMI cut-off levels for defining overweight and obesity in children aged between 2 and 18 years. This method is based on international data from developed Western cultures, and is therefore applicable within the Australian setting.

Body mass index of adult patients

BMI was calculated for 31,957 patients aged 18 years and over at encounters with 997 GPs. Overall, 20.2% (95% CI: 19.5–20.8) of these encounters were with patients considered obese, and 34.1% (95% CI: 33.4–34.7) were with those graded as overweight. A further 8.0% were with underweight patients and 37.8% were with patients whose BMI was in the normal range.

A greater proportion of males were overweight or obese (60.2%) than females (50.2%). The proportion of patients considered overweight or obese was greatest for males aged 45–64 years (Figure 13.1). These results are consistent with those of the 1995 National Nutrition Survey which estimated 64% of adult males and 49% of adult females were overweight or obese at that time (AIHW) 2000).

The patient was considered underweight at 8.0% (95% CI: 7.6–8.4) of adult encounters. In the 18–24 years age group, 21.6% of women and 10.9% of men were considered underweight, as were 14.0% of women and 6.4% of men in the 75 years and over age group (Figure 13.2). These estimates are almost four times those made from the general population in 1995 (underweight measured as BMI < 18.5) when only 3% of women and 1% of men were considered underweight and the prevalence in the 18–24 age group for females was about 6%.

In accepted clinical practice, GPs use a cut-off of BMI < 20 rather than < 18.5. to define ‘underweight’. The use of different underweight cut-off points between the two studies could account for the large difference between the BEACH results and those of the National Nutrition Survey. The BEACH data was therefore recalculated using the < 18.5 cut off The results were far more comparable to those from the Nutrition Survey, with 1.6% of adult males, 3.8% of adult females, and 8.1% of females aged 18–24 years, being underweight.

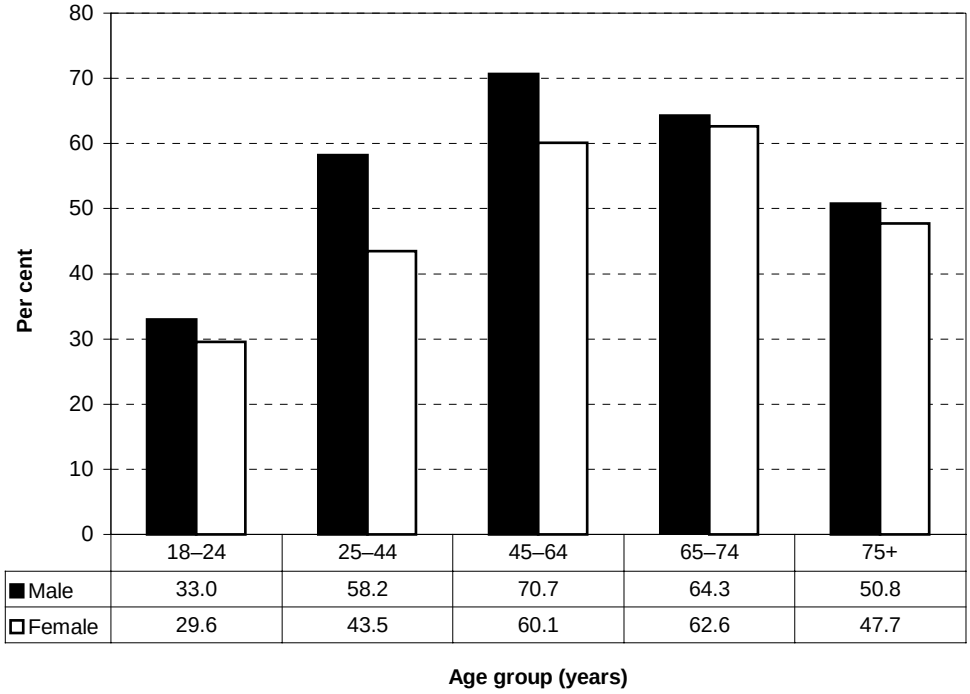


Figure 13.1: Age–sex-specific rates of overweight and obesity in adults

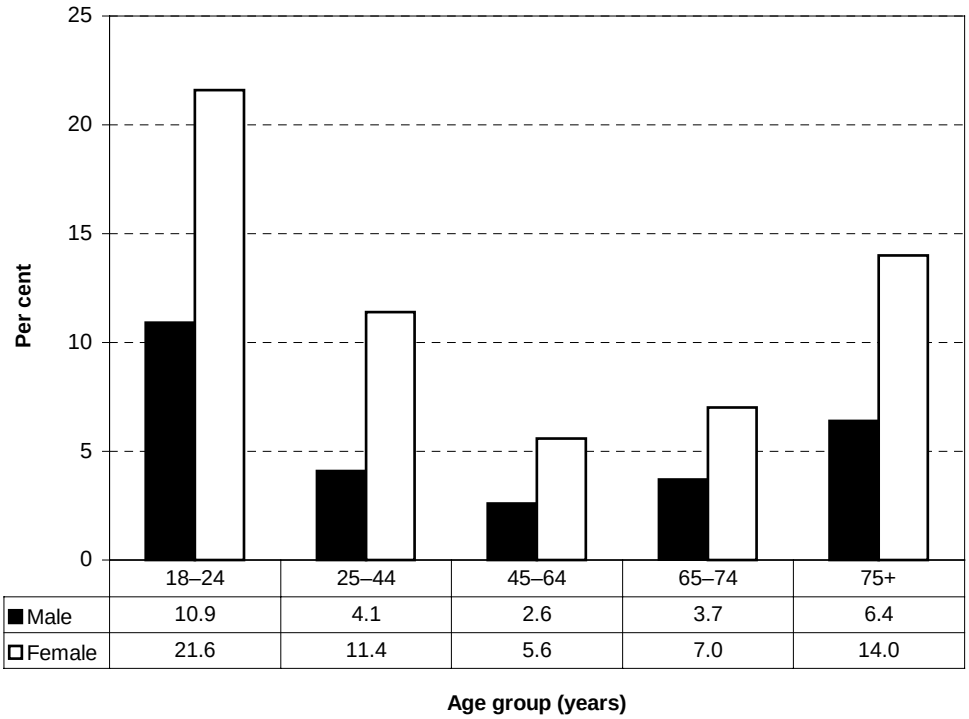


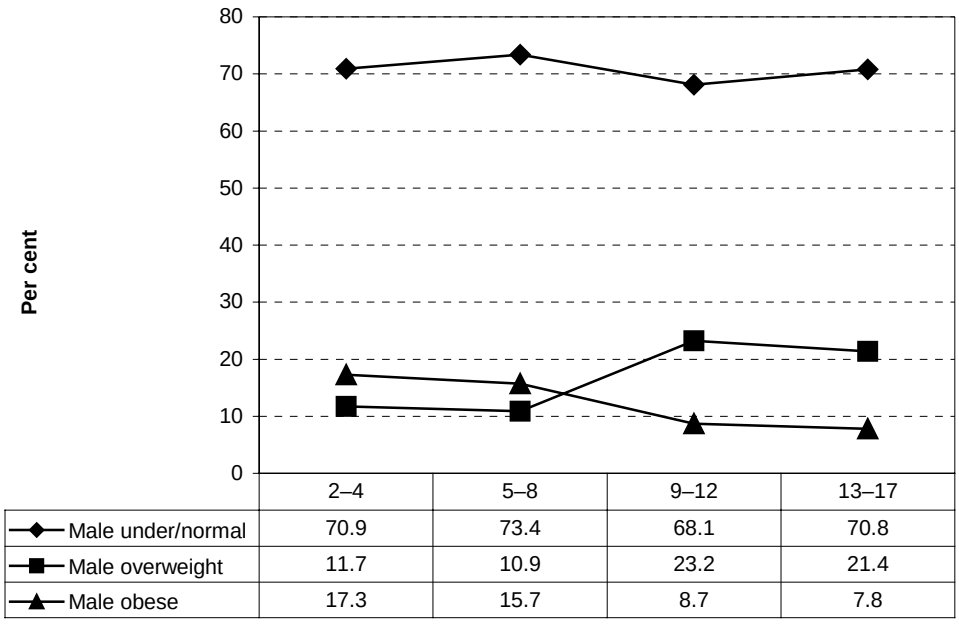
Figure 13.2: Age–sex-specific rates of underweight in adults

Body mass index of children attending general practice

BMI was calculated for 4,465 patients aged between 2 and 18 years at encounters with 911 GPs. Overall 11.7% (95% CI: 9.2–14.1) of these encounters were with children considered obese, and a further 15.3% (95% CI: 13.8–16.8) were with children defined as overweight. Of male children, 29.0% (95% CI: 26.0–32.0) were considered to be overweight or obese, compared with 25.5% (95% CI: 22.7–28.3) of female children.

Children aged 9–12 years were the most likely to be overweight or obese and this applied to both males (31.9%) and females (29.1%). In the adolescent age group (13–17 years) the rates of overweight and obesity were lower in both male (29.2%) and female (21.1%) patient groups, but the difference was more pronounced in the female population (Figures 13.3 and 13.4).

Now that this statistically rigorous and reliable method of defining overweight and obesity in children is being employed, it is anticipated that these figures for children will be a useful baseline for future comparisons.



	2–4	5–8	9–12	13–17
Male under/normal	70.9	73.4	68.1	70.8
Male overweight	11.7	10.9	23.2	21.4
Male obese	17.3	15.7	8.7	7.8

Figure 13.3: BMI in children—male age-specific rates

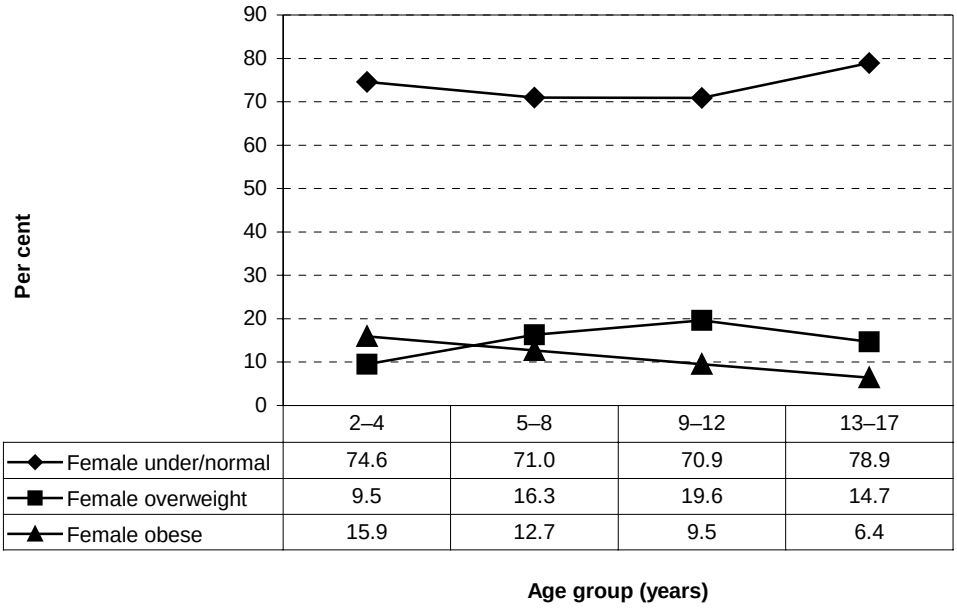


Figure 13.4: BMI in children—female age-specific rates

13.4 Smoking

The National Drug Strategy Household Survey estimated that 22% of the population aged 14 years and over are regular smokers, comprising 25% of Australian men and 20% of Australian women (AIHW 1999).

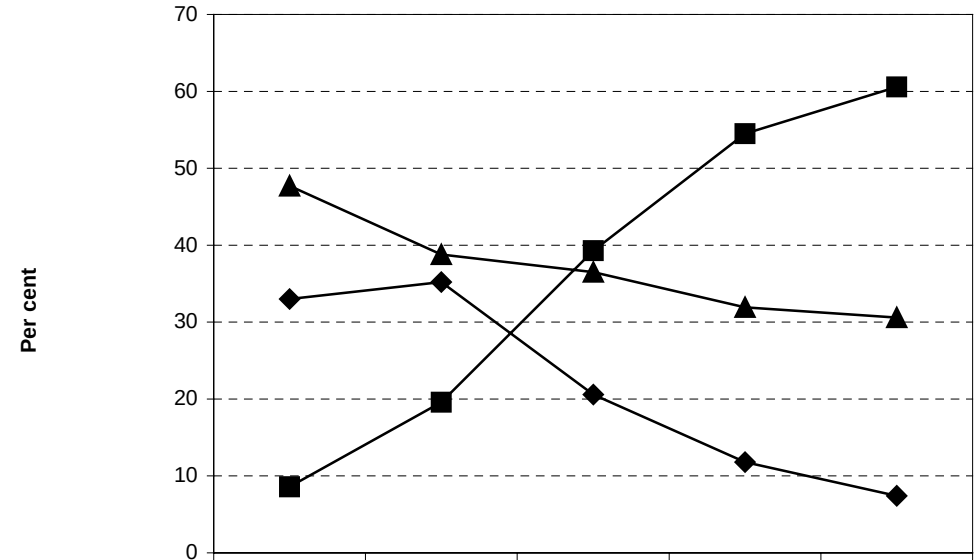
As part of the current study, the GPs were instructed to ask the patients (18+ years):

- What best describes your smoking status? Smoke daily; Occasional smoker; Previous smoker; Never smoked

Respondents were limited to adults aged 18 years and over as the reliability of information on smoking and alcohol consumption from patients aged 14–17 may be compromised if a parent is present at the consultation. There may also be ethical concerns about approaching this younger patient group to ask this information for survey purposes.

The smoking status of 32,124 adult patients aged 18 years and over was ascertained from encounters with 998 GPs. Overall, 19.3% (95% CI: 18.5–20.1) of patient encounters were with adults who were daily smokers, 4.4% (95% CI: 3.9–4.8) were with occasional smokers and 27.3% (95% CI: 26.5–28.0) were with previous smokers. A greater proportion of males (22.6%) than females (17.1%) were daily smokers. As shown in previous BEACH reports, the proportion of smokers decreased with age. Only 7.4% of male and 5.1% of female patients aged 75 years and over were daily smokers (Figures 13.5 and 13.6); however, 57% of males and 24% of females aged 65 years or more were previous smokers.

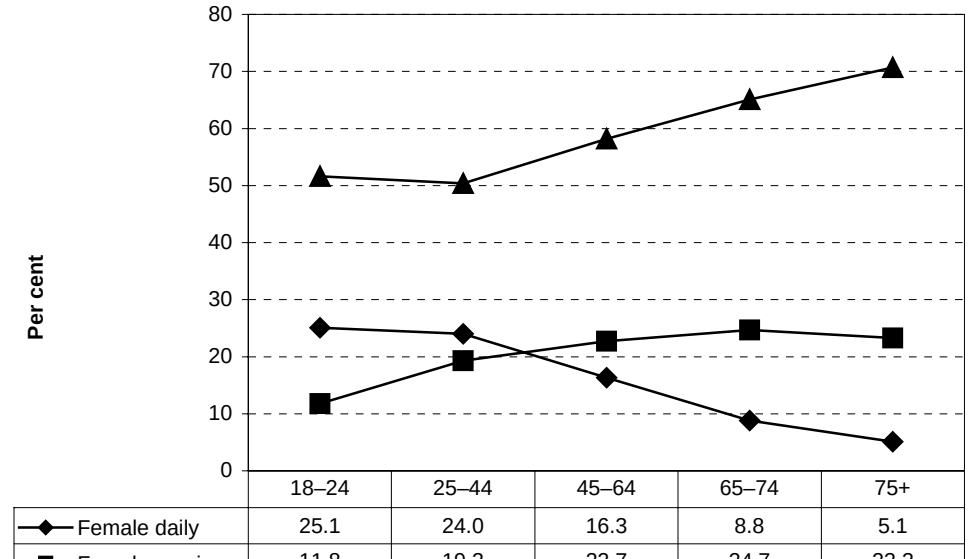
It is of some concern that currently about one in three young male and one in four young female patients are daily smokers, even after the considerable efforts made over the last decade to effect a decreased uptake of smoking.



	18–24	25–44	45–64	65–74	75+
Male daily	33.0	35.2	20.6	11.8	7.4
Male previous	8.6	19.6	39.3	54.5	60.6
Male never	47.7	38.8	36.5	31.9	30.6

Age group (years)

Figure 13.5: Smoking status—male age-specific rates



	18–24	25–44	45–64	65–74	75+
Female daily	25.1	24.0	16.3	8.8	5.1
Female previous	11.8	19.3	22.7	24.7	23.3
Female never	51.6	50.4	58.2	65.1	70.7

Age group (years)

Figure 13.6: Smoking status—female age-specific rates

13.5 Alcohol use

Alcohol use is the second leading cause of drug-related death in Australia after tobacco. National Health Priority Areas recognises alcohol as an important modifiable cause of premature death and disability in Australia (AIHW 2000). In 1993 Mattick and Jarvis estimated that of those people who consumed alcohol at all, 44% of males and 30% of females were drinking regularly to excessive levels (Mattick & Jarvis 1993). The 1998 National Drug Strategy Household Survey (NDSHS) estimated that between 7% and 16% of adult males, and between 4% and 10% of adult females, were drinking at hazardous or harmful levels. The latter figures are somewhat lower than the estimates from the 1995 ABS National Health Survey, of 15% for males and 13% for females (Mathers et al. 1999:109).

To measure alcohol consumption, BEACH uses three items from the WHO Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al. 1993), with slightly modified wording and scoring for an Australian setting (Centre for Drug and Alcohol Studies 1993). Together these three questions assess 'at-risk' alcohol use. The scores for each question range from 0 to 4. A score of 5+ for males or 4+ for females suggests that the person's drinking level is placing them at-risk.

GPs were instructed to ask the patient (18+ years):

- How often do you have a drink containing alcohol?
  Never
  Monthly or less
  Once a week
  2–4 times a week
  5+ times a week
- How many standard drinks do you have on a typical day when you are drinking? _____
- How often do you have 6 or more standard drinks on one occasion?
  Never
  Monthly or less
  Once a week
  2–4 times a week
  5+ times a week

A standard drinks chart was provided to each GP to help the patient identify the number of standard drinks consumed.

Responses to these questions were recorded at 31,543 patient encounters (18+ years) from 998 GPs.

Overall, 24.1% (95% CI: 23.3–24.9) of patient encounters were with adults who reported drinking 'at-risk' levels of alcohol. The proportion of at-risk drinkers was higher for male patients (30.3%, 95% CI: 29.2–31.4) than for female patients (19.9%, 95% CI: 19.1–20.8). The proportion of patients who were at-risk drinkers decreased with age for both males and females (Figure 13.7). These estimates are far higher than those made from the NDCHS and the 1995 ABS National Health Survey. If any conclusions are to be drawn about reasons for these differences in results, more detailed comparison of results will be required, with statistical adjustment for differences between the three studies, particularly in the age and gender distribution of respondents.

The proportion of adult male drinkers who were drinking at-risk levels of alcohol was estimated to be 38.6%. The corresponding figure for women was 31.4%. These estimates are similar to those of Mattick in 1993, though a little lower for males and a little higher for females (Mattick & Jarvis 1993).

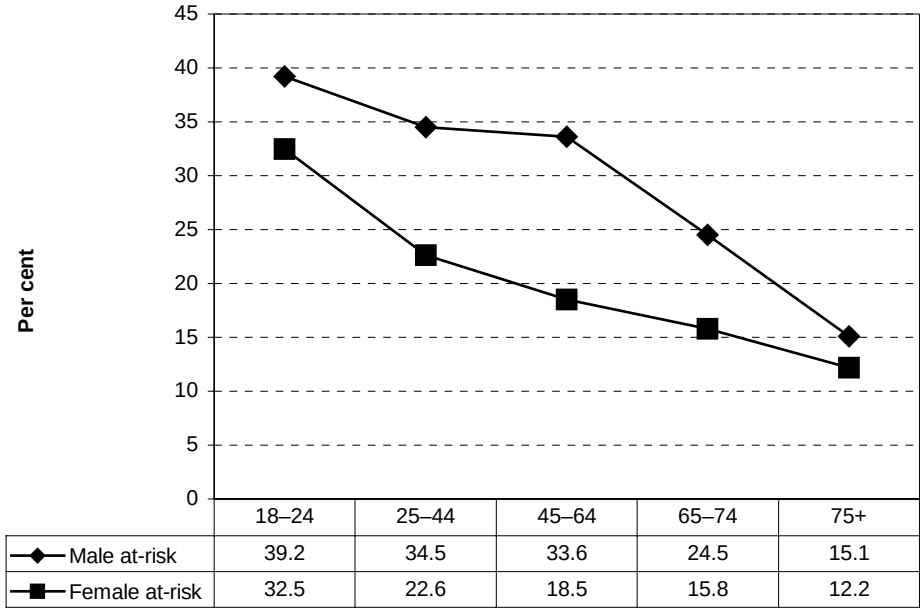


Figure 13.7: Age–sex-specific rates for at-risk alcohol use

13.6 Changes in patient health risk factors over the years 1998–99, 1999–00 and 2000–01

The proportion of adults attending general practice who were consuming at-risk levels of alcohol, and the proportion who said they were daily smokers showed no significant change with time over the first 3 years of the BEACH program. However, the proportion of adults who were classified as obese and the proportion classified as overweight according to their self-reported height and weight, showed a significant increase over the three years. The proportion classed as obese rose from 18.4% in 1998–99 to 20.2% in 2000–01 ($p < 0.0001$) and the proportion classed as overweight, from 32.8% to 34.1% ($p = 0.0039$).

