General practice activity in Australia 1999–2000

The Australian Institute of Health and Welfare is Australia's national health and welfare statistics and information agency. The Institute's mission is to improve the health and well-being of Australians by informing community discussion and decision making through national leadership in developing and providing health and welfare statistics and information.

The General Practice Statistics and Classification Unit is a collaborating unit of the Australian Institute of Health and Welfare and the University of Sydney, situated within the Family Medicine Research Centre at Westmead Hospital. It fulfils the obligation of the Australian Institute of Health and Welfare to collect statistics regarding general practitioners, their patients and their patients' care.

Other related publications:

Britt H, Sayer GP, Miller GC, Charles J, Scahill S, Horn F, Bhasale A. *BEACH*, Bettering the Evaluation and Care of Health. A study of general practice activity, six-month interim report. AIHW Cat. No. GEP 1. General Practice Series No. 1. Canberra: Australian Institute of Health and Welfare. ISBN 0 642 39576 4. ISSN 1442 3022

Britt H, Sayer GP, Miller GC, Charles J, Scahill S, Horn F, Bhasale A, McGeechan K. General practice activity in Australia 1998–99. AIHW Cat. No. GEP 2. General Practice Series No. 2. Canberra: Australian Institute of Health and Welfare. ISBN 1 74024 016 2. ISSN 1442–3022.

Sayer GP, Britt H, Horn F, Bhasale A, McGeechan K, Charles J, Miller GC, Hull B, Scahill S. Measures of health and health care delivery in general practice in Australia. AIHW Cat No. GEP 3. General Practice Series No. 3. Canberra: Australian Institute of Health and Welfare.

Britt H, Miller GC, McGeechan K, Sayer GP. 1999 [cited 30–10–2000]. Pathology ordering by general practitioners in Australia 1998. AIHW Cat No. GEP 4. General Practice Series No. 4. Canberra: Department of Health and Aged Care. Available from Internet: http:/www.health.gov.au:80/haf/docs/ pathorder.htm

GENERAL PRACTICE SERIES
Number 5

BEACH

Bettering the Evaluation and Care of Health

General practice activity in Australia 1999–2000

Helena Britt, Graeme C Miller, Janice Charles, Stephanie Knox, Geoffrey P Sayer, Lisa Valenti, Joan Henderson, Zoe Kelly

December 2000

A joint report by The University of Sydney and the Australian Institute of Health and Welfare
AIHW cat. no. GEP 5

This is the fifth publication of the General Practice Series, from the General Practice Statistics and Classification Unit, a collaborating unit of The University of Sydney and the Australian Institute of Health and Welfare. A complete list of the Institute's publications is available from the Publications Unit, Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601, or via the Institute's web site at http://www.aihw.gov.au.

ISBN 1 74024 093 6

ISSN 1442 3022

Suggested citation

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

Any enquiries about or comments on this publication should be directed to:

General Practice Statistics and Classification Unit
The University of Sydney
Acacia House
Westmead Hospital
WESTMEAD NSW 2145

Phone: 61 2 9845 8151
Fax: 61 2 9845 8155
Email: gpscu@fmrc.org.au

Published by the Australian Institute of Health and Welfare

Printed by Panther Publishing and Printing

Foreword

This publication is the second annual report of the national BEACH survey of general practice activity. The BEACH survey is the product of the collaboration between AIHW and the Family Medicine Research Centre at the University of Sydney, and I want to thank Associate Professor Helena Britt and all her colleagues for their great contribution to Australia's national health information.

I also want to thank all the public and private funders of the BEACH survey for supporting this vital work to understand the nature of general practice in Australia, and the demands placed on general practitioners, and how GPs respond to these demands.

The publication provides a wealth of information on the characteristics of patients who see general practitioners, on the problems managed at general practitioner-patient encounters and on the range of management techniques adopted by general practitioners. It is published well within 12 months of the end of the data collection period to which it refers, making it additionally relevant to a wide range of users.

The BEACH program is currently collecting data in its third data collection year. With the publication of this second annual report, the program is making an increasingly important contribution to the national health information landscape. The collection provides the only routinely collected data on many aspects of the 100 million Medicare billed general practice encounters in Australia each year. In addition, as the collection grows, characteristics of relatively rare events (such as referrals to hospitals) are now becoming amenable to analysis and will become more so over the next couple of years.

