

# 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.

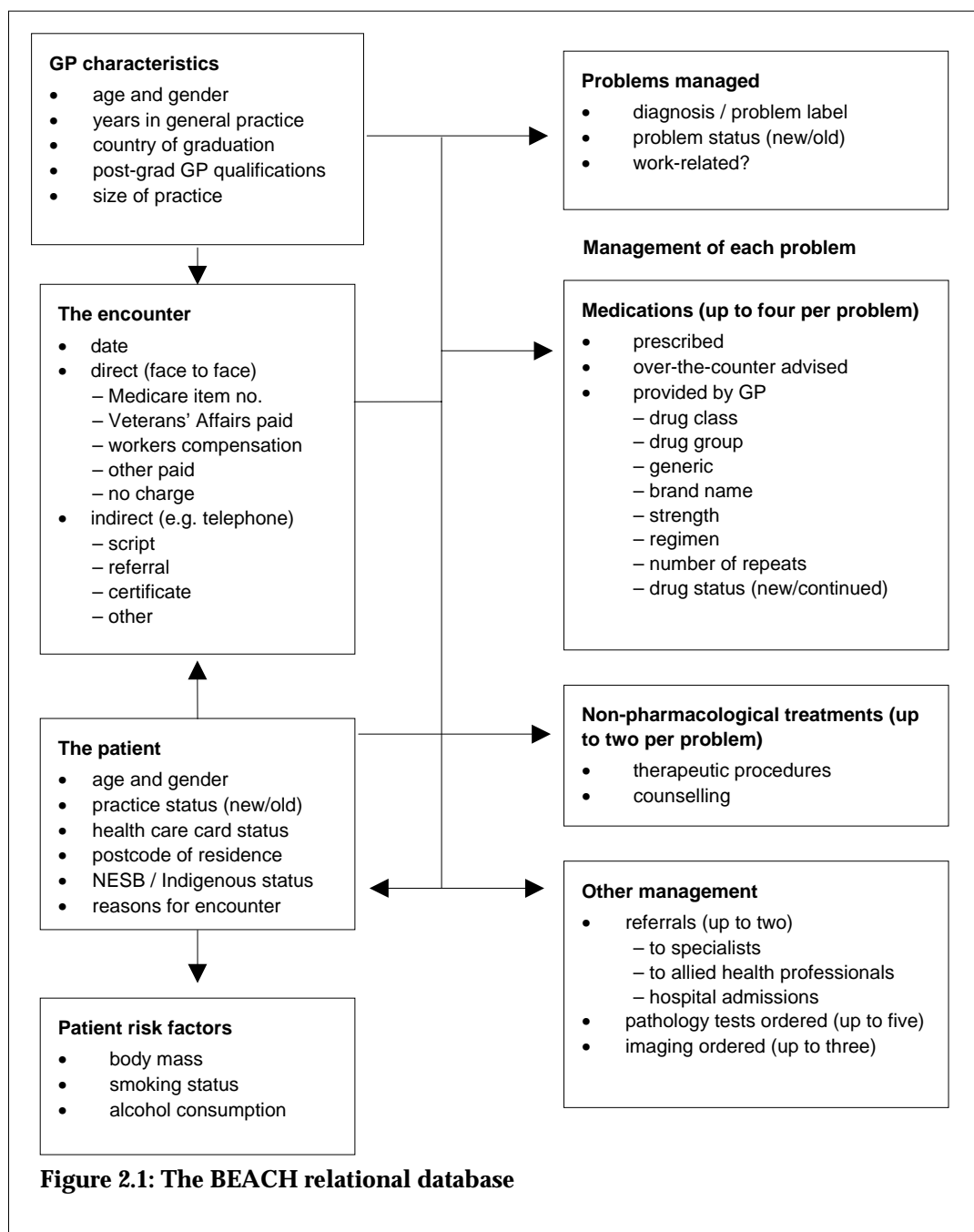
**Management data** for each problem include medications prescribed, over-the-counter medications advised and other medications supplied by the GP. Details for each **medication** comprise brand name, form (where required), strength, regimen, status (if new medication for this problem for this patient) 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.