Table 13.1: Comparative results for patient risk factors, 1998–99 to 2000–01

	BEACH 1998–99		BEACH 1999–00		BEACH 2000–01	
Risk factor	**Per cent**	**95% CI**	**Per cent**	**95% CI**	**Per cent**	**95% CI**
Obese	18.4	17.7–18.9	19.4	18.8–20.0	20.2	19.5–20.8
Overweight	32.8	32.1–33.4	33.1	32.5–33.8	34.1	33.4–34.7
Current daily smoker	19.2	18.4–20.0	18.9	18.2–19.6	19.3	18.5–20.1
At-risk alcohol level	24.5	23.6–25.3	24.2	23.4–24.9	24.1	23.3–24.9

14 Selected topics—changes over time

In Chapter 7 (Section 7.3) changes in the relative rates of management of common problems were reported. In Chapter 9 (Section 9.5) changes in medication rates for some selected medication groups of interest were also reported.

In this chapter, multiple linear regression is used to investigate changes in medication management of selected topics over time. The purpose was 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. This is the first opportunity to undertake these time trends analyses with BEACH data, as this year of the program has provided the third measurement point.

Topic selection was based on:

- medications or problems of topical interest in terms of public health initiatives or recent developments in treatments.
- whether there were significant changes in overall rates of management of a problem or in overall rates prescription of a medication as described in Chapter 7, (Section 7.3) and Chapter 9 (Section 9.5).

Using these criteria, four topics were selected for examination of management over time:

- medication rates for depression, in particular the rates of management with selective serotonin reuptake inhibitors (SSRIs) versus other anti-depressants.
- medication rates for lipid disorders over time, in particular the rates of management with HMG CoA reductase inhibitors (statins).
- medication rates for asthma over time, in particular asthma preventives versus bronchodilators.
- the use of non-steroidal anti-inflammatory drugs (NSAIDs) to manage all arthritis (including osteoarthritis and rheumatoid arthritis) versus other musculoskeletal problems.

14.1 Method

Multiple linear regression was used to predict changes in selected medication rates over time after adjusting for the main problems of interest related to that medication. By adjusting for the problem of interest, it is possible to test whether:

- there has been a change over time in the medication management of the problem of interest (e.g. Was there an increase over the 3 years in the overall prescribing rate of anti-depressants for depression?) *or*
- the observed change in medication rate is explained by a commensurate change in rates of management of the problems for which this medication is prescribed. This would mean there had been no change in medication management for that problem over the 3-year period, and that the observed change in medication rate was due to the change in management rates of the selected problem(s).

The outcome variable for each multiple regression model was medication rate (per 100 problem contacts). The predictors were problem managed and time. Patient age and sex were included as potential confounders of the effect of time and problem on medication rates.

'Time × problem' interaction terms were entered into the multiple regression models to test whether changes in medication rates over time differed for specific problems of interest. For example, for NSAIDs, two interaction terms, 'time × arthritis' and 'time × other musculoskeletal problems' were created to test whether changes in NSAID rates over time were uniform across all musculoskeletal problems, or whether the trends were more pronounced for the management of arthritic problems.

14.2 Anti-depressant medications and management of psychological problems over time

Before presenting trends in the prescribing of anti-depressant medications for psychological problems, the following section provides an overview of the rates of management of depression, the patients who are treated for depression and the current techniques adopted by GPs in its management during the third year of the BEACH program.

Depression management in 2000–01

A problem was classified as 'depression' if the GP recorded it in the diagnosis / problem section of the form as either: a complaint, such as 'feeling depressed', which included more specific labels of feeling sad, lonely, unhappy, worried or having low self-esteem (ICPC–2 rubric P03); or in diagnostic terms such as a depressive disorder, which included more specific labels of depressive neurosis, postnatal or reactive depression, or anxiety with depression (ICPC–2 rubric P76).

Depression was the fourth most common problem managed in general practice. It presented on 3,624 occasions (at a rate of 3.6 per 100 encounters), accounting for 2.5% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would suggest there are approximately 3.6 million encounters per year in which GPs manage depression.

Figure 14.1 illustrates the relationship of depression with other variables about which information is collected. Depression can be directly linked to patient characteristics such as age and sex, treatments provided, prescriptions written, tests and investigations ordered, and referrals transcribed (solid arrows). Depression can also be indirectly related to patient RFEs (dotted arrow). In addition, other problems that were managed at a 'depression encounter' have been included to give an indication of co-morbidities managed with depression.

Age and sex distribution of patients

Patients managed for depression were more likely to be female (67.6%). The majority of patients (72.4%) were aged between 25 and 64 years. Comparisons with the age and sex demographics for total encounters (females 57.1%) suggest that female patients were over-represented at depression encounters. Young patients of 24 years or less accounted for only 8.8% of those encounters at which depression was managed compared with 24.6% of all encounters. In contrast, patients aged 25–44 years (37.9%) and those aged 45–64 years

(34.5%) were over-represented in this sub-group when compared with the total sample (26.3% and 26.1% respectively).

Reasons for encounter

At the 3,623 encounters where depression was managed, 6,447 patient RFEs were described (178 per 100 depression encounters), somewhat more than in the total data set (151 per 100 total encounters). For over half of these encounters, the patients described a reason for the encounter as depression (52.4 per 100 depression encounters). Requests for medication (not necessarily for depression) were also a frequent RFE, presenting at a rate of 15.4 per 100 depression encounters. Other RFEs included anxiety (5.5 per 100 depression encounters), sleep disturbance (5.2 per 100) and weakness / tiredness (4.4 per 100). Miscellaneous preventive procedures such as a general or cardiovascular check-up, back complaints and hypertension were also noted.

Other problems managed

At each encounter where depression was managed, a number of other problems may have been managed. Overall, a total of 3,233 other problems were managed by the GP at encounters at which depression was managed. The most common co-morbidities managed with depression were similar to the commonly reported problems in the total data set. There were, however, some differences intheir relative frequency. Most co-morbidities managed at depression encounters were chronic conditions such as hypertension (8.3 per 100 depression encounters), diabetes (2.4), back complaints (2.3), lipid disorder (2.1) and osteoarthritis (2.1). Anxiety (1.8) and sleep disturbance (1.6) were the only other psychological problems commonly managed with depression.

Prescriptions and other treatments

Medications were prescribed for depression at a rate of 78 per 100 depression contacts, a somewhat higher rate than in the total data set (63.9 per 100 problems). Of the 2,842 medications prescribed for depression, selective serotonin uptake inhibitors (SSRIs) such as sertraline, paroxetine, citalopram, fluoxetine hydrochloride, and the seratonin and noradrenalin reuptake medication venlafaxine, were the most frequently prescribed, followed by the more traditionally used tricyclic anti-depressants (dothiepin).

Counselling was by far the most common form of non-pharmacological management, undertaken at a rate of 40.8 per 100 depression encounters. Note that this compares with an overall use of psychological counselling of only 2.5 per 100 encounters in the total data set. Other forms of counselling, advice and reassurance were also common. The relative rate of provision of psychological counselling for depression was signficantly higher (40.8 per 100 contacts with depression) than the rate reported in 1998–99 (34.2%) (Britt et al. 1999c).

Tests, investigations and referrals

Overall, rates of pathology orders for encounters where depression was managed (8.7 per 100 depression encounters) were far below those for the total data set (29.4 per 100 total encounters). Chemistry (e.g. urine analysis) and haematological (e.g. full blood counts) investigations were the most common pathology tests ordered for depression at the relatively low rates of 6.0 and 2.2 per 100 depression encounters respectively.

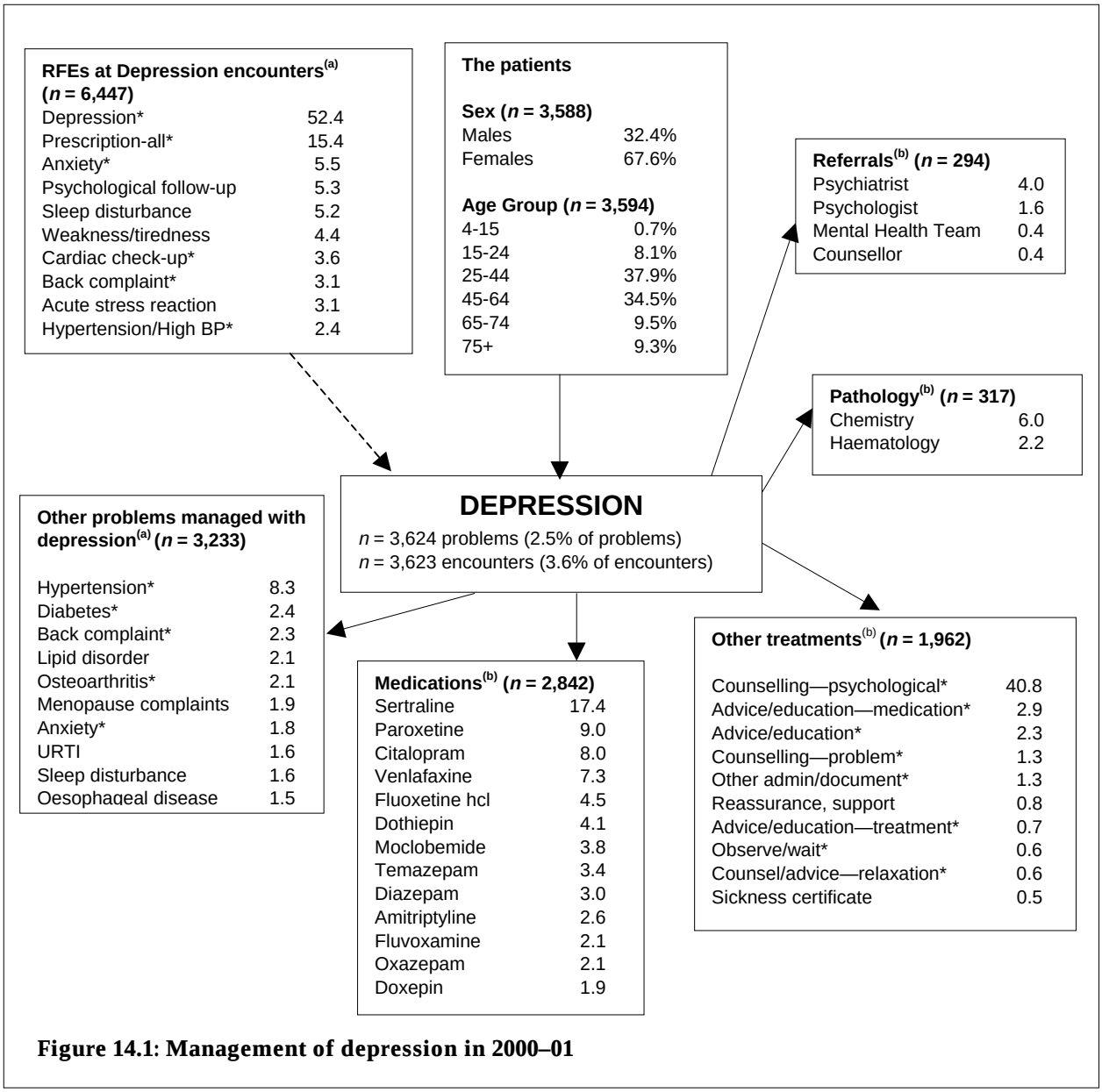


Figure 14.1: Management of depression in 2000–01

(a) Expressed as rates per 100 encounters at which depression was managed (*n* = 7,485).

(b) Expressed as rates per 100 problems at which depression was managed (*n* = 7,527).

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendices 3–9).

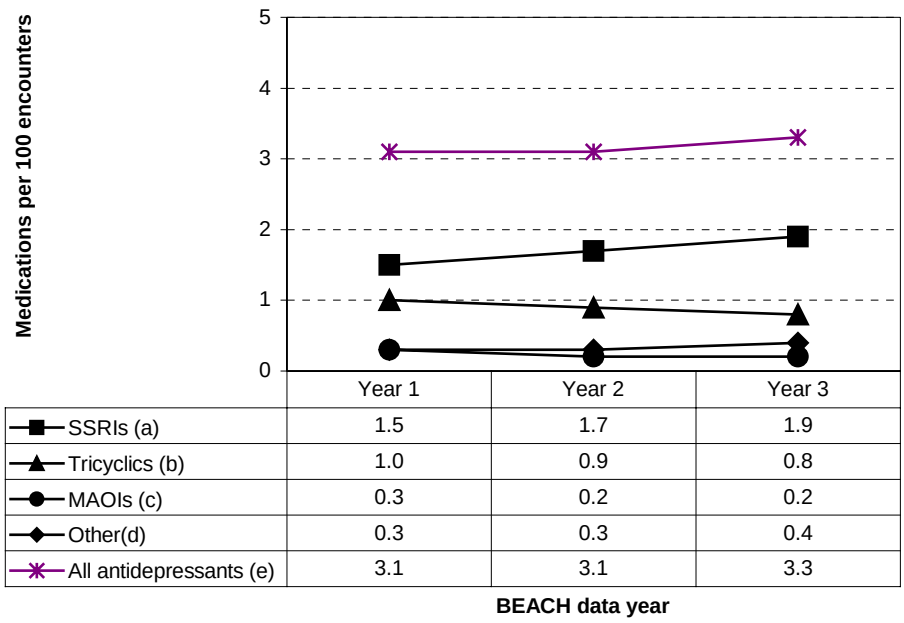
Total referrals for depression (8.1 per 100 depression encounters) were less frequent than those for the total data set (10.7 per 100 total encounters). Referrals to psychiatrists were made at a rate of 4.0 per 100 depression encounters and this was over ten times that seen in the total data set (0.3 per 100 total problem encounters). This reflects the finding that depression was the problem third most likely to be referred to any specialist (see Table 11.3). Referrals to an allied health service included referrals to psychologists, counsellors, and mental health teams.

Overall, the relative rate of depression managed in general practice and the techniques used by the GPs in its management are very similar to those in the first year of the BEACH program. The one exception was the increase, by almost 20%, in the rate of psychological counselling.

Changes over time

'All anti-depressant medications' included the ATC medication group N06A. This was subdivided into SSRIs (ATC code N06AB), non-selective monoamine re-uptake 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.

Figure 14.2 shows the overall rates of selected anti-depressant medications per 100 encounters, unadjusted for problem. As discussed in Chapter 9, Section 9.5, the relative prescribing rate of all anti-depressants per 100 encounters did not change over the 3-year period, but the prescribing rate of SSRIs rose significantly while the rate of prescribing of tricyclics and MAOIs decreased significantly.



	Year 1	Year 2	Year 3
SSRIs (a)	1.5	1.7	1.9
Tricyclics (b)	1.0	0.9	0.8
MAOIs (c)	0.3	0.2	0.2
Other(d)	0.3	0.3	0.4
All antidepressants (e)	3.1	3.1	3.3

Figure 14.2: Prescribing rates of antidepressant medications over time

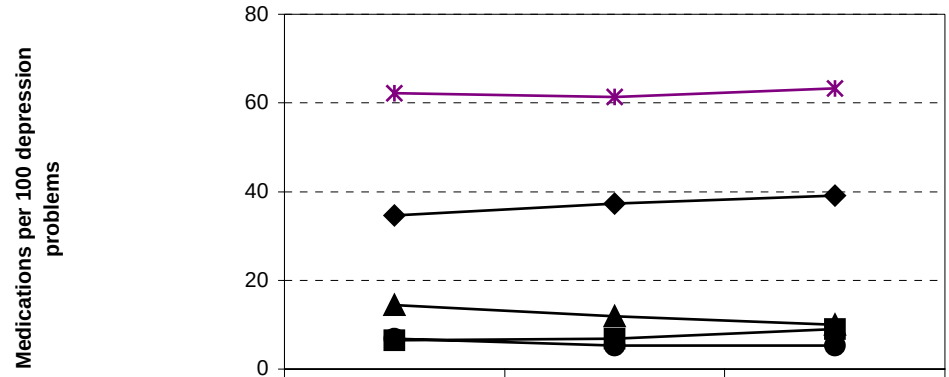
(a) Selective serotonin reuptake inhibitors, ATC code N06AB.

(b) Non-selective monoamine reuptake inhibitors, ATC code N06AA.

(c) Monoamine oxidase inhibitors, ATC code N06AG, N06AF.

(d) Other anti-depressants, ATC code N06AX.

(e) All anti-depressants ATC code N06A.



	Year 1	Year 2	Year 3
SSRIs (a)	34.7	37.3	39.1
Tricyclics (b)	14.4	11.9	10.0
MAOIs (c)	6.9	5.3	5.3
Other(d)	6.5	6.8	9
All antidepressants (e)	62.2	61.4	63.3

BEACH data year

Figure 14.3: Prescribing rates of anti-depressant medications for depression over time

(a) Selective serotonin reuptake inhibitors, ATC code N06AB.

(b) Non-selective monoamine reuptake inhibitors, ATC code N06AA.

(c) Monoamine oxidase inhibitors, ATC code N06AG, N06AF.

(d) Other anti-depressants, ATC code N06AX.

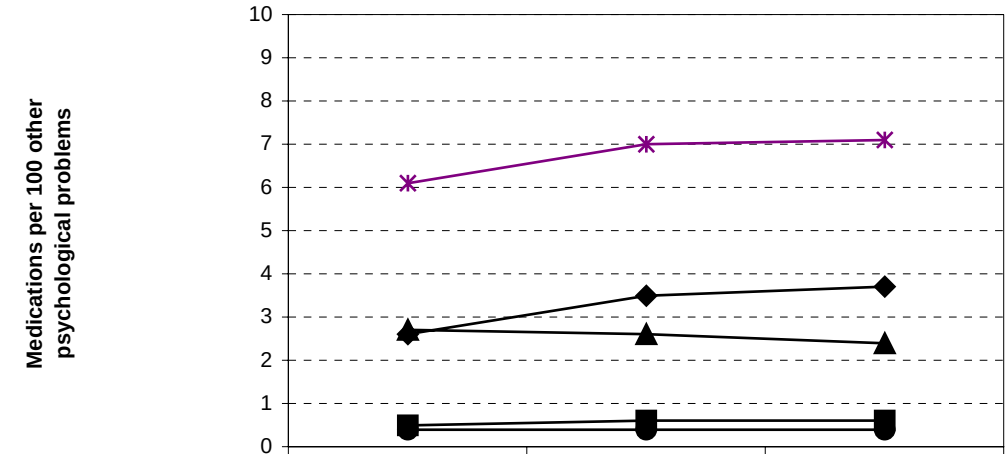
(e) All anti-depressants ATC code N06A.

Depression

Figure 14.3 shows the medication rates of anti-depressants specifically prescribed for depression. The rate of all anti-depressant prescribing for depression did not change over the 3 years, but the prescribing rate of SSRIs for depression increased significantly from 34.7 medications per 100 depression contacts in 1998–99 to 39.1 per 100 depression contacts in 2000–01. This was offset by a decrease over the period in the prescribing rate of tricyclic anti-depressants and monoamine oxidase inhibitors. There was also an increase in the prescribing rate of 'other' anti-depressants (including venlafaxine) (ATC code N06AX) from 6.5 medications per 100 depression problems in 1998–99 to 9.0 per 100 in 2000–01, largely explained by an increase in the prescribing rate of venlafaxine (3.7 medications per 100 depression problems in 1998–99 to 7.3 per 100 in 2000–01). The pattern of results indicates that there was no overall increase in medication rates for depression managed in general practice over the 3 years of the study, but that SSRIs were being substituted for older classes of anti-depressants during the period.

Other psychological problems

Figure 14.4 shows the prescribing rates over time of anti-depressant medications for all psychological problems other than depression. There was an increase in the rate of anti-depressants as a group for other psychological problems. This increase was explained by an increase in the prescribing rate of SSRIs for other psychological problems.



	Year 1	Year 2	Year 3
SSRIs (a)	2.6	3.5	3.7
Tricyclics (b)	2.7	2.6	2.4
MAOIs (c)	0.4	0.4	0.4
Other (d)	0.5	0.6	0.6
All antidepressants (e)	6.1	7.0	7.1

BEACH data year

Figure 14.4: Prescrbing rates of anti-depressant medications for other psychological problems over time

(a) Selective serotonin reuptake inhibitors, ATC code N06AB.