The collection continues to evolve in response to user needs, and this report includes commentary on the effects of changes in the data collection form for the second year of the collection. Some of the changes apparently resulted in lower response rates for some questions, so this will be taken into account in revisions to be made to the forms for the fourth data collection year. The timely and flexible nature of the data collection allows such refinements to be made with relative ease.

This year, the report includes some of the data collected at subsets of general practitioner-patient encounters on aspects of patient health status not collected as data on the encounter. Thus information is presented on the wellbeing, body weight to height ratio, smoking status and alcohol use of subsamples of patients.

The report also includes commentary on possible future collection of summary data on general practice from electronic health records. This is an exciting prospect that will be shaped over the years to come, with developments in thinking about 'event summaries' and about 'minimum data sets' and standardisation of nomenclature, classification and coding systems for general practice. These developments are likely to draw heavily on the BEACH experience.

Richard Madden
Director
Australian Institute of Health and Welfare
December 2000

Contents

List of tables

List of figures

Summary

This report details findings from the second year of the BEACH (Bettering the Evaluation and Care of Health) program, a study of general practice activity in Australia. It describes the results of the second year of the program, from April 1999 – March 2000. BEACH provides data users with up-to-date information about a sample of more than 100,000 encounters between general practitioners (GPs) and patients, from a random sample of about 1,000 GPs per year.

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

In the 1999–2000 BEACH data year a random sample of 1,047 GPs took part, providing data pertaining to 104,700 encounters. Results are reported in terms of GP and patient characteristics, patient reasons for encounter, problems managed, medications and other treatments provided, referrals and tests ordered. Questions about patient health status and selected risk factors were asked of subsample of patients and the results are included in this publication. Other subsample topics will be reported elsewhere.

The general practitioners

Males made up 69.6% of participants and GPs aged 45 years or older accounted for 59.1%. One in five participants was in solo practice and 26.7% had graduated in a country other than Australia. Almost one-third were Fellows of the Royal Australian College of General Practitioners (RACGP) and a further 2.2% were currently in the Training Program.

A comparison of characteristics of participating GPs (39.1% of those with whom contact was established) with those of the GPs from the random sample who declined to participate, found no significant differences between the groups with the exception of age group. Participants were significantly older and GPs aged less than 35 years were under-represented. The encounter data went through post-stratification weighting to overcome the difference and ensure that the BEACH dataset was representative of Australian general practice. The weighting also incorporated the differential activity level of each GP to improve the national estimates.

The encounters

After post-stratification weighting for age (stratified by sex) and for activity level, there were 104,856 encounters (weighted) included in the analysis. The majority were direct encounters (patient seen), though 3.3% were indirect (patient not seen). By far the majority (93%) of encounters were claimable from Medicare and almost 90% of these were in the surgery. The encounters involved 155,690 reasons for encounter, 153,857 problems managed and 115,432 medications, 48,194 non-pharmacological treatments, 11,760 referrals, 27,613 pathology test orders and 7,841 orders for imaging.

The patients

The age distribution of patients at encounter showed that 14.8% of encounters were with children, 10.4% with young adults, about 25% with patients aged 25–44 years, a further 25% with those aged 45–64 years and 25% with elderly patients. The patient was female at 57.3% of encounters, held a health care card at 38.6% and came from a non-English-speaking background at 8.0% of encounters. At small number of encounters (0.7%) the patient identified themselves as Aboriginal people or Torres Strait Islanders.

Up to three reasons for encounter (RFEs) could be recorded at each consultation and patient RFEs were recorded at a rate of 148.5 per 100 encounters. More than half related to the respiratory, musculoskeletal, skin, circulatory and digestive systems. Requests for a prescription, followed by a request for a check-up were the most common RFEs, followed by a request for immunisation/vaccination. The remainder of the top ten RFEs were largely symptomatic in nature and included coughs and colds, back complaints, fever, rash and headaches.

Problems managed

Doctors could record up to four problems at each encounter. Problems were managed at a rate of 147 per 100 encounters. At 65.4% of encounters only one problem was recorded.

Problems related to the respiratory system, the skin, the musculoskeletal and circulatory systems accounted for just over half of all problems managed. The most common individual problems were hypertension (8.4 per 100 encounters), upper respiratory tract infection (URTI) (7.2 per 100), immunisation/vaccination (4.6 per 100) and depression (3.4 per 100).