## 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 6 years 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 ( <i>n</i> = 3,624)	Per cent of contacts established ( <i>n</i> = 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**

<b>GP characteristic</b>	<b>Number<sup>(a)</sup></b>	<b>Per cent of GPs<sup>(a)</sup> (n = 999)</b>
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**

GP characteristics	Participants (n = 999) <sup>(a)</sup>		Non-participants (n = 2,351) <sup>(a)</sup>	
	Number	Per cent of GPs <sup>(b)</sup>	Number	Per cent of GPs <sup>(b)</sup>
Sex ( $\chi^2 = 3.5$ , p = 0.174)	..	..	..	..
Male	683	68.4	1,683	71.6
Female	316	31.6	668	28.4
Age ( $\chi^2 = 19.4$ , 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 ( $\chi^2 = 2.9$ , p = 0.235)	..	..	..	..
Australia	735	73.6	1,797	76.4
Overseas	264	26.4	557	23.7
State ( $\chi^2 = 19.1$ , 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 ( $\chi^2 = 10.5$ , 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 ( $\chi^2 = 6.61$ , 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 ( $\chi^2$ ), 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**

Variable	BEACH <sup>(a)(b)</sup>		Australia <sup>(a)(c)(d)</sup>	
	Number	Per cent of GPs	Number	Per cent of GPs
Sex ( $\chi^2 = .05$ , $p = 0.975$ )	..	..	..	..
Males	683	68.4	11,730	68.0
Females	316	31.6	5,514	32.0
Age ( $\chi^2 = 43.53$ ; $p < 0.001$ )	..	..	..	..
< 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 ( $\chi^2 = 2.17$ ; $p = 0.337$ )	..	..	..	..
Australia	723	73.2	12,928	75.0
Overseas	269	26.8	4,316	25.0
State ( $\chi^2 = 17.08$ ; $p = 0.017$ )	..	..	..	..
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 ( $\chi^2 = 5.38$ ; $p = 0.497$ )	..	..	..	..
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 than 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**

Variable	BEACH <sup>(a)</sup>		Australia <sup>(b)</sup>	Precision ratios		
	Number	Per cent	Per cent	Raw <sup>(a)</sup>	Weighted <sup>(c)</sup>	No Veterans' Affairs <sup>(d)</sup>
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.  $\chi^2$ ) 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 <sup>(a)</sup>	95% LCL	95% UCL	Per cent of direct encs	Per cent of Medicare-paid
General practitioners	999	..	..	..	..	..
<b>Direct consultations</b>	85,148	98.1	97.8	98.4	100.0	..
No charge	554	0.6	0.0	1.5	0.7	..
<b>MBS items of service<sup>(b)</sup></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.

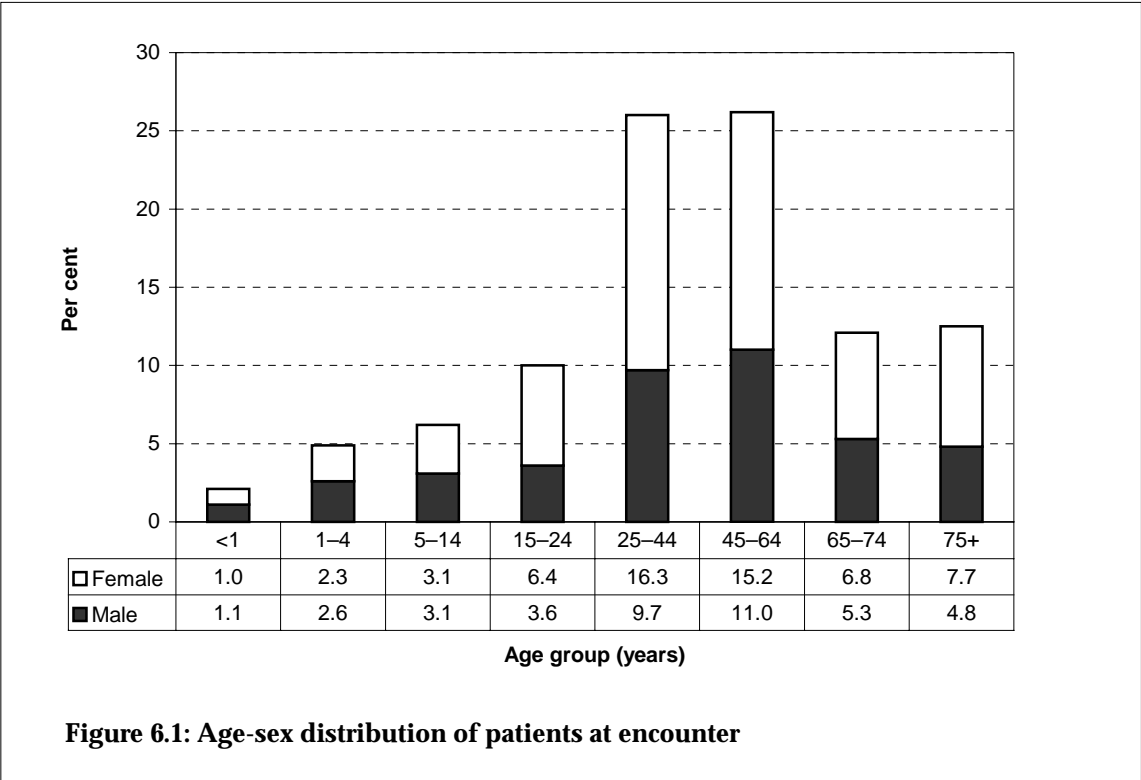
Note: Encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit.