(b) Non-selective monoamine reuptake inhibitors, ATC code N06AA.

(c) Monoamine oxidase inhibitors, ATC code N06AG, N06AF.

(d) Other anti-depressants, ATC code N06AX.

(e) All anti-depressants ATC code N06A.

Multiple linear regression

All anti-depressants

Multiple linear regression was performed to ascertain whether the patterns of anti-depressant prescribing rate for depression and for other psychological problems had changed over the period 1998–99 to 2000–01.

Multiple regression with the prescribing rate of all anti-depressants as the outcome confirmed that after adjusting for depression and all other psychological problems the prescribing rate of all anti-depressants had not changed significantly over time (time adjusted for problem, $p = 0.43$). The observed increase in anti-depressant medication for other psychological problems (Figure 14.4) did not affect the overall trend in prescribing rate of anti-depressants, since the majority of anti-depressants were prescribed for depression.

SSRIs

Multiple regression with the prescribing rate of SSRIs as the outcome confirmed that the prescribing rate of SSRI medications for depression had risen, as had the rate of SSRI medications for all other psychological problems. However, a significant time × problem interaction term indicated that the increase in the SSRI prescribing rate was more marked for

depression compared with other psychological problems (time × problem interaction, $p < 0.001$).

Conclusion

In spite of increasing professional and public programs about depression, there has been no significant increase in the overall number of encounters with depression in general practice. The rate of specific psychological counselling for the management of depression problems increased from 34.2 per 100 depression problems managed to 40.8 per 100 problems.

Overall rates of anti-depressant medication remained steady over the 3 years. There was no overall increase in anti-depressant medications prescribed specifically for depression, but there is evidence that during the 3-year period SSRIs were increasingly substituted for older classes of anti-depressant medication. There was also an increase in the relative prescribing rate of SSRIs for other psychological problems.

Selective serotonin re-uptake inhibitors (SSRIs) have significant advantages over the older anti-depressants such as tricyclics and MAOIs. The major advantage is the lower rate of side effects from this group of drugs. SSRIs are therefore the pharmacological treatment of first choice by Australian psychiatrists in virtually all forms of depression (Hickie et al. 1999). Studies by the SPHERE program indicate that older anti-depressants are still widely used in Australian general practice (Hickie & Marks 2001). This study demonstrates significant substitution of SSRIs and venlafaxine for tricyclic anti-depressants in line with accepted clinical practice.

14.3 Lipid-lowering agents and management of lipid disorders over time

Management of lipid problems in 2000–01

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, hypertriglyceridaemia or raised lipids (ICPC–2 rubric T93).

Lipid disorder was the fifth most common problem managed in general practice. It was recorded on 2,889 occasions (at a rate of 2.9 per 100 encounters), accounting for 2.0% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would suggest there are approximately 3 million encounters per year in which GPs manage lipid disorders.

Figure 14.5 illustrates the relationship of lipid disorder with other variables that are collected at the general practice encounter. Lipid disorder can be directly linked to patient characteristics such as age and sex, treatments provided, prescriptions written, tests and investigations ordered, and referrals transcribed (solid arrows). Lipid disorder can also be indirectly related to patient RFEs (dotted arrow). In addition, other problems that were managed at a 'lipid disorder encounter' have been included to give an indication of co-morbidities managed with lipid disorder.

Age and sex distribution of patients

Patients managed for lipid disorder were more likely to be male (51.0%), higher than the proportion of males in the study overall (42.9%). Older patients were over-represented in lipid disorder encounters (88.5% were over 44) compared with the proportion of older patients (49.1% over 44) in the sample as a whole.

Reasons for encounter

At the 2,888 encounters where lipid disorder was managed, a total of 5,425 patient RFEs were described (188 per 100 lipid disorder encounters), somewhat more than in the total sample (151 per 100 total encounters). The RFEs at lipid disorder encounters were frequently for lipid disorder (22.3 per 100 lipid disorder encounters) and processes related to managing lipid disorder, such as prescription (26.9 per 100 lipid disorder encounters), test result (23.3 per 100 lipid disorder encounters), and test orders (14.0 per 100 lipid disorder encounters).

Other problems managed

At each encounter where lipid disorder was managed, a range of other problems was also reported. A total of 3,774 other problems were managed by the GP where lipid disorder occurred (131 per 100 encounters). The most common co-morbidities managed with lipid disorder were cardiovascular and endocrine problems associated with lipid disorders such as hypertension (31.6 per 100 lipid disorder encounters) and diabetes (8.2 per 100 lipid disorder encounters), which were reported at rates somewhat higher than for encounters overall. Hypertension was managed at over three times the rate at lipid disorder encounters than at encounters overall (8.6 per 100 encounters).

Prescriptions and other treatments

Medications were provided at a rate of 64.7 per 100 lipid disorder contacts. The top six medications for lipid disorder included five ‘statins’. Atorvastatin was the most common medication prescribed / advised / supplied at a rate of 24.5 per 100 lipid disorder problems. Simvastatin was prescribed at a rate of 23.3 per 100 lipid disorder contacts.

Clinical treatments were provided at a rate of 46.2 per 100 encounters, advice about diet, exercise or lifestyle making up the majority of these managements.

Referrals, tests and investigations

The patient was referred in only 26 cases, and 12 of these were referred to a dietitian. Rates for pathology orders were relatively higher, with a total of 1,800 pathology tests, mainly blood chemistry (57.6 per 100 problems).

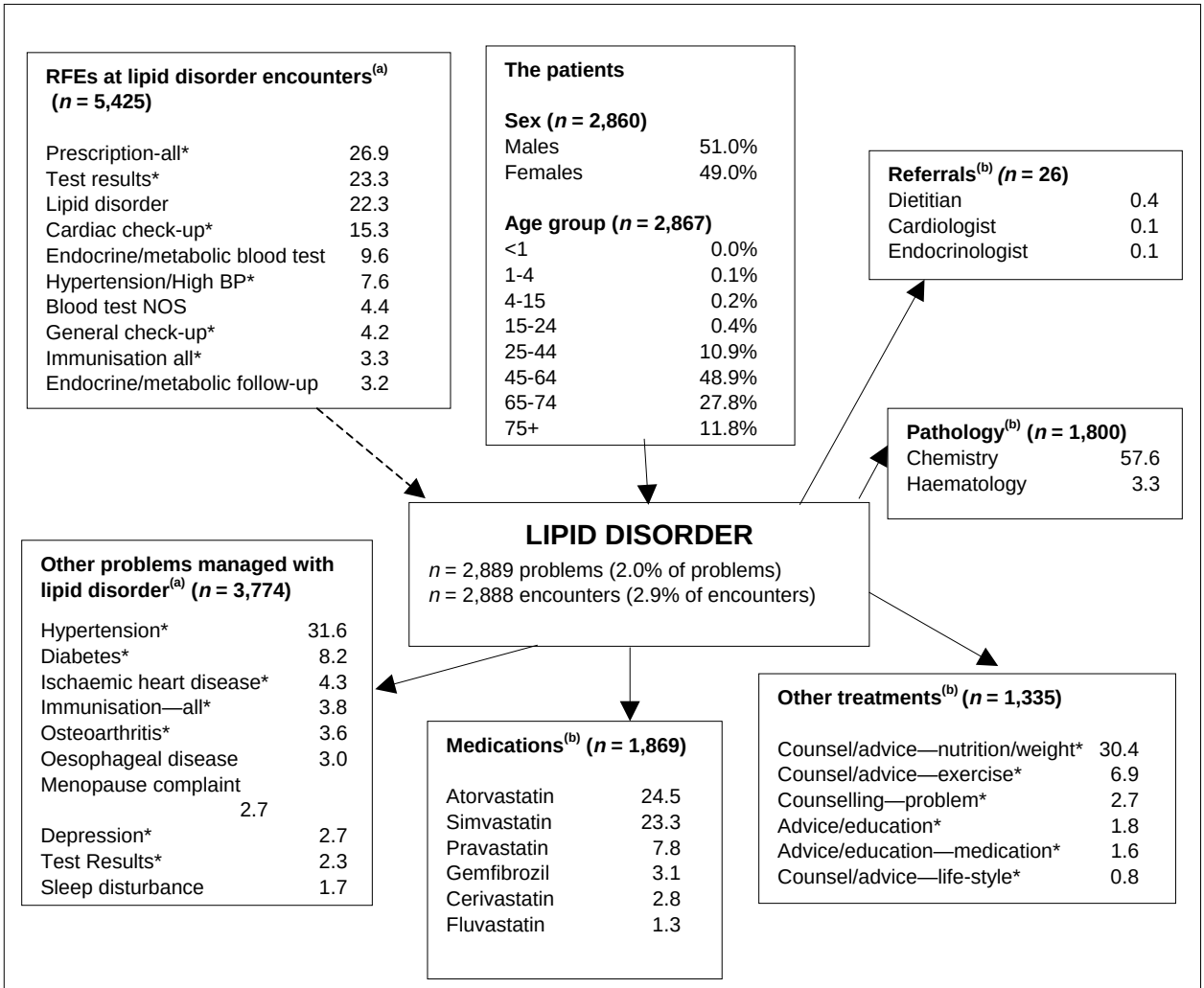


Figure 14.5: Management of lipid disorders in 2000–01

(a) Expressed as rates per 100 encounters at which lipid disorder was managed (*n* = 2,888).

(b) Expressed as rates per 100 problems at which lipid disorder was managed (*n* = 2,889).

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendices 3–9).

Changes over time

Lipid-lowering agents were defined as the medications included in the ATC code C10A. For analysis, the lipid-lowering agents were further divided into the HMG CoA reductase inhibitors (statins, ATC subgroup C10AA) and all other lipid-lowering agents.

Multiple regression was used to examine trends in prescribing rates of lipid-lowering agents over time, after adjusting for the rate of management of lipid disorders. Figure 14.6 shows the rate of lipid disorders over time. As discussed in Chapter 7, Section 7.3, the management rate of lipid disorders increased significantly over the 3-year period.

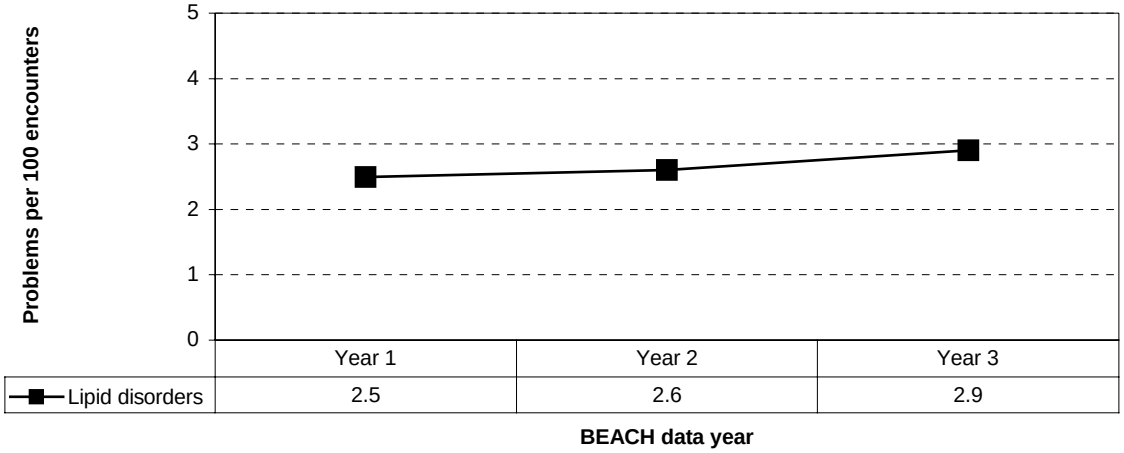


Figure 14.6: Management of lipid disorders over time

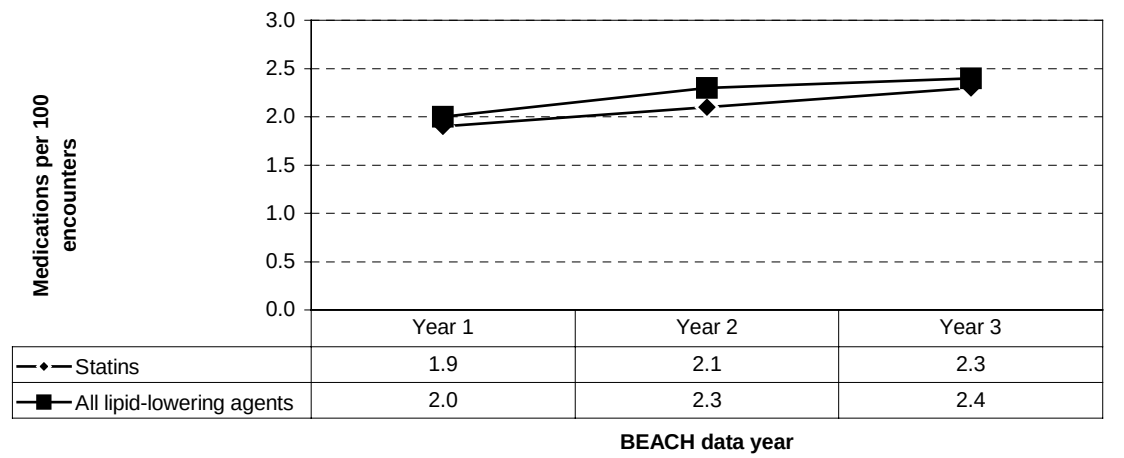


Figure 14.7: Prescribing rates of lipid-lowering agents over time

Figure 14.7 shows the rates of lipid-lowering medication per 100 encounters, unadjusted for morbidity. Statins represented the vast majority of lipid-lowering agents. As discussed in Chapter 9, Section 9.5, there was a significant increase from 1998–99 to 2000–01 in the rate of prescribing of lipid-lowering agents. In particular, there was an increase in the rate of prescribing of statins over the period.

The rate of prescribing of lipid-lowering agents specifically for lipid disorders appeared to remain steady for the period 1998–99 to 2000–01 at about 64 medications per 100 lipid disorder contacts (Figure 14.8).

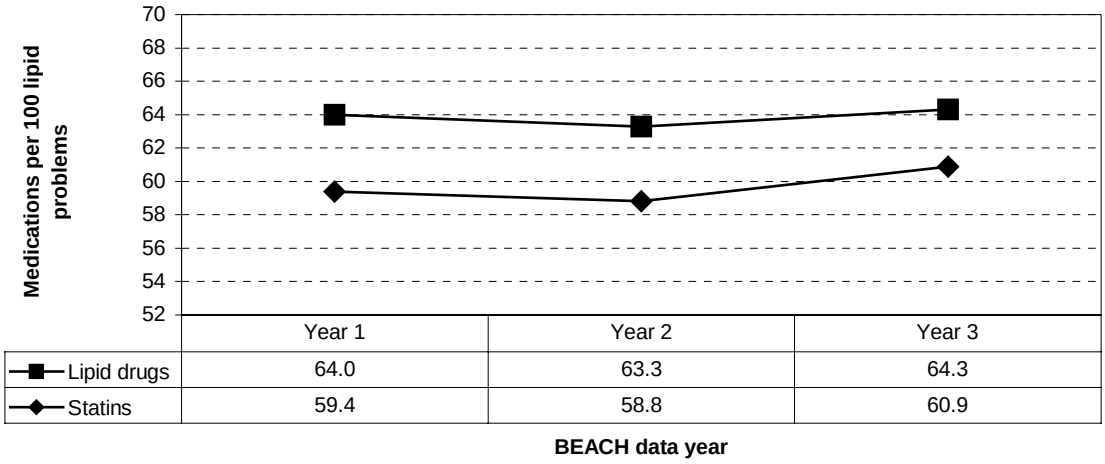


Figure 14.8: Prescribing rates of lipid-lowering agents for lipid disorders over time

Multiple linear regression

Total lipid-lowering agents

Multiple linear regression, with the rate of all lipid-lowering agents per 100 problems as the outcome revealed no significant change in the prescribing rate of lipid-lowering agents over time once changes in the management rate of lipid disorders were taken into account ($p = 0.09$).

Statins

Multiple regression with prescribing rate of statins per 100 problems as the outcome found a marginal increase over time in the prescribing rate of statins, once changes in the management rates of lipid disorders had been taken into account ($p = 0.02$).

Conclusion

Although the crude prescribing rates of lipid-lowering medications had increased in the 3-year period of the study, the observed increase in prescribing rates of lipid-lowering agents was largely explained by the accompanying increase in the management rates of lipid disorders. Within lipid disorders there was little evidence of any major change in medication management. It remains to be seen whether a slight rise in the statin prescribing rate heralds a future trend for greater use of statins in managing lipid disorders.

The importance of lipid disorders in the pathogenesis of vascular disease makes their detection and management an important part of primary and secondary prevention of vascular disease in general practice (National Preventive and Community Medicine Committee of the RACGP 2001).

There has been a significant increase in the rate of presentation of lipid problems per 100 encounters from 2.5 in year 1 to 2.9 in year 3. This extrapolates, on the basis of 103 million GP consultations per annum, to an additional 400,000 encounters per annum at which lipid disorders are managed. The increasing rate of lipid disorder encounters appears to be due to a constant annual addition of new cases (0.32 per 100 encounters) adding to a growing pool of patients on long-term therapy. It is notable that the detection rate of new cases does not

appear to have risen in the 3 years in spite of an increasing emphasis on preventive care in general practice.

Management has not changed significantly during the 3-year period with statins constituting the large majority of medications prescribed at a constant total rate of 64 per 100 problem encounters. Counselling regarding nutrition, weight and/or exercise occurred at the rate of 37.3 per 100 problems seen in BEACH year 3. These data suggest that general practitioners are treating lipid disorders broadly within accepted guidelines (National Heart Foundation of Australia 1998).

14.4 Asthma inhalant medications and the management of asthma problems over time

Management of asthma in 2000–01

A problem was classified as 'asthma' if the GP recorded it in the diagnosis/problem section of the form as asthma; allergic, wheezy or asthmatic bronchitis; extrinsic allergic alveolitis; or status asthmaticus (ICPC–2 rubric R96). Asthma was the sixth most common problem managed in general practice. It was recorded on 2,821 occasions (at a rate of 2.8 per 100 encounters), accounting for 2.0% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would then suggest there are approximately 2.9 million encounters per year in which GPs manage asthma. Figure 14.9 illustrates the relationship of asthma with other variables that are collected at the general practice encounter.

Age and sex distribution of patients

Patients managed for asthma were more likely to be female (55.0%). A large proportion of asthma patients (41.4%) were aged under 25 years. Comparison with the age distribution for total encounters (24.6% less than 25 years) indicates that young patients were over-represented at asthma encounters. Since 45.0% of asthma patients were male compared with 42.9% for the sample as a whole, males were slightly over-represented at asthma encounters.

Reasons for encounter

At the 2,818 encounters where asthma was managed, a total of 4,911 patient RFEs were described (174 per 100 asthma encounters), somewhat more than in the total data set (151 per 100 total encounters). For over a third of these encounters the patients described their reason for the encounter as asthma. Cough was another major reason for encounter (28.5 per 100 asthma encounters). Requests for medication (not necessarily for asthma) were also a frequent RFE, presenting at a rate of 16.0 per 100 asthma encounters. Other respiratory complaints such as shortness of breath (8.1 per 100), wheezing (7.1 per 100) and upper respiratory tract infection (3.9 per 100) were frequent RFEs. Other RFEs included respiratory follow-up (5.1 per 100) and throat symptom/complaint (2.9 per 100).