Treatments

Medications

Participants could record up to four medications for each problem. Medications were recorded at a rate of 110 per 100 encounters, or at a rate of 75 per 100 problems. These medications could be prescribed (85.2% of all medications), advised for over-the-counter purchase (8.5%), or supplied by the GP (6.3%).

Prescribed medications

Medications were prescribed at a rate of 93.8 per 100 encounters, at least one being prescribed at 60% of encounters and for 50.5% of problems managed. Medication groups most frequently prescribed were antibiotics, cardiovascular, and central nervous system medications. The most commonly prescribed individual medications were paracetamol, (4.3% of all prescriptions), amoxycillin (3.3%) and the paracetamol/codeine combination (2.6%).

Non-pharmacological treatments

Up to two non-pharmacological treatments could be recorded per problem. These treatments were classified into two groups, clinical and procedural. At least one non-pharmacological treatment was provided at over one-third of all encounters (36.2 per 100 encounters). Clinical treatments (33.5 per 100 encounters) were provided more frequently than procedures (12.5 per 100). Advice and education about the treatment of a problem (6.2 per 100 encounters) was the most common clinical treatment. The most frequent procedure was excision or removal of tissue (3.0 per 100 encounters).

Referrals, admissions and investigations

One or two new referrals could be recorded for each problem and at least one was given at 10.4% of encounters. The most frequent referrals to specialist medical practitioners were to

surgeons while the majority of referrals to allied health services were to physiotherapists. Admissions to hospital occurred infrequently (0.7 per 100 encounters).

Pathology tests were ordered at a rate of 26.3 per 100 encounters, at least one being placed at 13.8% of encounters. While blood chemistry accounted for almost half of all pathology tests ordered, the most commonly ordered individual test was a full blood count. Imaging was ordered at a rate of 7.5 per 100 encounters, at least one order being placed at 6.7% of encounters. Plain x-rays accounted for two-thirds of these, a plain chest x-ray being the most common.

Patient wellbeing and risk factors

Patient wellbeing

Responses were recorded at 37,444 patient encounters from 1,047 GPs**.** The distributions of self-rated general health for males and females were comparable. In adult patients aged 18 years and over (N=31,722), 13.7% of respondents rated their health as excellent, while 18.4% rated it fair and 6.0% rated it as poor. The proportion of patients rating their health as excellent decreased steadily with age.

Body mass

Responses were received at 38,660 patient encounters from 1,047 GPs. Of the 33,069 encounters with adults 19.4% were with people considered obese, 33.1% were with those considered overweight and 8.5% were with people considered underweight. A higher proportion of males were overweight or obese (59.0%) than females (48.1%).

Smoking

Responses were received at 32,483 patient encounters with adult patients from 1,044 GPs. Overall, 18.9% of encounters were with daily smokers, 5.2% were with occasional smokers and 27.1% with previous smokers. A greater proportion of males (23.4%) than females (16.2%) reported smoking daily.

Alcohol use

Responses were received at 32,908 patient encounters with adult patients from 1,045 GPs. 'At-risk' levels of alcohol intake were reported by 24.2% of patients encountered. Male patients had a higher rate of at-risk drinkers (30.3%) than women (20.1%). The proportion of patients of both sexes who were at-risk drinkers decreased with age.

Discussion

This report has provided an up-to-date description of general practice clinical activity in Australia in the 1999–2000 period. The results have raised some methodological issues that are discussed. The recent promotion by many people of the concept of gathering National data passively from electronic health records is also discussed in terms of the future development of the BEACH program.

For readers who wish to compare the BEACH data with that from the Health Insurance Commission, some of the differences between the two data sets are highlighted to ensure correct interpretation of similarity or differences in results.

Conclusion

This report provides researchers, government and industry with up-to-date information about the recent clinical activities of general practice. It describes the normative behaviour of over 1,000 GPs who together have more than 10,000 years clinical experience. It demonstrates the wide range of problems dealt with in general practice. Further it gives an indication of the enormous potential of the database to answer questions about the

majority of the population who visit a GP each year and how these problems are managed in general practice. More detailed analyses of specific topics of interest will be undertaken in the future.

Acknowledgments

The General Practice Statistics and Classification Unit wish to thank the 1,047 general practitioners who participated in BEACH 1999–2000. This report would not have been possible without their valued cooperation and effort in providing the data.