# 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%).



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 ( <i>n</i> = 99,307) <sup>(a)</sup>	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 <sup>(b)</sup>	702	0.7	0.0	2.5
Torres Strait Islander <sup>(b)</sup>	73	0.1	0.0	1.3

(a) Missing data removed in calculation of rates.

(b) One patient identified him/herself as both an 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).

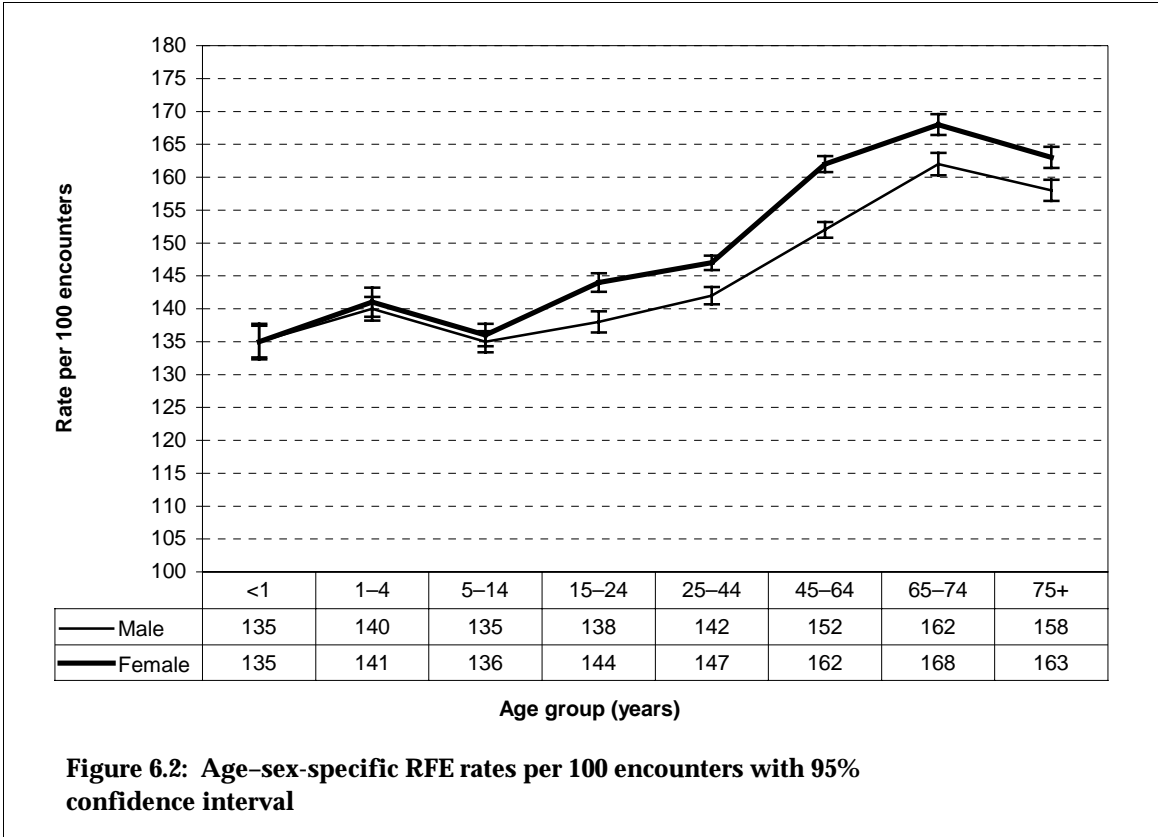
### Number of RFEs at encounter

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
<b>Total</b>	<b>99,307</b>	<b>100.0</b>	<b>..</b>	<b>..</b>