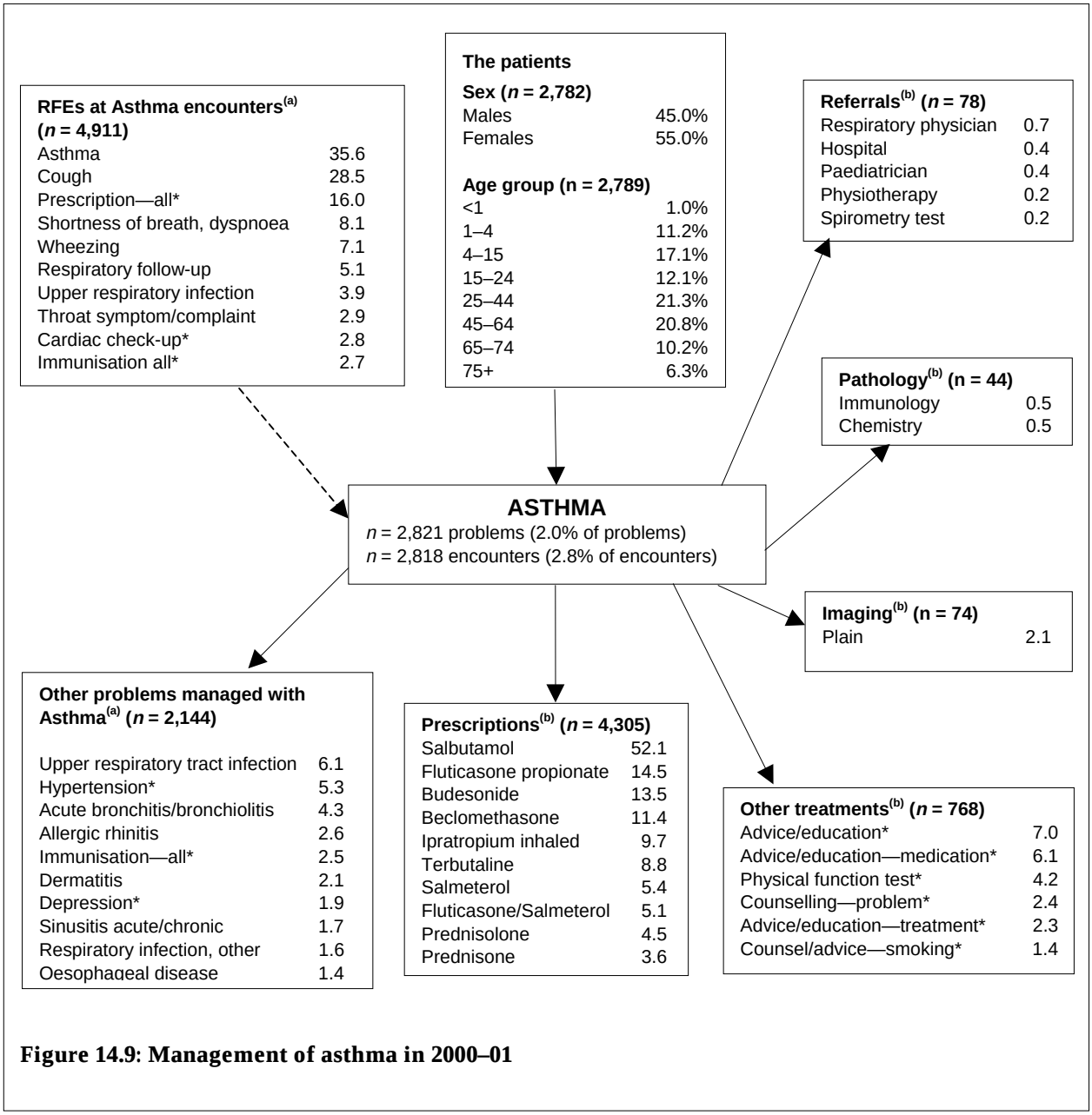


Figure 14.9: Management of asthma in 2000–01

(a) Expressed as rates per 100 encounters at which asthma was managed (*n* = 2,818).

(b) Expressed as rates per 100 asthma problems managed (*n* = 2,821).

* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendices 3–6).

At each encounter where asthma was managed a number of other problems may have been managed. Overall, a total of 2,144 other problems were managed by the GP where an asthma contact occurred. There were some differences in the most common co-morbidities managed with asthma compared with the total data set. Upper respiratory tract infection was the most common other problem at an asthma encounter (6.1 per 100 asthma encounters), managed at a similar rate as for the sample overall (6.9 per 100 encounters). Hypertension (5.3 per 100 asthma encounters), however, was managed less frequently than for the sample overall (8.3 per 100 encounters), perhaps reflecting the relatively young age of asthma patients. Acute bronchitis / bronchiolitis presented more frequently at asthma encounters (4.3 per 100) than for the sample overall (2.7 per 100 encounters).

Prescriptions and other treatments

Medication was by far the most common treatment for asthma; 4,305 medications were prescribed / advised or supplied at a rate of 153 medications per 100 asthma problems. Salbutamol was the most frequent medication (52.1 medications per 100 asthma problems). The other top medications included fluticasone propionate (14.5 per 100 asthma problems), budesonide (13.5 per 100) and beclomathasone (11.4 per 100).

Advice / education (7.0 per 100 asthma problems) and advice about medication (6.1 per 100 asthma problems) were the most common forms of management other than medication.

Referrals, tests and investigations

Referral rates for asthma were very low (2.7 per 100 asthma problems) compared with the total data set (7.2 per 100 problems). Referral to a respiratory physician (0.7 per 100 problems) was the most common. Less than one (0.4) in a hundred asthma problems were referred to hospital. There were few pathology (44) or imaging (74) tests ordered in the management of asthma.

Changes over time

As discussed in Chapter 7, Section 7.3, the management rate of asthma decreased significantly ($p = 0.007$) from 3.2 contacts per 100 encounters in 1999–00 to 2.8 per 100 encounters in 2000–01 (Figure 14.10). During this period, the prescribing rate of bronchodilators per 100 encounters decreased significantly, and the prescribing rate of preventive medications remained steady (Figure 14.11).

Figure 14.12 shows the prescribing rates of medications specifically for asthma problems over the 3-year period. There appears to be little change in prescribing rates of asthma medications for asthma over the period.

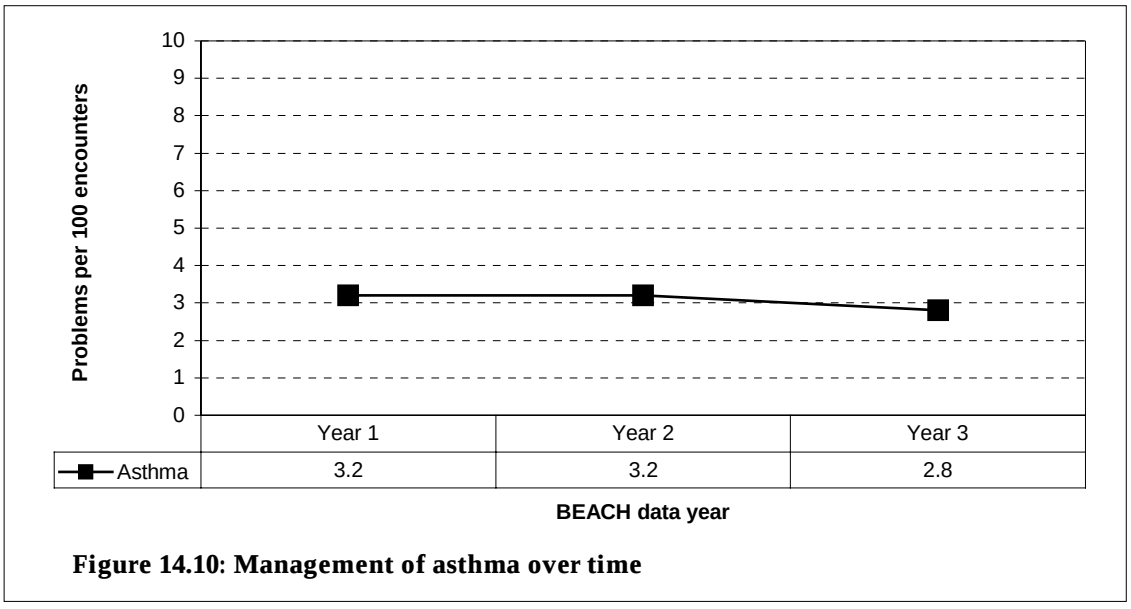


Figure 14.10: Management of asthma over time

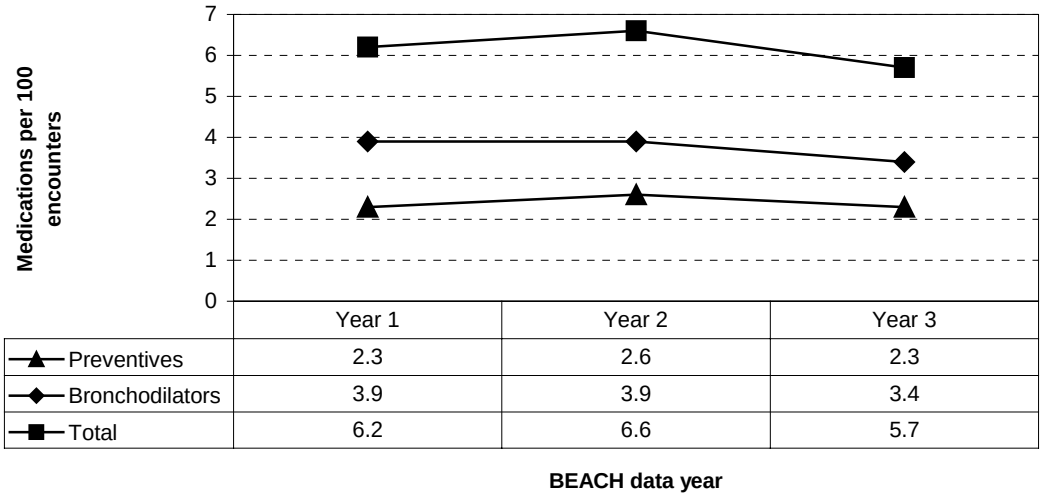


Figure 14.11: Prescribing rates of asthma medications over time

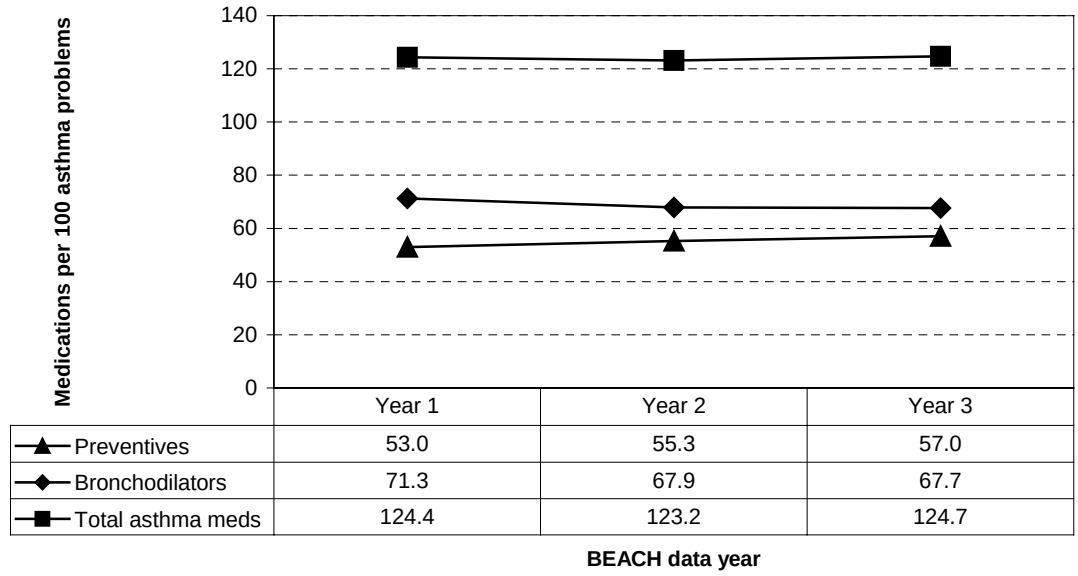


Figure 14.12: Prescribing rates of asthma medications over time for asthma problems

Multiple linear regression

Asthma preventives

Multiple linear regression with the rate of asthma preventives per 100 asthma problems as the outcome found no significant effect of time on the prescribing rate of preventive medications once the management rate of asthma was taken into account ($p = 0.17$).

Bronchodilators

Multiple regression with the rate of bronchodilators as the outcome found only a marginal effect of time on rate of bronchodilators, once the management rate asthma was taken into account ($p = 0.053$).

Conclusion

Although the decrease in asthma encounters in the 3-year period of 0.4 per 100 encounters may appear small, this represents a drop in annual asthma encounters of 400,000 per year when extrapolated to the 103 million per year general practitioner consultations. Whether this fall is due to a drop in prevalence of asthma or due to a drop in encounter rate resulting from better asthma control cannot be deduced from these data.

The rate of prescribing of bronchodilator medications also decreased during this period. The multiple regression analyses indicated that once changes over time in the management rate of asthma were taken into account there was little evidence of any real change in medication management for asthma over the 3-year period.

14.5 Non-steroidal anti-inflammatory drugs (NSAIDs) and the management of arthritis and other musculoskeletal problems

Use of NSAIDs in problem management in 2000–01

Figure 14.13 shows the relationship between the prescription or supply of NSAIDs, characteristics of the patients for whom they were prescribed, the problems for which they were prescribed, and other variables.

Rate of prescription, supply or recommendation

There were 6,706 occasions on which NSAIDs were recorded by GPs, accounting for 6.2% of all medications recorded. They were given at a rate of 6.7 per 100 total encounters and at a rate of 4.7 per 100 total problems. Celecoxib, despite being available for only 8 of the 12 months, was by far the most common individual NSAID.

Prescribed daily dose

Celecoxib had a median PDD of 200 mg, which falls at the midpoint of the recommended range. Ibuprofen had a median PDD of 1,200 mg, which is half the maximum dose suggested in MIMS (MIMS Australia 2001).

Age and sex distribution of patients

Patients under 25 years of age accounted for about 25.0% of all patients but only 9.7% of patients at NSAID encounters. On the other hand, those between 45 and 64 years of age were over-represented at NSAID encounters, accounting for 36.5% of all patients at these encounters. The sex distribution of the patients was similar to that of the GP patient population.

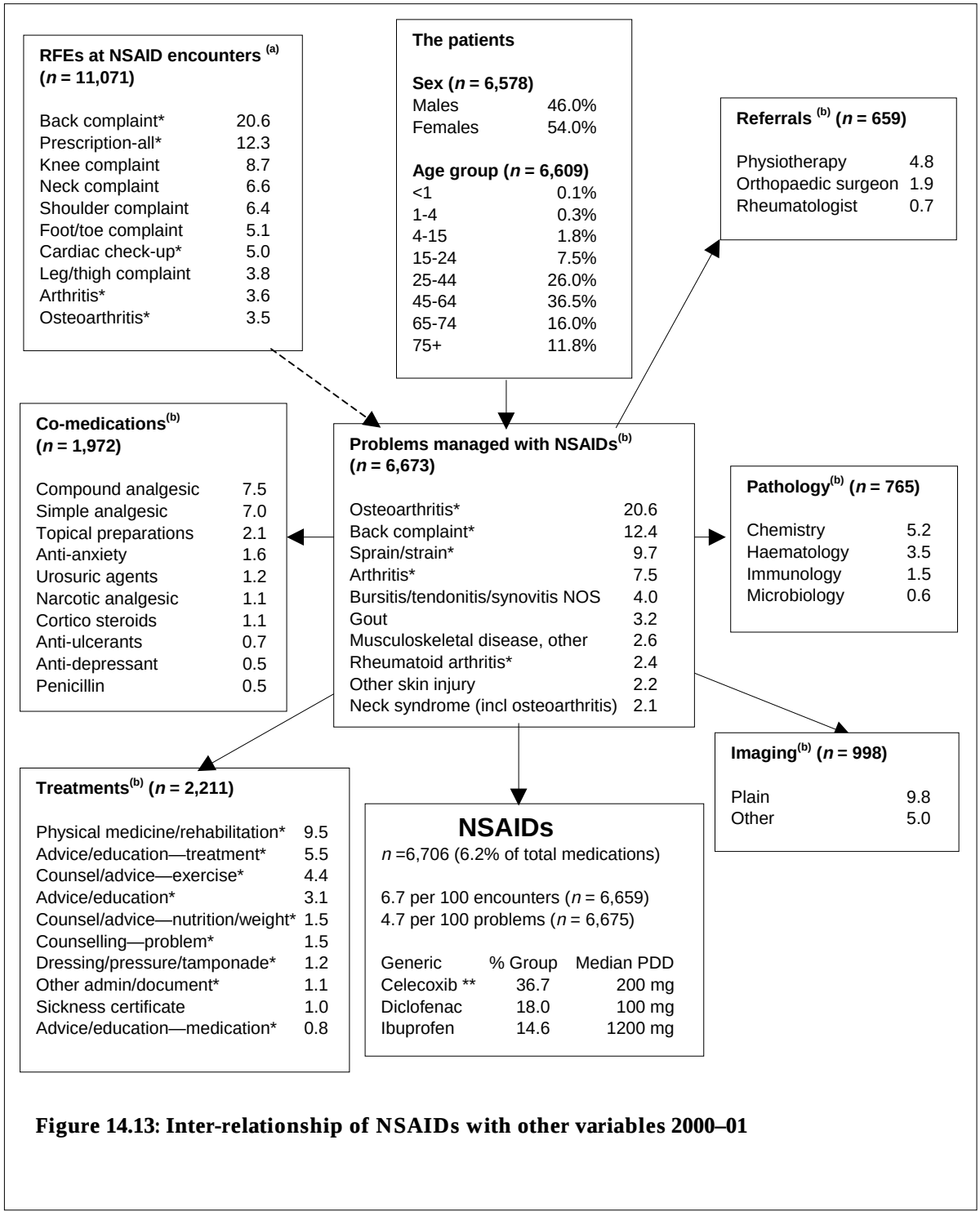


Figure 14.13: Inter-relationship of NSAIDs with other variables 2000–01

(a) Expressed as rates per 100 encounters at which a benzodiazepine was prescribed or supplied (*n* = 4,019)

(b) Expressed as rates per 100 problems for which a benzodiazepine was prescribed or supplied (*n* = 4,053).

* Indicates multiple ICPC–2 and ICPC–2 PLUS codes (see Appendices 3–9).

** Celecoxib was only available on the PBS from August 2000 i.e. 8 months of this 12-month period.

Reasons for encounter

The most commonly described patient reason for encounter was back complaint, described at a rate of 20.6 per 100 encounters at which NSAIDs were prescribed, given or recommended. A request for prescription was also a commonly cited reason, at 12.3 per 100 of these encounters.

Problems managed

Osteoarthritis was the most common problem managed with NSAIDs, accounting 20.6% of such problems. Back complaint was the second most common at 12.4% of problems.

Other medications prescribed or supplied

A total of 1,972 medications were prescribed or supplied at the same encounter and for the same problem for which NSAIDs were given. Compound analgesics were the most common co-medications, prescribed, supplied or advised at a rate of 7.5 per 100 of these problems.

Other treatments

Other treatments were provided at a rate of 33.1 per 100 problems managed with NSAIDs, similar to the total data set (34.2 per 100 problems). Physical medicine / rehabilitation was the most frequent non-pharmacological treatment, given at a rate of 9.5 per 100 of these problems.

Referrals, tests and investigation

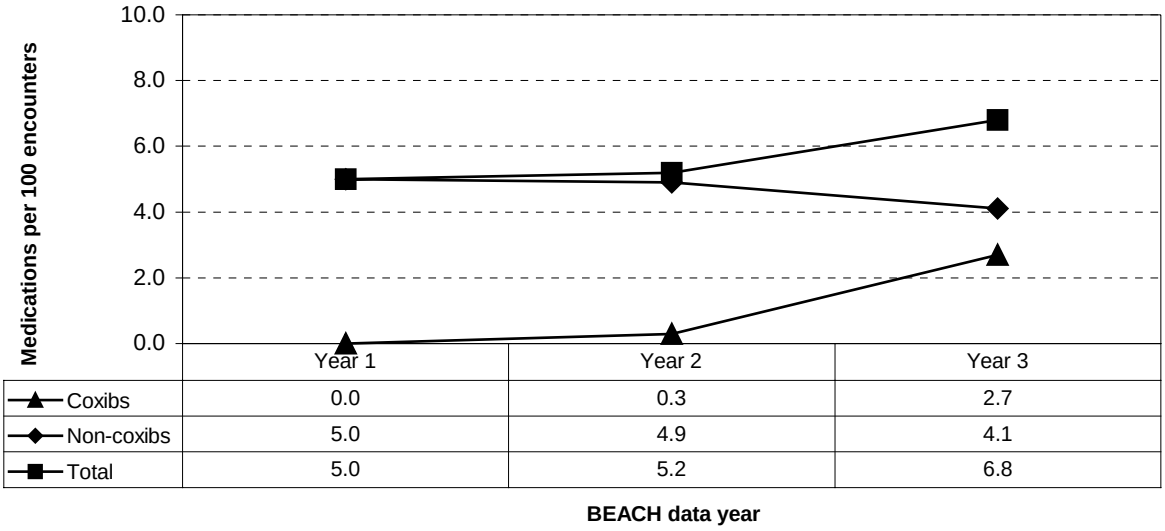
Patients were referred to other health professionals for these problems at a rate of 9.9 per 100 problems managed, most commonly for physiotherapy. Pathology was ordered at a rate of 11.5 per 100 problems managed with NSAIDs, and imaging was ordered at almost double the rate in the total data set, at a rate of 15.0 per 100 encounters.

Changes over time

NSAIDs were defined as the medications grouped in the ATC code M01A. For analysis the NSAIDs were further subdivided into coxibs (ATC subgroup M01AH) and all other NSAIDs.