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

- the Commonwealth Department of Health and Aged Care
- the Commonwealth Department of Veterans' Affairs
- the National Occupational Health and Safety Commission
- AstraZeneca (Australia)
- Aventis Pharma Pty Ltd
- Roche Products Pty Ltd

We acknowledge the support of the Royal Australian College of General Practitioners, the Australian Medical Association, the Australian Divisions of General Practice and the Consumers Health Forum, and the contribution of their representatives to the BEACH Advisory Board.

We recognise the large contribution of past members of the BEACH team to the first annual BEACH report (1998–99) on which this report is based and their contribution to the data collection process during the second year of BEACH: Fiona Horn, Sharon Scahill, Alice Bhasale and Kevin McGeechan.

We also gratefully acknowledge the strong administrative support provided by Dulcie Bucksath and Genevieve Freys and the valuable contribution of the general practitioner recruitment staff and data entry staff. The cooperation of Carolynn Fredericks and Gordon Calcino and of the General Practice Branch of the Commonwealth Department of Health and Aged Care in regularly supplying general practitioner random samples and national Health Insurance Commission data are also appreciated. At the Institute, Jenny Hargreaves assisted with the editing of the report and Amanda Nobbs coordinated the printing and publication process.

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

1 Introduction

This publication provides a summary of results from the second year of the BEACH (Bettering the Evaluation and Care of Health) program, a continuous study of general practice activity in Australia. It covers the period April 1999 – March 2000 inclusive. It reports details of over 100,000 encounters between general practitioners (GPs and patients, from a random sample of more than 1,000 recognised practising GPs from across the country.

- There were about 19 million people resident in Australia in March (AIHW 2000, p 2).
- In 1998–99 there were 17,101 vocationally registered general practitioners and 1,478 registrars enrolled in the Training Program of the RACGP (DHAC 2000a).
- In December 1998 the national average was 11.3 GPs per 100,000 population, or 898 persons per GP (DHAC 2000a).
- In that year there were 102.6 million Medicare-paid attendances to non-specialist practitioners, an average of approximately 5.4 attendances per person per year (AIHW 2000, p 410).
- Total expenditure on services provided by non-specialist practitioners (including those not vocationally registered) was $2,873 million in 1998–99 (including Visiting Medical Officer services provided through the Department of Veterans' Affairs) (DHAC 2000a).
- Secondary costs generating from these non-specialist consultations including prescribed medications were $4,235 million in that year (DHAC 2000a).
- While primary costs (for non-specialist services) had increased by 9.3% over the previous five years, the secondary costs had increased by 40.0% over the same period (DHAC 2000a).

These figures demonstrate that general practice plays a vital role in providing health care to the community. General practitioners are recognised as the first port of call and the gatekeepers in the Australian health care system. It is important to be able to describe the clinical activities undertaken during GP consultations to understand better the health of the population and the primary medical care provided to it.

In 1994, when speaking of family practice in Ontario, Canada, Norton et al. suggested:

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

The need for data about the activities of general practice and (more broadly) of primary care, has recently received increasing recognition throughout the world. In the United States the National Centre for Health Statistics collects data about ambulatory care visits in three ambulatory care settings—physicians' offices, hospital outpatient departments and hospital emergency departments. One-off studies were conducted in the early 1970s, and the program has been run on a regular annual basis since 1992 (Schappert 1998). The study uses national probability sampling survey methods that are, like BEACH, encounter-based. This is the only other ongoing national data collection program that attempts to provide nationally representative data regarding general practice or primary care. However, the differences in structure of the two health care systems render the data largely not comparable.

A national data collection program also exists in Norway but is limited to information about encounters involving sick leave certification (Brage et al. 1995). In Sri Lanka the

Institute of Policy Studies has recently completed a one-year pilot study of data collection in general practice utilising similar methods to those of BEACH. They are currently planning to instigate ongoing national data collection with this paper based, secondarily coded system (personal communication, Dr. Ravi Rannan-Eliya, Institute of Policy Studies, Sri Lanka).

In the United Kingdom (Lawrence et al. 1999) and in New Zealand (Tilyard et al. 1995) some research is conducted on specific morbidity or management types of interest, through the selective download of de-identified electronic data from electronic health records. However, the extent to which such data are representative of the activity of general practice in either country has not been demonstrated. Issues such as sample size and sample bias in self-selection of participating GPs need to be considered.