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 <sup>(a)</sup>	95% LCL	95% UCL
<b>General &amp; unspecified</b>	<b>28,101</b>	<b>18.7</b>	<b>28.3</b>	<b>27.5</b>	<b>29.1</b>
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
<b>Respiratory</b>	<b>24,391</b>	<b>16.3</b>	<b>24.6</b>	<b>23.7</b>	<b>25.4</b>
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
<b>Musculoskeletal</b>	<b>17,551</b>	<b>11.7</b>	<b>17.7</b>	<b>17.1</b>	<b>18.2</b>
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
<b>Skin</b>	<b>15,371</b>	<b>10.3</b>	<b>15.5</b>	<b>15.0</b>	<b>16.0</b>
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 <sup>(a)</sup>	95% LCL	95% UCL
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<b>Circulatory</b>	<b>11,565</b>	<b>7.7</b>	<b>11.7</b>	<b>11.1</b>	<b>12.2</b>
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
<b>Digestive</b>	<b>11,000</b>	<b>7.3</b>	<b>11.1</b>	<b>10.7</b>	<b>11.5</b>
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
<b>Psychological</b>	<b>8,047</b>	<b>5.4</b>	<b>8.1</b>	<b>7.7</b>	<b>8.6</b>
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
<b>Endocrine &amp; metabolic</b>	<b>6,142</b>	<b>4.1</b>	<b>6.2</b>	<b>5.9</b>	<b>6.5</b>
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
<b>Neurological</b>	<b>5,717</b>	<b>3.8</b>	<b>5.8</b>	<b>5.5</b>	<b>6.0</b>
Headache	2,146	1.4	2.2	2.0	2.4
Vertigo/dizziness	1,265	0.8	1.3	1.1	1.4
<b>Female genital system</b>	<b>5,462</b>	<b>3.6</b>	<b>5.5</b>	<b>5.1</b>	<b>5.9</b>
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
<b>Ear</b>	<b>4,117</b>	<b>2.8</b>	<b>4.2</b>	<b>4.0</b>	<b>4.3</b>
Ear pain	1,790	1.2	1.8	1.7	1.9
<b>Pregnancy &amp; family planning</b>	<b>3,445</b>	<b>2.3</b>	<b>3.5</b>	<b>3.2</b>	<b>3.8</b>
Pre-postnatal check-up*	950	0.6	1.0	0.6	1.3
Oral contraception*	899	0.6	0.9	0.7	1.1
<b>Eye</b>	<b>2,659</b>	<b>1.8</b>	<b>2.7</b>	<b>2.5</b>	<b>2.8</b>
<b>Urology</b>	<b>2,388</b>	<b>1.6</b>	<b>2.4</b>	<b>2.3</b>	<b>2.6</b>
<b>Blood</b>	<b>2,005</b>	<b>1.3</b>	<b>2.0</b>	<b>1.8</b>	<b>2.2</b>
<b>Male genital system</b>	<b>1,118</b>	<b>0.8</b>	<b>1.1</b>	<b>1.0</b>	<b>1.3</b>
<b>Social</b>	<b>882</b>	<b>0.6</b>	<b>0.9</b>	<b>0.7</b>	<b>1.1</b>
<b>Total RFEs</b>	<b>149,962</b>	<b>100.0</b>	<b>151.0</b>	<b>149.2</b>	<b>152.8</b>

(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 <sup>(a)</sup>	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
<i>Subtotal</i>	<i>83,204</i>	<i>55.5</i>	<i>..</i>	<i>..</i>	<i>..</i>
<b>Total RFEs</b>	<b>149,962</b>	<b>100.0</b>	<b>151.0</b>	<b>149.2</b>	<b>152.8</b>

(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.