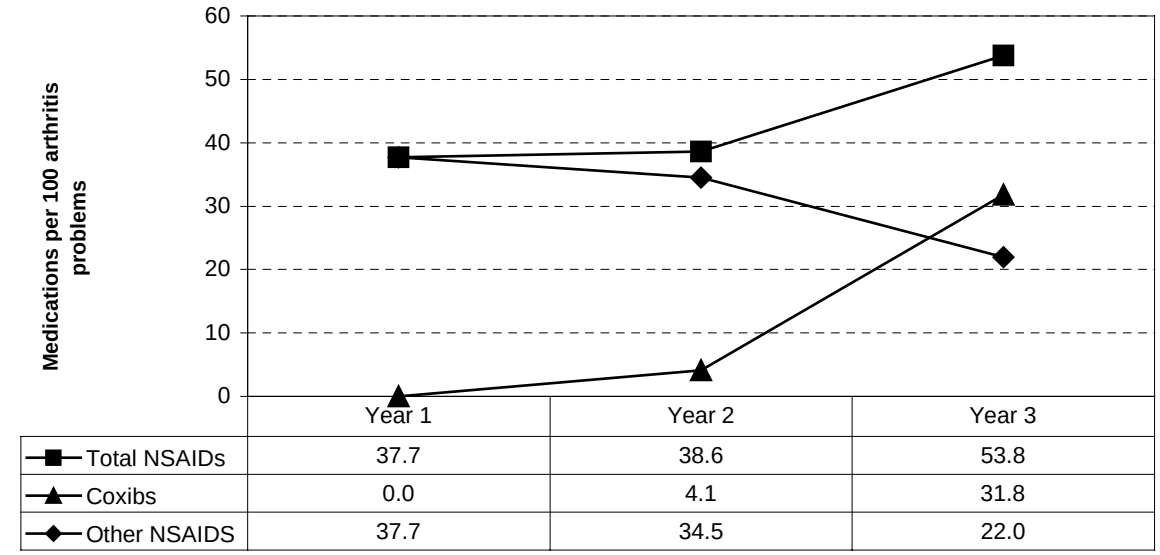
Musculoskeletal problems (ICPC chapter 'L') were divided into all arthritic problems (rheumatoid arthritis, osteoarthritis, and unspecified arthritis) versus all other musculoskeletal problems. These broad categories of problems of interest were derived from the recommended indications for the use of coxibs (MIMS Australia 2001) and the problems for which NSAIDs were most frequently prescribed (Figure 14.13). The prescribing rate of NSAIDs for arthritic problems was compared with the prescribing rate for other musculoskeletal problems. Multiple linear regression was used to examine trends over time in the prescribing rate of NSAIDs for arthritis, other musculoskeletal problems and all other problems.

Figure 14.14 shows the prescribing rate of NSAIDs per 100 encounters unadjusted for morbidity. As discussed in Chapter 9, Section 9.5, the univariate analysis indicated that the overall prescribing rate of NSAIDs had increased over the 3-year period. Specifically, the prescribing rate of coxibs had increased significantly from 1999–00 to 2000–01, and the prescribing rate of the other NSAIDs had remained steady.



	Year 1	Year 2	Year 3
Coxibs	0.0	0.3	2.7
Non-coxibs	5.0	4.9	4.1
Total	5.0	5.2	6.8

Figure 14.14: Prescribing rates of NSAIDs over time



	Year 1	Year 2	Year 3
Total NSAIDs	37.7	38.6	53.8
Coxibs	0.0	4.1	31.8
Other NSAIDS	37.7	34.5	22.0

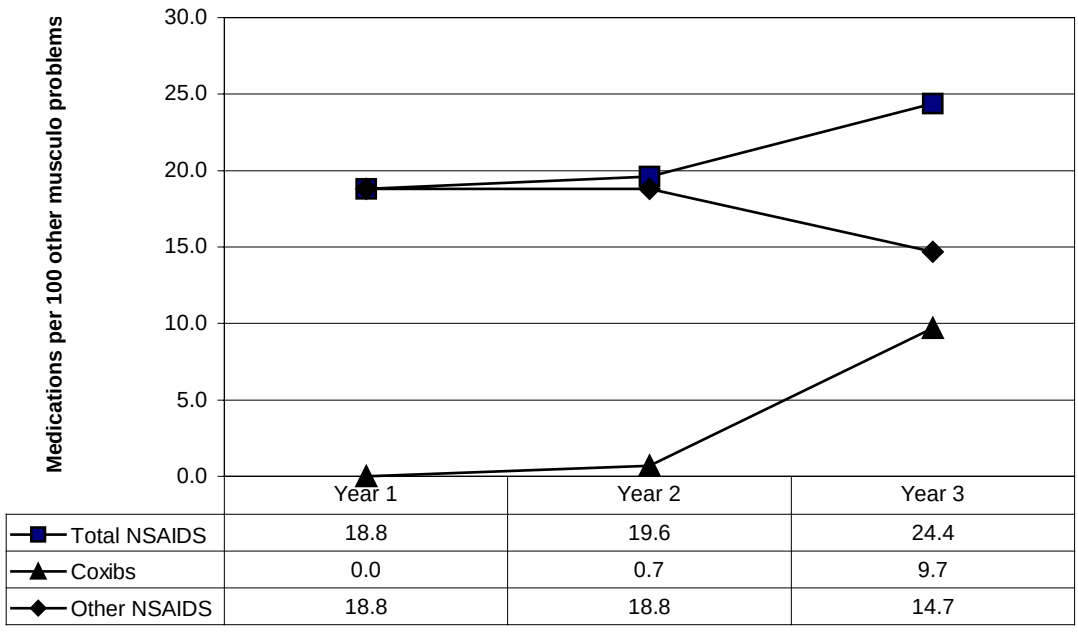
Figure 14.15: Prescribing rates of NSAIDs over time for all arthritis

Note: Includes multiple ICPC–2 codes for osteoarthritis and arthritis (see Appendix 3) and rheumatoid arthritis (ICPC rubric L88).

The rate of total NSAID prescribing specifically for arthritic problems increased from around 38 medications per 100 arthritic problems in 1999–00 to 54 per 100 arthritic problems in 2000–01 (Figure 14.15). This increase was due entirely to an increase in the prescribing rate of coxibs from 4 per 100 arthritic problems in 1999–00 to 32 per 100 arthritic problems in 2000–01. At the same time the prescribing rate of other NSAIDs decreased somewhat from 35 per 100 arthritic problems in 1999–00 to 22 per 100 in 2000–01. This changing pattern of medication management (illustrated in Figure 14.15) indicates that the increase in coxibs was largely responsible for an overall increase in the total NSAID medication rate for arthritic problems.

There was also substantial substitution of other NSAIDs by coxibs. By 2000–01 in the management of arthritic problems, coxibs had become more frequently prescribed than all other NSAIDs combined.

The prescribing rate of NSAIDs for musculoskeletal problems other than arthritis also rose over the period 1999–00 to 2000–01 (Figure 14.16). The prescribing rate of coxibs for other musculoskeletal problems increased, and the rate of all other NSAIDs decreased. However in 2000–01 coxibs still represented less than half of all NSAIDs prescribed for other musculoskeletal problems.



	Year 1	Year 2	Year 3
Total NSAIDS	18.8	19.6	24.4
Coxibs	0.0	0.7	9.7
Other NSAIDS	18.8	18.8	14.7

Figure 14.16: Prescribing rates of NSAIDs over time for other musculoskeletal problems

Multiple linear regression

All NSAIDs

Multiple linear regression, with the prescribing rate of total NSAIDs as the outcome found a significant time x problem interaction for the prescribing rate of total NSAIDs ($p < 0.001$).

This interaction indicates that the increase over time in the prescribing rate of total NSAIDs for arthritic problems was more pronounced than the increase in the prescribing rate of total NSAIDs for other musculoskeletal problems.

Coxibs

Multiple regression with the prescribing rate of coxibs as the outcome found a significant time×problem interaction for the prescribing rate of coxibs ($p < 0.001$). This interaction indicates that the rate of uptake of coxibs from 1999–00 to 2000–01 was more pronounced for arthritic problems than for other musculoskeletal problems.

Other NSAIDs (not coxibs)

Multiple regression, with the rate of NSAIDs other than coxibs as the outcome, found a significant time × problem interaction ($p < 0.001$). This interaction indicates that, from 1999–00 to 2000–01 the decrease in the prescribing rate of other NSAIDs was more pronounced for arthritic problems relative to other musculoskeletal problems.

Conclusion

From 1999–00 to 2000–00, there was a marked increase in the prescribing rate for total NSAIDs for both arthritic problems and other musculoskeletal problems, an increase which was entirely explained by an increase in the rate of coxibs. There was evidence that coxibs were also substituted for other NSAIDs for both arthritic problems and other musculoskeletal problems, as there was a decrease in medication rates of other NSAIDs. Significant time × problem interactions indicated that the increase in the prescribing rate of total NSAIDs, the uptake of coxibs and the discarding of other NSAIDs were significantly more pronounced for arthritic problems relative to other musculoskeletal problems.

The introduction of coxibs was accompanied by a wave of promotion emphasising the increased safety of this group of NSAIDs over older forms. These data indicate considerable prescribing of these drugs. Although the merits of substituting coxibs for older NSAIDs has been questioned by some authorities (National Prescribing Service 2001) the coxibs have clearly found some favour with GPs.

15 Discussion

15.1 Overview of results

This report has presented summaries of the most frequent events that occurred in general practice in Australia in 2000–01. Due to their high relative frequency these events form a large part of a GP's workload. They also demonstrate the breadth of general practice, the many reasons people have for attending a GP, and the wide range of problems managed, ranging from acute to chronic disease and from physical illness to psychosocial issues. This report has shown that prescribed medication is the most common form of problem management, but is used alone in the management of only 40% of problems. It has demonstrated the importance of counselling, advice and procedural work in a GP's working day. The small number of patients admitted to hospital or referred to the emergency department or to specialists indicates the extent to which patients are cared for by GPs in the community.

These data provide other researchers with a national average against which they can compare smaller study samples. The relatively large sample size underlying these national data, and the consequent relatively accurate estimates of the frequency of more common events also allow researchers to plan studies of specific morbidity and its management by providing better estimates of required GP sample size through a knowledge of the likely occurrence of the event of interest. They provide health care planners with an up-to-date view of the common issues taken to and managed by GPs, and an opportunity to relate prescribing patterns and costs to the management of specific types of morbidity.

Changes over time

For the first time, this report of the BEACH program has demonstrated the usefulness of ongoing data collection in the measurement of changes in general practice over a 3-year period. The third year of the program provided the third measurement point required for time series analysis.

Changes in rates of management of specific types of morbidity were described in Chapter 7 and changes in prescribing rates of some medications were demonstrated in Chapter 9. On the basis of these findings, four topics were selected for further investigation into the relationship between changes in pharmacological management and changes in morbidity rates (Chapter 14). The implications of these changes need to be considered in light of recent events.

For example, recently there has been considerable publicity given to a hypothesised increase in the prevalence of depression in the community. Certainly this hypothesised increase is supported by results of BEACH and its predecessor, when change is considered over the last decade. In 1990–91 depression was only the tenth most common problem managed in general practice, at a rate of 2.1 per 100 encounters (Bridges-Webb et al. 1992). In the 3 years from 1999 to 2001, depression has remained in fourth position of relative problem frequency, being managed at a rate of around 3.5 contacts per 100 encounters (a 70% increase since 1990–91).

Based on recent attendance data from the HIC (DHAC 2000), this would represent an increase in the total annual encounter rate for depression in general practice from an estimated 2.16 million encounters to 3.61 million encounters. However, annual general practice Medicare items of service have risen over the decade, from about 83 million in 1990–91 (Bridges-Webb et al. 1992) to around 100 million in 1998 (DHAC 2000). Therefore, in real terms the increase in GP–patient encounters involving the management of depression is more likely have been more than twofold, from 1.74 million in 1990–91 to 3.61 million encounters in 1998–99. Whether this represents an increase in population prevalence over the decade, or is the result of a greater acceptance by society of depression as being an acceptable and treatable problem, cannot be measured from these data. However the BEACH data demonstrate that since 1998–99 the management rate of depression in general practice has remained steady.

New MBS items for the management of psychological problems are proposed for introduction during 2002. These could act as an incentive to GPs to conduct more psychological counselling. However, this report has demonstrated that even without such incentives, there has been a significant increase in the use of psychological counselling in the management of depression over the 3 years accompanied by no change in the overall medication rate. The overall increase in GP use of non-pharmacological clinical management techniques for a range of problems (demonstrated in Chapter 10) is also worthy of note. It will therefore be interesting to measure the effect of the introduction of the new item numbers on the relative frequency of provision of counselling, particularly if, as suggested by Hickie and Marks (2001), GPs will be required to complete a training course prior to using these items. As BEACH continues, it has the potential to measure the effect of the introduction of these and other new MBS item numbers on GP practice.

The evaluation of changes in practice over time also provides an opportunity to assess some aspects of quality of care. Changes in the pharmacological management of depression over the 3-year period demonstrated a significant substitution of the older anti-depressants with SSRIs (Chapter 14). As SSRIs are the pharmacological treatment of first choice by Australian psychiatrists for all forms of depression (Hickie et al. 1999), this change can be seen as an improvement in quality of care. Again, future trends in this practice will be measurable over time.

The use of BEACH data to measure the effect of listing a new pharmacological preparation on the PBS is clearly demonstrated in the investigation of the changes in the pattern of GP prescription or provision of NSAIDs. The coxibs were put on the PBS only during this third year of the BEACH program and its effect on GP prescribing patterns was considerable (Chapter 14). The pattern of NSAID prescribing in general practice over the past decade is worth noting. In 1990–91 GPs prescribed NSAIDs at a relative rate of 5.9 per 100 encounters (Bridges-Webb et al. 1992). In 1998–99 this rate had dropped to 5.0 per 100 encounters, increased to 5.7 per 100 in the second year of BEACH and then to 6.8 per 100 encounters in 2000–01. One possible hypothesis for this pattern of change is that during the 1990s some people did not go onto NSAID medication because of the increased knowledge of past or possible side effects. When the cox-2s became available, many of these people may have chosen to use this new type of NSAID with less fear of side effects. This would explain the fact that only a partial substitution of coxibs for other NSAIDs was demonstrated in Chapter 14 in parallel with the significant jump in the number of occasions NSAIDs were supplied or prescribed. It is worthy of note that celecoxib was the medication in second place in those most frequently supplied directly to the patient by the GP. This occurred at a rate of only 0.3 per 100 encounters, and so these supplied medications accounted for about 11% of the total celecoxib prescribed or supplied.

The current BEACH year will provide a clearer indication of the extent to which these medications are being used to replace other NSAIDs and the extent to which they are being prescribed to a new group of patients.

BEACH is the only data source that provides an indication of GP use of non-pharmacological management. Recently some media reports have raised doubt about the extent to which GPs are attempting to effect a change in patient lifestyle prior to prescribing lipid-lowering agents.

This report has demonstrated that GPs are providing advice and counselling, with particular attention to nutrition, at a rate of 46 per 100 contacts with lipid problems. Medications were prescribed at a rate of 64 per 100 contacts. This suggests that GPs are considering patient lifestyle issues in the management of lipid disorders.

The effect of GP and patient educational interventions on practice patterns can less easily be measured. Often, multiple interventions occur in parallel to system changes. For example, Chapter 14 showed a measured decrease in the relative rate of GP management of asthma over the 3-year period. Many divisions of general practice have introduced a range of programs to effect improvement in the care of people with asthma in an effort to decrease the number of hospitalisations for these patients. Increased patient education in self-management of this problem has been encouraged, as has the use of a structured management plan by all patients with diagnosed asthma. At the same time there have been a number of changes in the availability of some asthma medications for over-the-counter purchase. The extent to which each of these has affected the measured decrease in the number of attendances for asthma in general practice cannot be assessed from the BEACH data. However, this trend will be worthy of further investigation in the coming years, particularly after the introduction of new MBS item numbers related to the completion of an Asthma 3+ Visit Plan (DHAC 2001a).

Unfortunately it was not possible to investigate changes in pathology and imaging order patterns in this report. When BEACH began, the codes introduced for these orders were relatively broad. During the second year of the program the pathology test orders recorded by the GPs were investigated in detail, and under a grant from the DHAC (Diagnostics and Technology Branch) a more specific coding system was developed to reflect the terminology used by GPs in these orders. In the third year of the program, the same approach was applied to the orders for imaging recorded by GPs in Year 2. This means that the data recorded in the first year of BEACH were not coded in a manner that can be compared with that recorded in Years 2 and 3. Quality use of pathology is receiving increased attention from the DHAC (DHAC 2001b). The assessment of changes in ordering patterns for pathology and imaging for years 2–4 will be possible in the next annual report.

Patient health risk factors

The third year of results describing the risk behaviours of adults attending general practice demonstrated remarkable consistency with those of earlier years. About 19% of these adults reported they were daily smokers and about 24% reported at-risk levels of alcohol consumption (from 32.8% in 1998–99 to 34.1% in 2000–01). However there was significant increase in the proportion of patients who were classed as obese (from 18.4% to 20.2%) and in the proportion classed as overweight (from 32.8 to 34.1%)—each of these two categories rising by about 1% per year. These results suggest that GPs are provided with ample opportunity to provide their patients educational interventions regarding alcohol intake.

The extent to which they are providing advice and counselling on lifestyle and diet to patients with lipid disorders (noted above) indicates their awareness of the need for many of their patients to decrease their health risk behaviours.

15.2 Methodological issues

Cluster sampling

The statistical techniques applied in BEACH recognise that the sampling is based on GPs and that for each GP there is a cluster of encounters. It also suggests that each cluster may have its own characteristics, being influenced by the characteristics of the GP. While ideally the sample should be a random sample of GP–patient encounters, such a sampling method is impractical in the Australian healthcare system. The reader should, however, be aware that the larger the GP sample and the smaller the cluster the better. The sample size of 100,000 encounters from a random sample of 1,000 GPs has been demonstrated to be the most suitable balance between cost and statistical power and validity (Meza et al. 1995).

GP participation rates

The participation rate of GPs in BEACH was 29.8% of those with whom contact was established. This was considerably lower than the response rate for the first (38.4%) (Britt et al. 1999c) and second (39.1%) (Britt et al. 2000) BEACH years. The participating GPs were found to be older and less busy than those who declined to participate, and post-stratification weighting was applied to the encounter data to deal with these differences.

Nevertheless, the drop in participation in this third year of the program is notable and the research team believes that a number of system factors influenced this result.

- The quality assurance cycle: One of the main reasons many GPs agree to participate in BEACH is because they receive 25 audit points towards their quality assurance requirements. The 3-year QA cycle therefore influences response rates.
  - BEACH 1998–99 started in April of the last year of the QA triennium. Those GPs who had not yet gained their QA points may have been keen to participate. It also included the first 3 months of the new QA cycle, when those keen to complete the audit requirements early in the triennium may have been attracted to the BEACH program when approached.
  - BEACH 1999–00 started in April in the first year of the new QA triennium and therefore included 9 months of the first year and 3 months of the second. Many GPs may have been keen to complete their requirements at this early to middle stage of the triennium.
  - BEACH 2000–01 started in April 2000 and included 9 months of year 2 of the triennium and the first 3 months of the last year of the triennium. Most GPs said they had completed their audit requirements when randomly approached in the BEACH sample. Many of those who still needed their audit points for the current triennium appeared to feel no urgency about the matter, as they still had until the end of 2001 to do so.

  If these assumptions are correct, we can anticipate an upsurge in response rates in the current beach year (Year 4).

- In the year 2000 the RACGP distributed a new document outlining many new and varied options available to GPs for their audit requirements. Sudden availability of a wide range of new options may well have influenced GPs to complete an alternative option prior to being approached through random sampling for the BEACH program.
- There are increasing demands being made on GPs to participate in a wide range of non-clinical activities such as divisional projects and programs and other audits (such as those offered by the National Prescribing Service), and this may influence the extent to which they are willing to participate in BEACH.
- GPs aged less than 35 years were underrepresented in the final GP sample and this could be due to the fact that general practice registrars are not required to undertake QA activities during training and during the QA triennium of completion of training. Some incentives may need to be introduced to encourage participation of these younger GPs in BEACH. A similar issue is arising with recruitment of the increasing number of unrecognised GPs now allowed to practice in needy rural areas, who by special arrangement can claim A1 Medicare items of service but who are not required to undertake QA activities. Incentives may also be required to encourage the participation of these GPs to ensure sufficient representation of general practice in these areas.
- Sampling issues also affect recruitment levels but these have been reasonably constant influences over the period of the BEACH program.

  Eight per cent of the GPs in the sample provided by the DHAC from the HIC records could not be contacted. A large proportion of these were not practising at the time of recruitment, having retired, died, gone overseas or taken maternity leave since their selection from the HIC records. As the aim is to represent active, practising GPs the exclusion of these GPs from the sample is a valid and necessary action. However, there were also some GPs who had left the practice to which the BEACH approach letter was sent, and could not be traced. In many of these cases the practice informed recruiting staff that the GP selected had not been at the practice for some years. This suggests that the HIC system of practice address registration is not error-free.