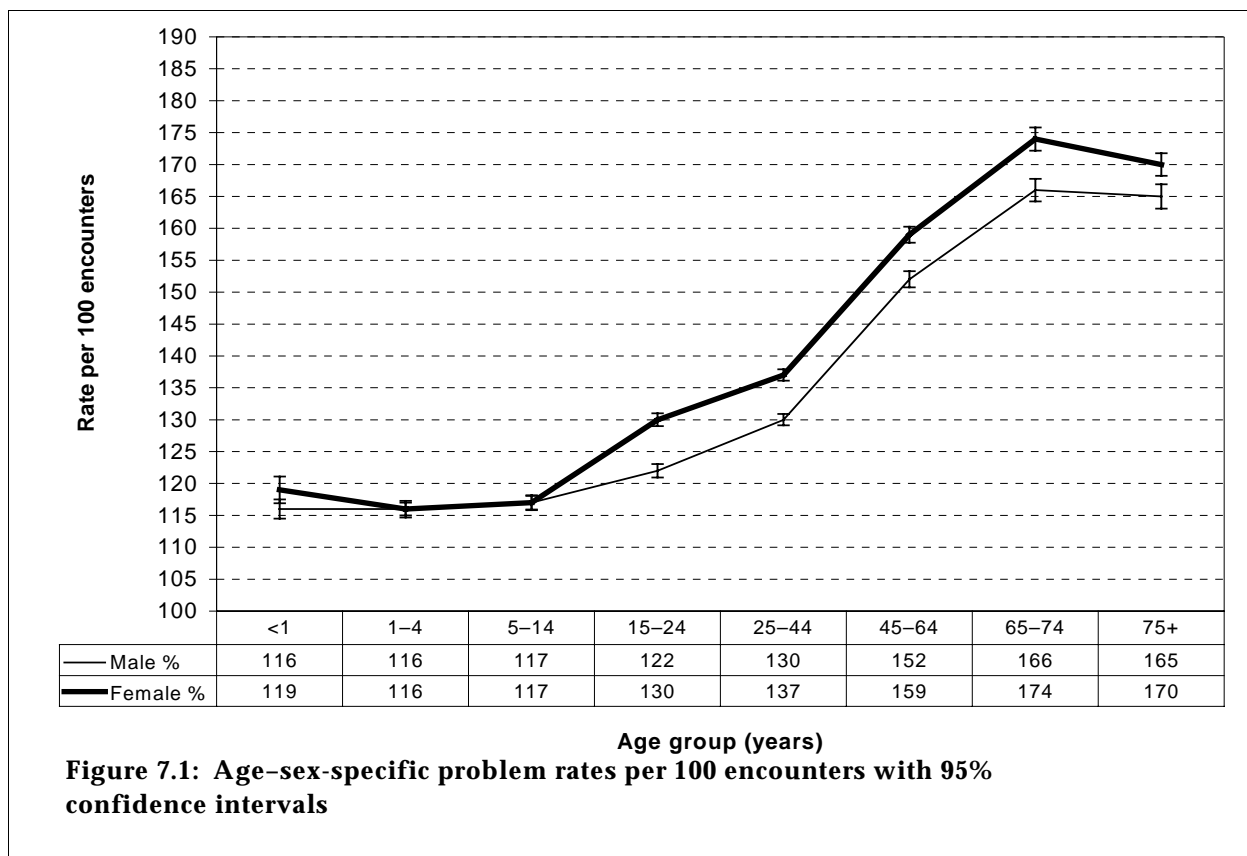
## 7.1 Number of problems managed at encounter

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
<b>Total</b>	<b>99,307</b>	<b>100.0</b>	<b>..</b>	<b>..</b>