Response rates to specific variables

In the second year of the BEACH study some changes were made to the layout of the forms based on the experience gained in the first year of the program. The second annual report raised some methodological issues regarding the effect of these changes on GP completion rates for some variables, including some patient characteristics and the number of repeat prescriptions (Britt et al. 2000). These effects were noted only during analysis of the Year 2 data which was conducted in parallel with the Year 3 data collection. Therefore changes could not be made for the third year.

Changes in layout were made at the end of the third year in an effort to improve completion rates for some variables. These included changes to the layout of the patient characteristic questions and more-specific instructions regarding number of repeats. The next annual report may well provide greater insight into the effects of these changes on completion rates, and therefore on reliability of these results.

Electronic BEACH data collection: a controlled trial

The BEACH program is currently a paper-based data collection program. Many people have recently suggested that with the increased GP uptake of electronic prescribing systems or

full clinical systems (electronic health records, EHRs), national data could soon be drawn passively directly from the GPs' computers. Although an attractive proposition, there are many barriers to its implementation:

- To obtain a national random sample of practising GPs each GP must have an equal chance of selection. Until all GPs are using EHRs this would not be the case. Further, with the recognised variance between GPs (Crombie 1990) it is likely that those who do not have EHRs differ from those who do. Sampling of only GPs with EHRs would therefore give a biased national result.
- Many GPs currently use electronic prescribing systems rather than full EHRs. The extent to which data are entered at encounters that do not involve a prescription is not known. Further, this report has demonstrated that drug prescription is only one of many management techniques used by GPs. The measurement of GP clinical activity should not be confined to the measurement of prescribing behaviour any more than it should be limited to activities claimed only through the MBS.
- The structure of electronic clinical systems varies, as do the coding and classification systems used. Drawing reliable and representative data from electronic clinical systems is likely to require the introduction of a standardised minimum data set and use of standard coding and classification systems in all electronic clinical systems. Such coding systems will be required for each of the data elements within the minimum data set (i.e. such variables as patient cultural background, pathology orders, clinical services, procedures etc.) as well as the problems under management).
- Issues of privacy and confidentiality also need to be resolved.

It may therefore be many years before data collection programs aiming to describe national general practice activity will be able to rely on passive data collection directly from EHRs.

Another possibility is for data to be actively collected on computer, either as the sole method of data collection (when all GPs have EHRs), or in parallel with paper-base data collection. The GPSCU has recently received funding to conduct a longitudinal matched controlled trail of active computerised data collection compared with paper-based data collection, in the Western Sydney area. Interactive software is currently being developed that reflects the data elements collected in BEACH. This initial trial software will not interact with any clinical system being used by the GP so that s/he will be required to actively complete each field covered by the recording form. However, the system will include the ICPC–2 PLUS coding system and the CAPS pharmaceutical coding system with their search engines. This will ensure that on term selection or entry, the data will be coded and classified automatically in the background.

The trial will be conducted with a sample of 40 GPs who participated in BEACH during 2000–01 and, apart from the method of data collection, the process will remain the same as that normally used in the BEACH program. The results of the two data sets will be compared after statistical adjustment for differences in the age–sex distribution of the patients seen. Management patterns will be compared after adjustment for the morbidity managed in the two time frames. If this trial demonstrates that the data collected by active computerised methods is not significantly different from that collected on paper and the method is found to be acceptable to the participating GPs, future participants in BEACH could be offered the option of paper- or computer-based methods.

Other BEACH applications

Under DHAC funding, the National Consortium for Education in Primary Medical Care (NCEPMC) has recently established an alternative pathway to general practice recognition. Practitioners who wish to take this pathway to the FRACGP examination must complete 400 hours of education prior to sitting the examination. They first must assess their educational needs so that the educational program can be planned around the individual practitioner. The general practitioners complete the BEACH process as a tool to assist in the identification of specific educational needs. Currently these practitioners complete BEACH on paper. However, if the trial of active computerised collection described above proves valid and acceptable to the GPs, participants in the Alternative Pathway program will be offered this method.

15.2 Comparing BEACH data with those from other sources

Users of the data reported in this publication might wish to compare the results with those from other sources, such as that from the HIC (HIC 2000). Although integration of data from multiple sources can provide a more comprehensive picture of the health of the Australian community, the user must keep in mind the limitations of each data set and the differences between them. Some examples are presented below.

The Pharmaceutical Benefits Scheme (PBS)

If comparing BEACH prescribing data with data from the PBS, the reader should be conscious of the following:

- Total medications in BEACH include those prescribed, supplied to the patient directly by the GP, and those advised for over-the-counter purchase.
- Each prescription recorded in the BEACH program reflects the GP's intent that the patient receives the prescribed medication and the specified number of repeats. The prescription, irrespective of the number of repeats ordered, is counted only once.
- Prescriptions are counted in BEACH irrespective of whether or not the medication is covered by the PBS for all patients, for those holding a health care card or for those who have reached the safety net threshold.
- The BEACH data does not provide information on the number of prescriptions not filled by the patient (and neither does the PBS).

In contrast, the PBS data:

- count the prescription each time it crosses the pharmacist's counter;
- count only prescribed medications subsidised by the PBS and costing more than the minimum subsidy and which are therefore covered by the PBS for all patients, or are prescribed for those holding a health care card or for those who have reached the safety net threshold.

These differences will influence not only the numbers of prescriptions counted but also their distribution. For example, the majority of hormone replacement therapies (HRTs) fall under the PBS minimum subsidy level and would not be counted in the PBS data unless patients receive the medication under the PBS scheme because they are a health care card holder or

have reached the annual safety net threshold. The PBS would therefore underestimate the number of HRT prescriptions filled and the proportion of total medications accounted for by HRTs.

The Medicare Benefits Schedule (MBS) items

If comparing the BEACH data with Medicare data, remember:

- The MBS data provided by the DHAC does not usually include data about patients and encounters funded through the Department of Veterans' Affairs. The effect of this on comparisons between data sets was demonstrated in Chapter 4 (Section 4.3) in the comparison of the age–sex distribution of patients at A1 encounters in BEACH with those of the MBS A1 items of service. In previous BEACH years it was thought the BEACH data over-represented encounters with elderly male patients, even after post-stratification weighting. In this BEACH year, the reason for this apparent over-representation became clear. The BEACH A1 items of service included encounters claimable through the Department of Veterans' Affairs and the MBS data did not. Further comparisons of the age–sex distribution of the encounters from the two data sources, excluding those in the BEACH data set that were recorded as claimable through the Department of Veterans' Affairs, discounted this apparent difference.
- The BEACH participants have the opportunity to record only one Medicare item number on each encounter form. They are instructed to select the more general item number where two item numbers apply to the consultation because additional services attracting their own item number (e.g. 30026–repair of wound) are counted as actions in other parts of the form. This results in a lesser number of 'other' Medicare items than would be counted in the Medicare data.
- The BEACH database includes data about all clinical activities, not only those billed to the MBS. Both direct (patient seen) and indirect (patient not seen but a clinical activity undertaken) consultations are recorded. Some of these are paid by other funding sources (such as State health departments, private insurance companies, workers compensation etc.) and some are provided free of charge by the GP (see Chapter 5). In contrast, the MBS data include only those GP services that have been billed to Medicare.

Pathology data from the MBS

The BEACH database includes details of pathology tests ordered by the participating GPs. When comparing these data with those in the MBS, remember:

- BEACH reflects the GP's intent that the patient have the pathology test(s) done and information as to the extent to which patients do not have the test done is not available.
- Each pathology company can respond differently to a specific test order label recorded by the GP. Further, the pathology companies can charge through the MBS only for the three most expensive tests undertaken even where more were actually undertaken. This is called 'coning' and is part of the DHAC pathology payment system.
- Pathology MBS items contain pathology tests grouped on the basis of cost. An item may therefore not give a clear picture of the precise tests performed.

The effect of these factors is that the MBS pathology data includes only those tests billed to the MBS after interpretation of the order by the pathologist and after selection of the three most expensive tests. This effect will not be random. For example, in an order for four tests to review the status of a patient with diabetes it is likely that the HbA1C will be the least expensive and will 'drop' off the billing process due to coning. This would result in an underestimate of the number of HbA1Cs being ordered by GPs.

The distributions of the two data sets will differ, reflecting on the one hand the GP order and on the other the MBS-billed services after coning and assignment of MBS item number.

Those interested in GP pathology ordering will find more detailed information from the BEACH program in *Pathology Ordering by General Practitioners in Australia 1998* (Britt et al. 1999a).

Imaging data from the MBS

Some of the issues discussed regarding pathology data also apply to imaging data. Although coning is not an issue for imaging, radiologists are free to decide whether or not the test ordered by the GP is the most suitable and whether to undertake other tests of their choosing. The MBS data therefore reflect the tests that are actually undertaken by the radiologist whereas the BEACH data reflect those ordered by the GP. Those interested in GP imaging ordering will find more detailed information from the BEACH program in *Imaging Orders by General Practitioners in Australia 1999–00* (Britt et al. 2001).

16 Conclusion

> *We believe that it would be useful for researchers to keep up databases…over several years so that changes over time and their consequences on quality of care and practice patterns can be quantified and a predictive model developed. Such a model could be used for projecting changes to the system and for planning in the future. (Norton et al. 1994)*

This report has summarised general practice activity in Australia in 2000–01 and described the normative behaviour of almost 1,000 general practitioners who together have more than 10,000 years of clinical experience in this role. Further, it has demonstrated the usefulness of continuous data collection, as opposed to one-off studies, in the measurement of changes in practice over time.

No single report can investigate all the topics of possible interest to the community, the government and industry. The examples of analyses provided in this report may help the reader understand the many ways in which this relational database can be analysed. Many other questions may arise in the reader's mind as to how a particular morbidity is managed in general practice, for whom a particular medication is prescribed, or the extent to which a specific clinical activity has changed since the BEACH program began. Others who are interested in the health of the population at a State or Territory level will find sufficient sample size already available for the more populated States to allow State based reporting. The BEACH database now contains records of about 350,000 GP–patient encounters, providing a rich data source for studies of such specific topics. Access to the data is described below.

Norton et al. (1994) suggested that an ongoing database could be useful in measuring changes over time. Australia now has such a database of general practice activity. A wide range of people from government, industry and research organisations are currently using BEACH data. The uses to which they have already been put in the area of policy development have been summarised elsewhere (Britt & Miller 2000). The potential of this rich database is immense for those interested in health services research, population health, health economics or quality of health care.

16.1 Current status of BEACH

The BEACH program is now in its fourth year. The database for the first 3-years includes data pertaining to approximately 300,000 GP–patient encounters from more than 3,000 GPs. Each year the GPSCU publishes an annual report of BEACH results through the Australian Institute of Health and Welfare in which the results from the previous BEACH data year are reported on a national basis for the more common events. Other reports use the database for secondary analyses of a selected topic or for a specific research question. A recent example is a study of imaging ordering by GPs (Britt et al. 2001).

16.2 Access to BEACH data

Public domain

In line with standard Australian Institute of Health and Welfare practice, this annual publication provides a comprehensive view of general practice activity in Australia.

Abstracts of results for the substudies conducted in the third year of the program and not reported in this document are available through the web site of the Family Medicine Research Centre (of which the GPSCU is a part) at http://www.fmrc.org.au. The subjects covered in the abstracts are listed below, together with an indication of the number of GPs and the number of encounters in each subsample.

Abstract Number	Subject	Number of encounters	Number of GPs
13	Perceived stress in general practice patients	2,891	90
14	Co-medications	12,318	211
15	Lipid-lowering medications	5,669	189
16	Effect of day and time of GP visit on billing method	5,876	196
17	Private prescription products	5,774	192
18	Drugs for the treatment of peptic ulcer and reflux	2,856	95
19	Osteoporosis	2,710	90
20	Screening and management of blood cholesterol	2,905	95
21	Diabetes—prevalence, management and screening	2,856	95
22	Asthma—prevalence, severity and management	5,495	95
23	Depression	5,624	196
24	Gastro-oesophageal reflux disease (GORD)	2,767	93

Participating organisations

Organisations providing funding for the BEACH program receive summary reports of the encounter data quarterly and standard reports about their subjects of interest. Analysis of the data is a complex task. The General Practice Statistics and Classification Unit has therefore designed standard report formats that cover most aspects of the subject under investigation. Individual data analyses are conducted where the specific research question is not adequately answered through standard reports.

External purchasers of standard reports

Non-contributing organisations may purchase standard reports or other ad hoc analyses. Charges are available on request. The General Practice Statistics and Classification Unit should be contacted for further information. Contact details are provided at the front of this publication.

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Glossary

A1 Medicare items: Medicare item numbers 1, 2, 3, 4, 13, 19, 20, 23, 24, 25, 33, 35, 36, 37, 38, 40, 43, 44, 47, 48, 50, 51, 601, 602, 720, 722, 724, 726, 728, 730, 734, 738, 740, 742, 744, 746, 749, 757, 759, 762, 765, 768, 771, 773, 775, 778, 779, 801, 803, 805, 807, 809, 811, 813, 815.

Aboriginal: The patient identifies himself or herself as an Aboriginal person.

Activity level: The number of general practice A1 Medicare items claimed during the previous three months by a participating general practitioner.

Allied and other health professionals: Those who provide clinical and other specialised services in the management of patients, including physiotherapists, occupational therapists, dietitians, dentists and pharmacists.

Chapters (ICPC–2): The main divisions within ICPC–2 there are 17 chapters primarily representing the body systems.

Complaint: A symptom or disorder expressed by the patient when seeking care.

Component (ICPC–2): In ICPC–2 there are seven components which act as a second axis across all chapters.

Consultation: See *Encounter*

Diagnosis/problem: A statement of the provider's understanding of a health problem presented by a patient, family or community. GPs are instructed to record at the most specific level possible from the information available at the time. It may be limited to the level of symptoms.

- *new problem:* The first presentation of a problem, including the first presentation of a recurrence of a previously resolved problem but excluding the presentation of a problem first assessed by another provider.
- *old problem:* A previously assessed problem that requires ongoing care. Includes follow-up for a problem or an initial presentation of a problem previously assessed by another provider.

Encounter (enc): Any professional interchange between a patient and a GP.

- *indirect:* Encounter where there is no face-to-face meeting between the patient and the GP but a service is provided (eg: prescription, referral).
- *direct:* Encounter where there is a face-to-face meeting of the patient and the GP.

Direct encounters can be further divided into:

Medicare-claimable

- A1 items of service: MBS item numbers 1–51, 601, 602
  - *surgery consultations:* encounters identified by any one of MBS item numbers 3; 23; 36; 44
  - *home visits:* encounters identified by any one of MBS item numbers 4; 24; 37; 47
  - *hospital encounters:* encounters identified by any one of MBS item numbers 19; 33; 40; 50
  - *nursing home visits:* encounters identified by any one of MBS item numbers 20; 35; 43; 51
  - *other institutional visits:* encounters identified by any one of MBS item numbers 13; 25; 38; 40
  - *other MBS encounters:* encounters identified by an MBS item number that does not identify place of encounter
- *Workers compensation:* encounters paid by workers compensation insurance
- *Other paid:* encounters paid from another source (e.g. State).

General practitioner (GP): 'A medical practitioner who provides primary comprehensive and continuing care to patients and their families within the community' (Royal Australian College of General Practitioners).

Grouper: Multiple ICPC–2 or ICPC–2 PLUS codes which are grouped together for purposes of analysis.

Medication: Medication which is prescribed, advised for over-the-counter purchase or provided by the GP at the encounter.

Medication status:

- n*ew:* The medication prescribed / advised / provided at the encounter is being used for the management of the problem for the first time.
- n*ontinuation:* The medication prescribed / advised / provided at the encounter is a continuation or repeat of previous therapy for this problem.
- o*ld:* see *Continuation*

Morbidity: Any departure, subjective or objective, from a state of physiological wellbeing. In this sense, sickness, illness and morbid conditions are synonymous.

Patient status: The status of the patient to the practice

- *new patient*: The patient has not been seen before in the practice.
- *old patient:* The patient has attended the practice before.

Problem managed: See *Diagnosis/problem*

Provider: A person to whom a patient has access when contacting the healthcare system.

Reasons for encounter (RFEs): The subjective reasons given by the patient for seeing or contacting the general practitioner. These can be expressed in terms of symptoms, diagnoses or the need for a service.

Recognised GP: A medical practitioner who is:

- vocationally recognised under Section 3F of the Health Insurance Act, ***or***
- a holder of the Fellowship of the Royal Australian College of General Practitioners who participates in, and meets the requirements for, quality assurance and continuing medical education as defined in the RACGP Quality Assurance and Continuing Medical Education Program, ***or***
- undertaking an approved placement in general practice as part of a training program for general practice leading to the award of the Fellowship of the Royal Australian College of General Practitioners or undertaking an approved placement in general practice as part of some other training program recognised by the RACGP as being of equivalent standard. (Medicare Benefits Schedule book, 1 November 1998)

Referral: The process by which the responsibility for part or all of the care of a patient is temporarily transferred to another health care provider. Only new referrals to specialist, allied health professionals, and for hospital and nursing home admissions arising at a recorded encounter are included. Continuation referrals are not included. Multiple referrals can be recorded at any one encounter.

Rubric: The title of an individual code in ICPC–2 PLUS.

Statins: HMG CoA reductase inhibitors.

Torres Strait Islander: The patient identifies himself or herself as a Torres Strait Islander.

Tricyclics: non-selective monoamine re-uptake inhibitor medications.

Work-related problem: Irrespective of the source of payment for the consultation, it is likely in the GP's view that the problem has resulted from work-related activity or workplace exposures or that a pre-existing condition has been significantly exacerbated by work activity or workplace exposure.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
AHP	Allied health professional
AMA	Australian Medical Association
AMTS	Australian Morbidity and Treatment Survey 1990–91
ATC	Anatomical Therapeutic Chemical (classification)
AUDIT	Alcohol Use Disorders Identification Test
BEACH	Bettering the Evaluation And Care of Health
BMI	Body mass index
BMMS	Better Medication Management System
C&S	Culture and sensitivity
CAPS	Coding Atlas for Pharmaceutical Substances
CI	Confidence interval (in this report 95% CI is used)
CNS	Central nervous system
COAD	Chronic obstructive airways disease
CT	Computed tomography
CVS	Cardiovascular system
DHAC	Commonwealth Department of Health and Aged Care
DHHCS	Commonwealth Department of Health, Housing and Community Services
DHSH	Department of Human Services and Health
DPIE	Department of Primary Industries and Energy
Enc	Encounter
ESR	Erythrocyte sedimentation rate
EUC	Electrolytes, urea and creatinine
FBC	Full blood count
FMRC	Family Medicine Research Centre, The University of Sydney
GISCA	National Centre for Social Applications of Geographic Information Systems
GP	General practitioner
GPSCU	General Practice Statistics and Classification Unit, University of Sydney, a collaborating unit of the Australian Institute of Health and Welfare
HIC	Health Insurance Commission
HRT	Hormone replacement therapy
ICPC	International Classification of Primary Care
ICPC–2	International Classification of Primary Care (Version 2)

ICPC–2 PLUS	An extended vocabulary of terms classified according to ICPC–2
IHD	Ischaemic heart disease
LCL	Lower confidence limit
MAOIs	monoamine oxidase inhibitors medications
MBS	Medicare Benefits Schedule
MC&S	Microscopy, culture and sensitivity
NEC	Not elsewhere classified
NESB	The patient reports coming from a non-English-speaking background, i.e. a language other than English is spoken at home.
NHMRC	National Health and Medical Research Council
NOS	Not otherwise specified
NSAID	Non-steroidal anti-inflammatory medications
OA	Osteoarthritis
OTCs	Medications advised for over-the-counter purchase
PBS	Pharmaceutical Benefits Scheme
PIP	Practice Incentive Program of the Commonwealth Department of Health and Aged Care
QA	Quality assurance (in this case the Quality Assurance Program of the Royal Australian College of General Practitioners)
RACGP	Royal Australian College of General Practitioners
RFE(s)	Reason(s) for encounter (see Glossary)
RRMA	Rural, remote and metropolitan area classification
SAND	Supplementary analysis of nominated data
SAS	Statistical Analysis System
SSRIs	Serotonin reuptake inhibitor medications
UCL	Upper confidence limit
URTI	Upper respiratory tract infection
UTI	Urinary tract infection
VA	Veterans' Affairs
WHO	World Health Organization
WONCA	World Organization of Family Doctors

Appendix 1: Example of a recording form

BEACH (Bettering the Evaluation And Care of Health) - Morbidity and Treatment Survey - National DOCID

Encounter Number | Date of encounter ___/___/___ | Date of Birth ___/___/___ | Sex M ☐ F ☐ | Patient Postcode

New patient ☐ | Health Care Card/Benefits holder ☐ | Veterans Affairs Card holder ☐ | NESB ☐ | Aboriginal ☐ | Torres Strait Islander ☐

PATIENT NOT SEEN ☐

Item No: (if applicable)

VA paid ☐ State/Other paid ☐ | Workers comp paid ☐ No charge ☐

START Time ___:___ AM / PM (please circle)

Patient Reasons for Encounter
1.
2.
3.