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



## 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 <sup>(a)</sup>	95% LCL	95% UCL
<b>Respiratory</b>	<b>22,387</b>	<b>15.6</b>	<b>22.5</b>	<b>21.9</b>	<b>23.2</b>
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
<b>Musculoskeletal</b>	<b>17,323</b>	<b>12.1</b>	<b>17.4</b>	<b>16.9</b>	<b>18.0</b>
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
<b>Skin</b>	<b>16,622</b>	<b>11.6</b>	<b>16.7</b>	<b>16.2</b>	<b>17.3</b>
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
<b>Circulatory</b>	<b>15,869</b>	<b>11.1</b>	<b>16.0</b>	<b>15.3</b>	<b>16.7</b>
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
<b>General &amp; unspecified</b>	<b>14,087</b>	<b>9.8</b>	<b>14.2</b>	<b>13.7</b>	<b>14.7</b>
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 <sup>(a)</sup>	95% LCL	95% UCL
<b>Psychological</b>	<b>10,690</b>	<b>7.5</b>	<b>10.8</b>	<b>10.2</b>	<b>11.3</b>
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
<b>Digestive</b>	<b>9,855</b>	<b>6.9</b>	<b>9.9</b>	<b>9.6</b>	<b>10.2</b>
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
<b>Endocrine &amp; metabolic</b>	<b>9,706</b>	<b>6.8</b>	<b>9.8</b>	<b>9.3</b>	<b>10.2</b>
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
<b>Female genital system</b>	<b>6,040</b>	<b>4.2</b>	<b>6.1</b>	<b>5.7</b>	<b>6.4</b>
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
<b>Ear</b>	<b>4,357</b>	<b>3.0</b>	<b>4.4</b>	<b>4.2</b>	<b>4.6</b>
Acute otitis media/myringitis	1,493	1.0	1.5	1.3	1.7
<b>Pregnancy &amp; family planning</b>	<b>3,863</b>	<b>2.7</b>	<b>3.9</b>	<b>3.6</b>	<b>4.2</b>
Oral contraception*	835	0.6	0.8	0.6	1.0
Pre-postnatal check-up*	741	0.5	0.8	0.3	1.2
<b>Neurological</b>	<b>3,728</b>	<b>2.6</b>	<b>3.8</b>	<b>3.6</b>	<b>3.9</b>
Migraine	918	0.6	0.9	0.8	1.0
<b>Urology</b>	<b>2,652</b>	<b>1.9</b>	<b>2.7</b>	<b>2.5</b>	<b>2.8</b>
Urinary tract infection*	1,534	1.1	1.5	1.4	1.7
<b>Eye</b>	<b>2,558</b>	<b>1.8</b>	<b>2.6</b>	<b>2.5</b>	<b>2.7</b>
Infectious conjunctivitis	716	0.5	0.7	0.6	0.8
<b>Blood</b>	<b>1,652</b>	<b>1.2</b>	<b>1.7</b>	<b>1.5</b>	<b>1.8</b>
<b>Male genital system</b>	<b>1,447</b>	<b>1.0</b>	<b>1.5</b>	<b>1.3</b>	<b>1.6</b>
<b>Social</b>	<b>692</b>	<b>0.5</b>	<b>0.7</b>	<b>0.5</b>	<b>0.9</b>
<b>Total problems</b>	<b>143,528</b>	<b>100.0</b>	<b>144.5</b>	<b>142.8</b>	<b>146.3</b>

(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 <sup>(a)</sup>	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
<b>Total problems</b>	<b>143,528</b>	<b>100.0</b>	<b>144.5</b>	<b>142.8</b>	<b>146.3</b>

(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 <sup>(a)</sup>	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
<i>Subtotal</i>	<i>68,896</i>	<i>48.0</i>	<i>..</i>	<i>..</i>	<i>..</i>
<b>Total problems</b>	<b>143,528</b>	<b>100.0</b>	<b>144.5</b>	<b>142.8</b>	<b>146.3</b>

(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**

<b>Problem managed</b>	<b>Number</b>	<b>Per cent of total problems</b>	<b>Rate per 100 encounters<sup>(a)</sup></b>	<b>95% LCL</b>	<b>95% UCL</b>
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
<i>Subtotal</i>	<i>22,439</i>	<i>47.7</i>	<i>..</i>	<i>..</i>	<i>..</i>
<b>Total problems</b>	<b>47,019</b>	<b>100.0</b>	<b>47.4</b>	<b>45.7</b>	<b>49.0</b>

(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 <sup>(a)</sup>	2000–01 Problems per 100 encounters <sup>(a)</sup>	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
<b>Total management activities</b>	<b>204,290</b>	<b>205.7</b>	<b>..</b>	<b>..</b>	<b>142.3</b>	<b>..</b>	<b>..</b>

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 <sup>(a)</sup> (n = 99,307)	Number of problems	Per cent of total problems <sup>(a)</sup> (n = 143,528)
<b>At least one management type</b>	<b>90,987</b>	<b>91.6</b>	<b>123,963</b>	<b>86.4</b>
<b>At least one medication or non-pharmacological treatment</b>	<b>82,911</b>	<b>83.5</b>	<b>109,061</b>	<b>76.0</b>
<b>At least one medication</b>	<b>67,553</b>	<b>68.0</b>	<b>84,205</b>	<b>58.7</b>
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
<b>At least one non-pharmacological treatment</b>	<b>37,367</b>	<b>37.6</b>	<b>42,601</b>	<b>29.7</b>
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
<b>At least one referral</b>	<b>9,862</b>	<b>9.9</b>	<b>10,332</b>	<b>7.2</b>
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
<b>At least one investigation</b>	<b>19,174</b>	<b>19.3</b>	<b>21,355</b>	<b>14.9</b>
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**

<b>Management type</b>	<b>Number of problems</b>	<b>Per cent of total problems<sup>(a)</sup> (n = 143,528)</b>
<b>No recorded management</b>	<b>19,565</b>	<b>13.6</b>
<b>Management recorded</b>	<b>123,963</b>	<b>86.4</b>
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.