Diagnosis/ Problem ①: New Problem ☐ Work related ☐

Drug Name for this problem	Strength	Dose	Frequency	No. of Rpts	OTC Advised	GP Supply	New Drug
1.							
2.							
3.							
4.							

Procedures, other treatments, counselling this consult for this problem
1. 2.

Diagnosis/ Problem ②: New Problem ☐ Work related ☐

Drug Name for this problem	Strength	Dose	Frequency	No. of Rpts	OTC Advised	GP Supply	New Drug
1.							
2.							
3.							
4.							

Procedures, other treatments, counselling this consult for this problem
1. 2.

Diagnosis/ Problem ③: New Problem ☐ Work related ☐

Drug Name for this problem	Strength	Dose	Frequency	No. of Rpts	OTC Advised	GP Supply	New Drug
1.							
2.							
3.							
4.							

Procedures, other treatments, counselling this consult for this problem
1. 2.

Diagnosis/ Problem ④: New Problem ☐ Work related ☐

Drug Name for this problem	Strength	Dose	Frequency	No. of Rpts	OTC Advised	GP Supply	New Drug
1.							
2.							
3.							
4.							

Procedures, other treatments, counselling this consult for this problem
1. 2.

NEW REFERRALS, ADMISSIONS Problem(s)
1. _____ 1 2 3 4
2. _____ 1 2 3 4

IMAGING/Other tests Body site Problem(s)
1. _____ - _____ 1 2 3 4
2. _____ - _____ 1 2 3 4

PATHOLOGY Problem(s)
1. _____ 1 2 3 4
2. _____ 1 2 3 4
3. _____ 1 2 3 4

PATHOLOGY (cont) Problem(s)
4. _____ 1 2 3 4
5. _____ 1 2 3 4

Patient's
Height: ___ cm
Weight: ___ kg

To the patient if 18+:
How often do you have a drink containing alcohol?
Never ☐
Monthly or less ☐
Once a week ☐
2-4 times a week ☐
5+ times a week ☐

How many standard drinks do you have on a typical day when you are drinking? ___

How often do you have 6 or more standard drinks on one occasion?
Never ☐
Monthly or less ☐
Once a week ☐
2-4 times a week ☐
5+ times a week ☐

To the patient if 18+:
Which best describes your smoking status?
Smoke daily ☐
Smoke occasionally ☐
Previous smoker ☐
Never smoked ☐

FINISH Time ___:___ AM / PM (please circle)

BA

Appendix 2: GP characteristics questionnaire 2000–01

The University of Sydney
at Westmead Hospital

General Practice Statistics and Classification Unit
Family Medicine Research Centre
Department of General Practice

a collaborating unit of the
Australian Institute of Health and Welfare

AIHW

Please fill in boxes or circle answers where appropriate

Doctor Identification Number [ ][ ][ ][ ]

1. Sex: ..... **Male / Female**

2. Age ..... [ ]

3. How many years have you spent in general practice? ..... [ ]

4. Number of general practice sessions you usually work per week? ..... [ ]

5. How many **full-time** (>5 sessions per week) general practitioners work with you at this practice? (Practice= shared medical records) ..... [ ]

6. How many **part-time** (<6 sessions per week) general practitioners work with you at this practice? (Practice = shared medical records) ..... [ ]

7. Do you conduct more than **50%** of consultations in a language other than English? ..... **Yes / No**

8. What is the postcode of your major practice address? ..... [ ][ ][ ][ ]

9. Country of graduation: ..... **Aust** **NZ** **Asia** **UK** **Other:(specify)** .....

10. General Practice training status ..... (CSCT or RACGP training programme)? **Presently training** **Completed training** **Not Applicable**

11. Do you hold FRACGP? ..... **Yes / No**

12. Are you a member of any of the following organisations? **AMA** **RACGP** **RDAA**

13. How do you routinely instruct pharmacists on the substitution of generic drugs? **No substitute allowed** **Substitute allowed**

14. To what extent are computers used at your major practice address? *(Circle as many as apply)*
Not at all **Billing** **Prescribing** **Medical Records** **Internet / Email** **Other Admin**

15. Is this practice accredited ? ..... **Yes / No**

16. What are the normal after-hours arrangements for your practice?
Practice does its own **Co-operative with oth. practices** **Deputising service** **Referral to other service (eg A&E)** **Other** **None**

17. Do you have your own ***on-site*** NATA accredited pathology lab? ..... **Yes / No**

18. Which external pathology provider does your practice normally use?
Name of provider.....
Provider's Postcode [ ][ ][ ][ ]

GPS&CU, Acacia House, Westmead Hospital, WESTMEAD, 2145.
Ph: 02 98458151 fax: 02 98458155 email: janc@genprac.wsahs.nsw.gov.au Web http://www.fmru.org.au

Appendix 3: Reasons for encounter and problems managed—code groups from ICPC–2 and ICPC–2 PLUS

Group	ICPC rubric	ICPC–2 PLUS code	ICPC/ICPC–2 PLUS label
Abdominal pain	D01		Pain/cramps; abdominal general
	D06		Pain; abdominal localised; other
Abnormal test results	A91		Abnormal results investigations NOS
	B84		Abnormal white cells
	U98		Abnormal urine test NOS
	X86		Abnormal Pap smear
Anaemia	B80		Iron deficiency anaemia
	B81		Anaemia; vitamin B12/folate deficiency
	B82		Anaemia other/unspecified
Anxiety	P01		Feeling anxious/nervous/tense
	P74		Anxiety disorder/anxiety state
Arthritis		L70009	Arthritis; pyogenic
		L70010	Arthritis; viral
		L81003	Arthritis; traumatic
		L83010	Arthritis; spine cervical
		L84003	Arthritis; spine
		L84023	Arthritis; spine thoracic
		L84024	Arthritis; spine lumbar
		L84025	Arthritis; lumbosacral
		L84026	Arthritis; sacroiliac
		L89004	Arthritis; hip
		L90004	Arthritis; knee
		L91009	Arthritis
		L91010	Arthritis; acute
		L91011	Arthritis; allergic
		L91012	Polyarthritis
		L92006	Arthritis; shoulder
		S91002	Arthritis; psoriatic
		T99063	Arthritis; crystal (excl. gout)

(continued)

Appendix 3 (continued): Reasons for encounter and problems managed—code groups from ICPC–2 and ICPC–2 PLUS

Group	ICPC rubric	ICPC–2 PLUS code	ICPC/ICPC–2 PLUS label
Back complaint	L02		Back symptom/complaint
	L03		Low back symptom/complaint
	L86		Back syndrome with radiating pain
Check-up—all	–30		Medical examination/health evaluation, complete
	–31		Medical examination/health evaluation, partial
	X37		Pap smear
Check-up—ICPC chapter	A30;A31		General
	B30;B31		Blood
	D30;D31		Digestive
	F30;F31		Eye
	H30;H31		Ear
	K30;K31		Cardiovascular
	L30;L31		Musculoskeletal
	N30;N31		Neurological
	P30;P31		Psychological
	R30;R31		Respiratory
	S30;S31		Skin
	T30;T31		Endocrine
	U30;U31		Urology
	W30;W31		Prenatal/postnatal
	X30;X31;X37		Female genital
	Y30;Y31		Male genital
	Z30;Z31		Social
Depression	P03		Feeling depressed
	P76		Depressive disorder
Diabetes—non gestational)	T89		Diabetes; insulin-dependent
	T90		Diabetes; non-insulin-dependent
Diabetes—all*	T89		Diabetes; insulin-dependent
	T90		Diabetes; non-insulin-dependent
	W85		Gestational diabetes

(continued)

Appendix 3 (continued): Reasons for encounter and problems managed—code groups from ICPC–2 and ICPC–2 PLUS

Group	ICPC rubric	ICPC–2 PLUS code	ICPC/ICPC–2 PLUS label
Fracture	L72		Fracture; radius/ulna
	L73		Fracture; tibia/fibia
	L74		Fracture; hand/foot bone
	L75		Fracture; femur
	L76		Fracture; other
		L99017	Fracture; non-union
		L99018	Fracture; pathological
		L99019	Fracture; malunion
		N80012	Fracture; skull (base)
		N80013	Fracture; skull
		N80014	Injury; head; fracture
Hypertension/high BP (RFEs)	K85		Elevated blood pressure without hypertension
	K86		Uncomplicated hypertension
	K87		Hypertension with involvement of target organs
		W81003	Hypertension in pregnancy
Hypertension (problems)	K86		Uncomplicated hypertension
	K87		Hypertension with involvement of target organs
		W81003	Hypertension in pregnancy
Immunisation	A44		Preventive immunisation/medication–general/unspecified
	D44		Preventive immunisation/medication; hepatitis
	N44		Preventive immunisation/medication; tetanus
	R44		Preventive immunisation/medication; influenza
Ischaemic heart disease	K74		Ischaemic heart disease without angina
	K76		Ischaemic heart disease with angina
Menstrual problems	X02		Pain; menstrual
	X03		Pain; intermenstrual
	X05		Menstruation; absent/scanty
	X06		Menstruation; excessive
	X07		Menstruation; irregular/frequent
	X08		Intermenstrual bleeding
	X09		Premenstrual symptoms/complaint
	X10		Postponement of menstruation

(continued)

Appendix 3 (continued): Reasons for encounter and problems managed—code groups from ICPC–2 and ICPC–2 PLUS

Group	ICPC rubric	ICPC–2 PLUS code	ICPC/ICPC–2 PLUS label
Osteoarthritis		L83011	Osteoarthritis; spine; cervical
		L84004	Osteoarthritis; spine
		L84009	Osteoarthritis; spine; thoracic
		L84010	Osteoarthritis; spine; lumbar
		L84011	Osteoarthritis; lumbosacral
		L84012	Osteoarthritis; sacroiliac
		L89001	Osteoarthritis; hip
		L90001	Osteoarthritis; knee
		L91001	Osteoarthritis; degenerative
		L91003	Osteoarthritis
		L92007	Osteoarthritis; shoulder
Oral contraception	W10		Contraception; postcoital
	W11		Oral contraceptive
	W50		Medication; reproductive system
Pregnancy	W01		Question of pregnancy
	W78		Pregnancy
	W79		Unwanted pregnancy
Prescription	–50		Medication prescription/request/renewal/injection
Rash	S06		Localised redness/erythema/rash of skin
	S07		Generalised/multiple redness/erythema/rash skin
Rheumatoid arthritis	L88		Rheumatoid arthritis
Swelling (skin)	S04		Localised swelling/papules/ lump/mass/ skin/subcutaneous tissue
	S05		Generalised swelling/papules/ lumps/mass/ skin/subcutaneous tissue
Sprain / strain		L19014	Strain; muscle(s)
	L77		Sprain/strain; ankle
	L78		Sprain/strain; knee
	L79		Sprain/strain; joint NOS
		L83023	Sprain; neck
		L83024	Strain; neck
		L84020	Sprain; back
		L84021	Strain; back
Test results	–60		Results test/procedures
	–61		Results examinations/test/record/letter other provider
Tonsillitis	R76		Tonsillitis; acute
	R90		Hypertroph; tonsils/adenoids
Urinary tract infection (UTI)	U70		Pyelonephritis/pyelitis; acute
	U71		Cystitis/other urinary infection;non-venereal

Appendix 4: Clinical treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Advice—care of other person	A45022	Advice; care of sick 3rd person
	A45023	Advice; care of well 3rd person
	A58001	Counselling; terminal care
Advice/education	A45002	Advice/education
	B45002	Advice/education; blood
	D45002	Advice/education; digestive
	F45002	Advice/education; eye
	H45002	Advice/education; ear
	K45002	Advice/education; cardiovascular
	L45002	Advice/education; musculoskeletal
	N45002	Advice/education; neurological
	P45001	Advice/education; psychological
	R45002	Advice/education; respiratory
	S45002	Advice/education; skin
	T45002	Advice/education; endocrine/metabolic
	U45002	Advice/education; urology
	W45004	Advice/education; reproductive
	X45002	Advice/education; genital; female
	Y45002	Advice/education; genital; male
	Z45002	Advice/education; social
Advice/education—legal/other	A45017	Advice/education; compensation
	Z45009	Advice/education; legal
Advice/education—medication	A45015	Advice/education; medication
	A48003	Review; medication
	A48005	Increased; drug dosage
	A48006	Decreased; drug dosage
	A48007	Change (in); drug dosage
	A48008	Stop medication
	A48009	Recommend medication
	A48010	Change (in); medication
Advice/education—mothercare	A45024	Advice; mothercare

(continued)

Appendix 4 (continued): Clinical treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Advice/education—treatment	A45016	Advice/education; treatment
	A45019	Advice; time off work
	A45020	Advice; rest/fluids
	A45021	Advice; naturopathic treatment
	A48004	Review; treatment
	S45004	Advice/education; RICE
	T45004	Advice/education; diabetes
Consultation with primary care provider	–46	
Consultation with specialist	–47	
Counsel/advice—STDs	A45012	Advice/education; STD
	A58008	Counselling; STDs
	X58004	Counselling; STDs; female
	Y58004	Counselling; STDs; male
Counsel/advice—alcohol	P45005	Advice/education; alcohol
	P58009	Counselling; alcohol
Counsel/advice—drug abuse	P45006	Advice/education; illicit drugs
	P58010	Counselling; drug abuse
Counsel/advice—exercise	A45004	Advice/education; exercise
	A58005	Counselling; exercise
Counsel/advice—health/body	A45005	Advice/education; health
	A45009	Health promotion
	A45010	Information; health
	A45011	Health promotion; injury
	A45018	Advice/education; body
	A58006	Counselling; health
Counsel/advice—lifestyle	P45008	Advice/education; lifestyle
	P58012	Counselling; lifestyle
Counsel/advice—nutrition/weight	A45006	Advice/education; diet
	T45005	Advice/education; nutritional
	T45007	Advice/education; weight management
	T58002	Counselling; weight management
Counsel/advice—occupational	Z45004	Advice/education; occupation
	Z45010	Advice/education; work practice
	Z58004	Counselling; occupational

(continued)

Appendix 4 (continued): Clinical treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Counsel/advice—other	A45014	Advice/education; travel
	P45009	Advice/education; sexuality
	P45010	Advice/education; life stage
	P58016	Counselling; life stage
	Z58005	Counselling; environment
Counsel/advice—pregnancy	W45009	Advice/education; pregnancy
	W58004	Counselling; prenatal
	W58006	Counselling; problem; pregnancy
Counsel/advice—prevention	A45025	Advice/education; immunisation
	A58007	Counselling; prevention
	X45004	Advice/education; breast self exam
	Z45005	Advice/education; environment
Counsel/advice—relationship	Z45006	Advice/education; parenting
	Z45007	Advice/education; mothering
	Z45008	Advice/education; fathering
	Z58001	Counselling; conjugal; partner
	Z58003	Counselling; marriage/relationship
	Z58006	Counselling; parenting
	Z58007	Counselling; mothering
	Z58008	Counselling; fathering
	Z58009	Counselling; family
Counsel/advice—relaxation	P45007	Advice/education; relaxation
	P58011	Counselling; relaxation
	P58017	Counselling; stress management
Counsel/advice—smoking	P45004	Advice/education; smoking
	P58008	Counselling; smoking
Counselling—problem	A58002	Counselling; problem
	A58003	Counselling; individual
	B58001	Counselling; problem; blood/blood-forming
	D58001	Counselling; problem; digestive
	F58001	Counselling; problem; eye
	H58001	Counselling; problem; ear
	K58001	Counselling; problem; cardiovascular
	L58001	Counselling; problem; musculoskeletal
	N58001	Counselling; problem; neurological
	R58001	Counselling; problem; respiratory
	S58001	Counselling; problem; skin
	T58001	Counselling; problem; endocrine/metabolic

(continued)

Appendix 4 (continued): Clinical treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
	U58001	Counselling; problem; urology
	W58003	Counselling; problem; reproductive
	X58001	Counselling; problem; genital; female
	X58003	Counselling; sexual; physical; female
	Y58001	Counselling; problem; genital; male
	Y58003	Counselling; sexual; physical; male
	Z58002	Counselling; problem; social
Counselling—psychological	P58001	Counselling; psychiatric
	P58002	Psychotherapy
	P58004	Counselling; psychological
	P58005	Counselling; sexual; psychological
	P58006	Counselling; individual; psychological
	P58007	Counselling; bereavement
	P58013	Counselling; anger
	P58014	Counselling; self-esteem
	P58015	Counselling; assertiveness
	P58018	Therapy; group
Family planning	W14015	Counselling; genetic; female
	W45006	Advice/education; preconceptual
	W45007	Advice/education; contraception
	W45008	Advice/education; family plan; female
	W58001	Counselling; abortion
	W58005	Counselling; terminate pregnancy
	W58007	Counselling; preconceptual
	W58012	Counselling; sterilisation; female
	W58013	Counselling; family planning; female
	Y14006	Counselling; genetic; male
	Y45006	Advice/education; family plan; male
	Y58005	Counselling; sterilisation; male
	Y58006	Counselling; family planning; male
Observe/wait	A45001	Observe/wait
	B45001	Observe/wait; blood/blood-forming organs
	D45001	Observe/wait; digestive
	F45001	Observe/wait; eye
	H45001	Observe/wait; ear
	K45001	Observe/wait; cardiovascular
	L45001	Observe/wait; musculoskeletal
	N45001	Observe/wait; neurological
	P45002	Observe/wait; psychological
	R45001	Observe/wait; respiratory

(continued)

Appendix 4 (continued): Clinical treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
	S45001	Observe/wait; skin
	T45001	Observe/wait; endocrine/metabolic
	U45001	Observe/wait; urology
	W45003	Observe/wait; reproductive
	X45001	Observe/wait; genital; female
	Y45001	Observe/wait; genital; male
	Z45001	Observe/wait; social
Other admin/document	–62 (excluding sickness certificate A62008	
Reassurance support	A58010	Reassurance/support
Sickness certificate	A62008	Admin; certificate; sickness
Clinical measurements		
Electrical tracings	–42	
Diagnostic radiology/imaging	–41	
Physical medicine/rehabilitation	–57	

Note: NOS—Not otherwise specified, –(code) signifies that the concept includes all of the specified code across all chapters of ICPC–2.

Appendix 5: Procedural treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Assist at operation	A69006	Assist at operation
	B69002	Assist at operation; blood
	D69002	Assist at operation; digestive
	F69002	Assist at operation; eye
	H69002	Assist at operation; ear
	L69002	Assist at operation; musculoskeletal
	N69002	Assist at operation; neurological
	P69002	Assist at operation; psycho
	R69002	Assist at operation; respiratory
	S69002	Assist at operation; skin
	T69002	Assist at operation; endo/metab
	U69002	Assist at operation; urological
	W69002	Assist at operation; reproductive
	X69002	Assist at operation; genital; female
	Y69002	Assist at operation; genital; male
	Z69003	Assist at operation; social
Contraceptive device fit/supply/remove	W12003	Contraception; IUD
	W12004	Insertion; IUCD
	W12005	Removal; IUCD
	W14010	Contraception; diaphragm
	W14012	Fitting (of); diaphragm
	W14013	Supply; diaphragm
	W14014	Removal; diaphragm
Pregnancy test	W33001	Test; urine; pregnancy
	W33002	Test; pregnancy
Sensitivity test	–32	
Urine test	–35	
Physical function test	–39	
Diagnostic endoscopy	–40	
Diagnostic radiology/imaging	–41	
Electrical tracings	–42	
Other diagnostic procedures	–43	

(continued)

Appendix 5 (continued): Procedural treatment—code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Other preventive procedures/high-risk medication/condition	–49	
Incise/drainage/flushing/aspiration/removal body fluid	–51	
Instrumentation/catheterisation/intubation/dilution	–53	
Repair/fixation–suture/cast/prosthetic device (apply/remove)	–54	
Local injection/infiltration	–55	
Dressing/pressure/compression/ tamponade	–56	
Physical therapy/rehabilitation	–57	
Other procedures/minor surgery NEC	–59	
Test; glucose	T34005	Test; glucose

Note: – (code) signifies that the concept includes all of the specified code across all chapters of ICPC–2; NEC—not elsewhere classified.

Appendix 6: Referrals—code groups from ICPC–2 and ICPC–2 PLUS

Referral group	ICPC–2 PLUS code	ICPC–2 PLUS label
Allied health services	–66	Referral to other provider/nurse/therapist/social worker
	–68 excluding A68009 and A68011	Other referrals NEC
	Z67002	Referral; respite care
Specialist	–67 excluding A67010; A67011; P67005 and Z67002	Referral to physician/specialist/clinic/hospital
	A68009	Referral; oncologist
Emergency department	A67011	Referral; A & E
Hospital	A67010	Referral; hospital
	P67005	Referral; hospital; psychiatrist
Other referrals	A68011	Referral

Note: – (code) signifies that the concept includes all of the specified code across all chapters of ICPC–2; NEC—not elsewhere classified; A & E— accident and emergency.

Appendix 7: Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
Chemistry	Amylase	D34004	Test; amylase
	B12	B34015	Test; B12
		D34009	Test; Schillings
	C reactive protein	A34005	Test; C reactive protein
	Calcium/phosphate	A34006	Test; calcium
		A34013	Test; phosphate
	Cardiac enzymes	D34005	Test; asparate aminotransferase
		K34003	Test; cardiac enzymes
		K34004	Test; creatine kinase
	Chemistry; other	A33023	Test; alpha fetoprotein
		A33026	Test; cancer antigen 125
		A33027	Test; cancer antigen 15.3
		A33028	Test; cancer antigen 19.9
		A33029	Test; carcinoembryonic antigen
		A34015	Test; protein
		A34018	Vitamin assay
		A34019	Test; lead
		A34020	Test; blood gas analysis
		A35004	Test; urine sodium
		B34023	Test; transferrin
		D34002	Test; alanine aminotransferase
		K34001	Test; blood; digitalis
		N34001	Test; blood; phenylhydantoin
		P34003	Test; methadone
		T34021	Test; C peptide
	Digoxin	A34002	Drug assay
		K34005	Test; digoxin
		N34003	Test; phenytoin
		P34002	Test; lithium
	Drug screen	A35003	Drug screen
	Electrolytes, urea, creatinine	A34007	Test; chloride
		A34008	Test; electrolytes

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		A34010	Test; EUC
		U34002	Test; creatinine
		U34003	Test; urea
		A34014	Test; potassium
		A34017	Test; sodium
	Ferritin	B34016	Test; ferritin
		B34019	Tests; iron studies
	Folic acid	B34017	Test; folic acid
		B34024	Test; folate (red cell)
	Glucose—all*	T34005	Test; glucose
		T34009	Test; glucose tolerance
		T34023	Test; glucose (fasting/random)
	HbA1C	T34010	Test; HbA1C
		T34017	Test; fructusamine
		T34022	Test; HBA1
	Hormone assay	A34003	Hormone assay
		D33015	Test; Antigliadin antibody
		T34007	Test; cortisol
		T34018	Test; androgens
		T34019	Test; insulin
		W34005	Test; HCG
		W34006	Test; BHCG level (titre/quant)
		X34002	Test; LH
		X34003	Test; progesterone
		X34004	Test; oestradiol
		X34005	Test; FSH
	Lipids	T34001	Check-up; cholesterol
		T34004	Test; lipids profile
		T34006	Test; cholesterol
		T34011	Test; cholesterol HDL
		T34013	Test; cholesterol LDL
		T34016	Test; triglycerides
		T34020	Test; chol/trig
		T34024	Test; free fatty acids
	Liver function	A34004	Test; albumin
		D34003	Test; alkaline phosphatase

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		D34006	Test; bilirubin
		D34007	Test; gGT
		D34008	Test; liver function
		T34012	Test; LDH
	Multibiochemical analysis	A34012	Test; multi biochemical analysis
		A34021	Test; E & LFT
	Prostate specific antigen	Y34002	Test; acid phosphatase
		Y34003	Test; prostate-specific antigen
	Thyroid function	T34015	Test; thyroid function
	Urate/uric acid	U34004	Test; urate/uric acid
Cytopathology	Cytology; other	A37002	Test; cytology
		B37003	Test; cytology; blood
		D37002	Test; cytology; digestive
		F37002	Test; cytology; eye
		H37002	Test; cytology; ear
		K37002	Test; cytology; cardiovascular
		L37002	Test; cytology; musculoskeletal
		N37002	Test; cytology; neurological
		R37002	Test; cytology; respiratory
		R37003	Test; sputum cytology
		S37002	Test; cytology; skin
		T37002	Test; cytology; endocr/metabol
		U37002	Test; cytology; urology
		W37002	Test; cytology; reproduction
		Y37002	Test; cytology; genital; male
	Pap smear	X37001	Pap smear
		X37003	Test; cytology; genital; female
Haematology	Blood grouping & typing	B33001	Test; Coombs
		B33002	Test; blood grouping & typing
		B33009	Test; blood group
	Blood; other	B33003	RH; antibody titer
		B34005	Test; blood; platelets
		B34007	Test; blood; sickle cell
		B34021	Test; reticulocyte count
		B37001	Exam; bone marrow
	Coagulation	B34002	Test; blood; coagulation/bleed

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		B34003	Test; blood; coagulation time
		B34006	Test; part thromboplastin time
		B34008	Test; bleeding/coagulation time
		B34009	Test; prothrombin time
		B34014	Test; APTT
		B34022	Test; thrombin time
		B34025	Test; INR
		B34026	Test; fibrinogen
		B34028	Test; bleeding time
		B34029	Test; coagulation screen
	ESR	A34009	Test; ESR
	Full blood count	A34011	Test; full blood count
	Haemoglobin	B34018	Test; haemoglobin
Histopathology	Histology; other	A37001	Test; histology
		B37002	Test; histology; blood
		D37001	Test; histology; digestive
		F37001	Test; histology; eye
		H37001	Test; histology; ear
		K37001	Test; histology; cardiovascular
		L37001	Test; histology; musculoskeletal
		N37001	Test; histology; neurological
		R37001	Test; histology; respiratory
		T37001	Test; histology; endoc/metabol
		U37001	Test; histology; urology
		W37001	Test; histology; reproductive
		X37002	Test; histology; genital; female
		Y37001	Test; histology; genital; male
	Histology; skin	S37001	Test; histology; skin
Immunology	Anti-nuclear antibodies	L33004	Test; anti-nuclear antibodies
	Immunology; other	A32001	Test; sensitivity
		A33005	Test; immunology
		A33011	Test; HLA
		A33024	Test; bone marrow surface mark
		A33025	Test; serum electrophoresis
		B33005	Test; immunology; blood

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		B33007	Test; immunoglobulins
		B33011	Test; IgE
		B34027	Test; FBC for surface markers
		D32001	Test; sensitivity; digestive
		D33004	Test; immunology; digestive
		D33014	Test; endomysial antibody
		H33002	Test; immunology; ear
		K33002	Test; immunology; cardiovascular
		L33003	Test; immunology; musculoskeletal
		L34001	Test; lupus erythemat; cell prep
		N33002	Test; immunology; neurological
		R32004	Test; sensitivity; respiratory
		R33004	Test; immunology; respiratory
		S32001	Test; sensitivity; skin
		S33002	Test; immunology; skin
		S33004	Test; skin patch
		T33002	Test; immunology; endocrine/metabolic
		U33003	Test; immunology; urology
		W33007	Test; immunology; reproductive
		X33002	Test; immunology; genital; female
		Y33002	Test; immunology; genital; male
	RAST	A34016	Test; RAST
	Rheumatoid factor	L33001	Test; rheumatoid factor
Infertiliity/pregnancy test	Infertility/pregnancy	W33001	Test; urine; pregnancy
		W33002	Test; pregnancy
		W34002	Test; blood; pregnancy
		W34003	Test; antenatal
		Y38002	Test; sperm count
		Y38003	Test; semen examination
Microbiology	Antibody	A33003	Test; antibody
	Cervical swab	X33004	Test; cervical swab
	Chlamydia	A33006	Test; chlamydia
		A33034	Test; chlamydia direct immunofl
		X33006	Test; viral culture; genital; female
	Ear swab and C&S	H33003	Test; ear swab and C&S

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
	Faeces MC&S	D33002	Stool(s); culture
		D33008	Test; faeces MC&S
		D36001	Test; faeces; cyst/ova/parasite
	Fungal ID/sensitivity	A33008	Test; fungal ID/sensitivity
		A33030	Test; skin scraping fungal MCS
	H pylori	D33009	Test; H Pylori
		D33005	Test; hepatitis A serology
		D33006	Test; hepatitis B serology
		D33007	Test; hepatitis C serology
		D33013	Test; hepatitis serology
	HIV	A33021	Test; cytomegalovirus serology
		B33006	Test; HIV
		B33008	Test; AIDS screen
	Microbiology; other	A33004	Test; microbiology
		A33007	Test; culture and sensitivity
		A33012	Test; mycoplasma serology
		A33013	Test; parvovirus serology
		A33015	Test; Barmah forest virus
		A33016	Test; Antistreptolysin O Titre
		A33017	Test; herpes simplex culture
		A33019	Test; herpes simplex serology
		A33020	Test; toxoplasmosis serology
		A33033	Test; swab MCS
		B33004	Test; microbiology; blood
		B33010	Test; serum immumnoglobulins
		D33003	Test; microbiology; digestive
		D33010	Test; hepatitis D serology
		D33011	Test; hepatitis E serology
		D33012	Test; rotavirus
		D33016	Test; hepatitis C antibody
		D33017	Test; hepatitis B surf antigen
		F33001	Test; microbiology; eye
		H33001	Test; microbiology; ear
		K33001	Test; microbiology; cardiovascular
		L33002	Test; microbiology; musculoskeletal
		N33001	Test; microbiology; neurological
		R33001	Culture; tuberculosis
		R33002	Culture; throat
		R33003	Test; microbiology; respiratory

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		S33001	Test; microbiology; skin
		S33005	Test; varicella zoster serology
		S33006	Test; varicella zoster culture
		T33001	Test; microbiology; endoc/metabolic
		U33002	Test; microbiology; urology
		W33006	Test; microbiology; reproductive
		X33001	Test; microbiology; genital; female
		X33003	Culture; gonococcal; female
		Y33001	Test; microbiology; genital; male
		Y33003	Culture; gonococcal; male
		Y33004	Test; viral culture; genital; male
		Y33005	Test; urethral/penile swab
	Monospot	A33002	Test; monospot
		A33014	Test; Paul Bunnell
		A33031	Test; Epstein Barr virus serol
		A33032	Test; Epstein Barr virus
	Nose swab C&S	R33008	Test; nose swab C&S
	Pertussis	R33007	Test; pertussis
	Ross River fever	A33009	Test; Ross River fever
	Rubella	A33001	Test; rubella
	Skin swab C&S	S33003	Test; skin swab C&S
	Sputum C&S	R33005	Test; sputum MC&S
	Throat swab C&S	R33006	Test; throat swab C&S
	Urine MC&S	U33001	Test; culture; urine
		U33004	Test; urine MC&S
	Vaginal swab and C&S	X33005	Test; vaginal swab and C&S
	Venereal disease	A33010	Test; venereal disease
		A33022	Test; syphilis serology
Other NEC	Blood test	A34001	Test; blood
		B38001	Test; other lab; blood
		D34001	Test; blood; digestive
		F34001	Test; blood; eye
		H34001	Test; blood; ear
		K34002	Test; blood; cardiovascular
		L34003	Test; blood; musculoskeletal
		N34002	Test; blood; neurological
		P34001	Test; blood; psychological
		R34001	Test; blood; respiratory

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		S34001	Test; blood; skin

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		T34002	Test; blood; endocr/metabolic
		U34001	Test; blood; urology
		W34001	Test; blood; reproductive
		X34001	Test; blood; genital; female
		Y34001	Test; blood; genital; male
	Faeces test	A36001	Test; faeces
		D36002	Test; faeces; digestive
	Other test NEC	A38001	Test; other lab
		A38002	Pathology
		D38001	Test; other lab; digestive
		F38001	Test; other lab; eye
		H38001	Test; other lab; ear
		K38001	Test; other lab; cardiovascular
		L38001	Test; other lab; musculoskeletal
		N38001	Test; other lab; neurological
		P38001	Test; other lab; psychological
		R38001	Test; other lab; respiratory
		S38001	Test; other lab; skin
		T38001	Test; other lab; endocr/metabol
		U38001	Test; other lab; urology
		W38001	Test; other lab; reproductive
		X38001	Test; other lab; genital; female
		Y38001	Test; other lab; genital; male
		Z38001	Test; other lab; social
	Urinalysis	A35002	Urinalysis
	Urine test	A35001	Test; urine
		D35001	Test; urine; digestive
		P35001	Test; urine; psychological
		T35001	Test; urine; endocrine/metabolic
		U35002	Test; urine; urology
		W35001	Test; urine; reproductive
		X35001	Test; urine; genital; female
		Y35001	Test; urine; genital; male
	Simple test; other	B35001	Test; urine; blood
		D36003	Test; occult blood
		R32001	Test; Mantoux

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		R32002	Test; tuberculin

Appendix 8: Imaging test orders—Australian MBS groups and their ICPC–2 PLUS codes and terms

Imaging group (MBS)	ICPC–2 PLUS code	ICPC–2 PLUS term
Diagnostic radiology	A41001	Radiology; diagnostic
	A41002	X-ray; chest
	A41006	X-ray; abdomen
	A41007	Imaging other
	A41010	Radiology
	A41014	Test; imaging; contrast/special
	B41001	Radiology; diagnostic; blood
	D41001	GI series
	D41003	Radiology; diagnostic; digestive
	D41006	X-ray; oesophagus
	D41007	X-ray; biliary ducts
	D41008	X-ray; digestive tract
	D41009	X-ray; mouth
	D41012	X-ray; dental
	D41015	Barium enema
	D41016	Barium meal
	D41017	Barium swallow
	F41001	Radiology; diagnostic; eye
	F41002	X-ray; eye
	H41001	Radiology; diagnostic; ear
	H41002	X-ray; ear
	K41002	Radiology; diagnostic; cardiovas
	K41003	Cardiogram
	K41005	Angiography; coronary
	K41006	Angiography; femoral
	K41007	Angiography; cerebral
	K41011	Angiogram
	K41012	Angiogram; coronary
	K41013	Angiogram; cerebral
	K41014	Angiogram; femoral
	L41001	Arthrogram
	L41002	Scan; bone(s)
	L41003	X-ray; bone(s)

(continued)

Appendix 8 (continued): Imaging test orders—Australian MBS imaging groups and their ICPC–2 PLUS codes and terms

Imaging group (MBS)	ICPC–2 PLUS code	ICPC–2 PLUS term
	L41004	Plain x-ray; bone(s)
	L41005	Radiology; diagnostic; musculo
	L41013	X-ray; elbow
	L41014	X-ray; hand
	L41015	X-ray; wrist
	L41016	X-ray; knee
	L41017	X-ray; hip
	L41018	X-ray; neck
	L41019	X-ray; pelvis
	L41020	X-ray; shoulder
	L41021	X-ray; lumbosacral
	L41022	X-ray; cervical
	L41023	X-ray; thoracic
	L41024	X-ray; spinal
	L41025	X-ray; joint(s)
	L41026	X-ray; foot/feet
	L41027	X-ray; ankle
	L41028	X-ray; leg
	L41029	X-ray; ribs
	L41030	X-ray; face
	L41032	X-ray; arm
	L41033	X-ray; spine; lumbar
	L41034	X-ray; spine; sacrum
	L41035	X-ray; spine; coccyx
	L41036	X-ray; finger(s)/thumb
	L41037	X-ray; toe(s)
	L41038	X-ray; heel
	L41039	X-ray; tibia/fibula
	L41040	X-ray; femur
	L41041	X-ray; radius/ulna
	L41042	X-ray; clavicle
	L41043	X-ray; humerus
	L41044	X-ray; jaw
	L41045	X-ray; temporomandibular joint
	L41060	X-ray; spine; cervicothoracic
	L41061	X-ray; spine; sacrococcygeal
	L41062	X-ray; spine; thoracolumbar
	L41063	X-ray; back
	L41064	X-ray; back lower
	L41065	X-ray; forearm
	L41066	X-ray; eg lower
	L41067	X-ray; metacarpal
	L41068	X-ray; metatarsal
	L43003	Test; bone marrow density
	N41001	Radiology; diagnostic neurolog

(continued)

Appendix 8 (continued): Imaging test orders—Australian MBS imaging groups and their ICPC–2 PLUS codes and terms

Imaging group (MBS)	ICPC–2 PLUS code	ICPC–2 PLUS term
	N41004	X-ray; skull
	P41001	Radiology; diagnostic; psychol
	R41001	Radiology; diagnostic; respirat
	R41002	X-ray; sinus
	R41003	X-ray; nose
	S41001	Radiology; diagnostic; skin
	T41001	Radiology; diagnostic; endo/meta
	T41003	X-ray; endo/metabolic
	U41001	Pyelogram; intravenous
	U41002	Pyelogram; retrograde
	U41005	Radiology; diagnostic; urology
	U41007	X-ray; urinary tract
	U41008	X-ray; kidney/ureter/bladder
	W41002	Radiology; diagnostic; reprod
	W41003	X-ray; uterus
	X41001	Mammography; female
	X41002	Mammography; request; female
	X41003	Thermography; breast
	X41005	Radiology; diagnostic; genital;female
	X41007	X-ray; breast; female
	Y41001	Radiology; diagnostic; genital; male
Ultrasound	A41012	Ultrasound
	A41015	Ultrasound; abdomen
	A41017	Ultrasound; chest
	A41021	Ultrasound; inguinal
	A41022	Ultrasound; abdomen; upper
	A41023	Ultrasound; abdomen; lower
	B41002	Ultrasound; spleen
	D41013	Ultrasound; gallbladder
	D41014	Ultrasound; liver
	K41001	Echocardiography
	K41016	Ultrasound; cardiac
	K43003	Test; Doppler
	K43004	Test; Doppler carotid
	K43005	Scan; duplex
	L41046	Ultrasound; neck
	L41047	Ultrasound; pelvis
	L41048	Ultrasound; shoulder
	L41049	Ultrasound; spine
	L41050	Ultrasound; knee
	L41051	Ultrasound; elbow
	L41070	Ultrasound; wrist
	L41071	Ultrasound; ankle
	L41072	Ultrasound; groin
	L41073	Ultrasound; back
	L41074	Ultrasound; back lower

(continued)

Appendix 8 (continued): Imaging test orders—Australian MBS imaging groups and their ICPC–2 PLUS codes and terms

Imaging group (MBS)	ICPC–2 PLUS code	ICPC–2 PLUS term
	L41075	Ultrasound; hand/finger(s)
	L41076	Ultrasound; foot/toe(s)
	L41078	Ultrasound; arm
	L41079	Ultrasound; leg
	N41005	Ultrasound; brain
	N41007	Ultrasound; head
	T41004	Ultrasound; thyroid
	U41009	Ultrasound; renal tract
	U41010	Ultrasound; kidney
	W41004	Ultrasound; obstetric
	X41009	Ultrasound; breast; female
	X41011	Ultrasound; uterus (not preg)
	Y41005	Ultrasound; prostate
	Y41006	Ultrasound; scrotum
Computed tomography	A41013	CT scan
	A41016	CT scan; abdomen
	A41018	CT scan; chest
	A41019	CT scan; abdomen; upper
	A41020	CT scan; abdomen; lower
	D41018	CT scan; liver
	K41017	CT scan; cardiac
	L41052	CT scan; neck
	L41053	CT scan; pelvis
	L41054	CT scan; spine
	L41055	CT scan; spine; cervical
	L41056	CT scan; spine; thoracic
	L41057	CT scan; spine; lumbar
	L41058	CT scan; spine; lumbosacral
	L41059	CT scan; spine; sacrum
	L41069	CT scan; spine; thoracolumbar
	L41077	CT scan; spine; cervicothoracic
	N41006	CT scan; brain
	N41008	CT scan; head
	R41004	CT scan; sinus
	X41010	CT scan; breast; female
	Y41007	CT scan; breast; male
Nuclear medicine	A41009	Nuclear medicine
	A41011	Isotope scan
	K41015	Scan; thallium heart
	R41005	Scan; VQ (lung)
Magnetic resonance imaging	A41008	MRI

Appendix 9: Other investigations—ICPC–2 PLUS codes and terms

ICPC–2 PLUS code	ICPC–2 PLUS term
A40001	Endoscopy
A40002	Laparoscopy
D40001	Gastroscopy
D40002	Proctoscopy
D40004	Colonoscopy
D40005	Oesophagoscopy
D40007	Sigmoidoscopy
D40009	Endoscopy; diagnostic; digestive
D43002	Procedures; diagnostic; digest
H39001	Test; audiometry
H39003	Test; hearing
H39007	Test; tympanometry
K39002	Monitoring; BP
K42001	Electrocardiogram; ambulatory
K42002	Electrocardiogram
K42003	Electrocardiogram; 24
K42004	Electrocardiogram; exercise
K42005	Holter
K42010	Electrocardiogram; stress
L40001	Arthroscopy
L42001	Electrical
L42002	Electromyogram
L43001	Synovial
N39001	Test; physical
N42001	Electroencephalogram
N43001	Procedures; diagnostic; neuro
P39001	Test; physical
R39002	Test; peak
R39003	Test; pulmonary
R39004	Test; spirometry
R39005	Test; lung
R39007	Test; physical
R40001	Bronchoscopy

(continued)

Appendix 9 (continued): Other investigations—ICPC–2 PLUS codes and terms

ICPC–2 PLUS code and	ICPC–2 PLUS term
R43001	Procedures; diagnostic; resp
U39001	Test; physical
U40001	Cystoscopy
W42001	Monitoring; foetal
X40001	Colposcopy