In other countries the move has been towards data collection from a group of practices or practitioners who supply clinical information on a regular basis. These are often referred to as registration networks. However, these networks can only represent the practices involved. The variance in practice patterns of individual clinicians, the cluster of patients around the GP and the consistency of behaviour of individual GPs affect the extent to which such groups can be regarded as representative of the profession in their country.

Such registration networks are established in Denmark (Schroll et al. 1998) and in the Netherlands (Cost et al. 2000). In Japan such registration practices have been established for specific studies of morbidity in the elderly (Yamada et al. 1998). French-speaking GPs from Belgium and France are also establishing a network of this type (personal communication,
M Jamoulle, Public Health School Universite Libre de Bruxelles, Belgium) while Malta is in the early stages (personal communication, Jean Karl Soler, Malta College of Family Doctors).

Clearly the international movement is towards seeking better information about the care provided by practitioners at the point of entry into the medical care system. Measurement of cost effectiveness and quality and the development of health policy cannot be successfully pursued in a data-free environment. Further, changes in clinical care which result from policy initiatives must be measured continually.

While the BEACH program is the first continuous national study of its type in Australia, there have been a number of 'one-off' earlier studies that contributed to its development. The first was in 1962–63 (National Morbidity Survey Sub-committee 1966). Between 1969 and 1974 the RACGP undertook a morbidity and prescribing survey in conjunction with Intercontinental Medical Statistics (Bridges-Webb & RACGP 1976). The third study, the Australian Morbidity and Treatment Survey), was carried out in 1990–91 by the Family Medicine Research Centre (then Unit) at The University of Sydney (Bridges-Webb et al. 1992).

However, these studies were few and far between and until BEACH was established the assessment of Australia's health and health services at the national level relied mainly on: self-reported data from the Australian Bureau of Statistics' National Health Survey (Australian Bureau of Statistics 1996), data from the HIC (HIC 1999) (which mostly lack information about morbidity under management), hospital and mortality statistics (which tell us about those with serious illness); and disease registers (which are limited to a few specific diseases of interest).

The BEACH program now provides another view of the health of the vast majority of the community. It describes the problems presented to and managed by GPs for those who visit on a regular basis for the management of chronic illness and for those healthy individuals who present with an acute condition. The data can be combined with those from other

sources to provide a more comprehensive description of the health of the population. Some of the issues surrounding comparison of BEACH data with those from the HIC are investigated in the Discussion (Chapter 14).

The year 2000 has been fruitful for data users interested in general practice in Australia. While this report describes what happens in GP–patient encounters there have been two other major publications that provide information about the history of general practice and its changing role in the health care system: *General Practice in Australia 2000* (DHAC 2000a) and *Australia's Health 2000* (AIHW 2000).

Earlier publications from the BEACH program have been an interim report describing the data collection methods (Britt et al. 1999b), a report of results from the first year of the program (Britt et al. 1999c) and one describing the results of specific subjects (including aspects of patient health risk behaviour, prevalence of selected diseases and preventive care), studied in subsamples of the BEACH sample in 1998–99 (Sayer et al. 2000).

This publication provides an overview of the results from the second BEACH survey year (April 1999 – March 2000 inclusive). It also includes summaries of examples of analyses on specific topics, to facilitate understanding of the ways in which the database can be used. In general the report does not attempt to compare the results with those of the previous year. For reliable analysis of trends at least three measurement points are required. Next year, when three years of BEACH data are available, analyses will concentrate on measurable changes of general practice clinical activity from 1998 to 2001.

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 the GP asking the patient questions about specific aspects of their health. Between ten and twenty topics are covered in SAND each year (depending on subsample size for each topic). However, there are four that are consistent across all years and in which all participating GPs are involved. Due to their standard nature, results pertaining to these topics will now be included in each annual report rather than in other publications. This report therefore includes summary results for patient self-assessed wellbeing; derived body mass index, smoking status, and alcohol consumption.

1.1 Aims

The BEACH program has three primary 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; and
- 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). In summary, a random sample of approximately 1,000 recognised GPs per year each records details about 100 GP–patient encounters of all types on structured paper encounter forms. It is a rolling sample, each GP participating only once in any RACGP quality assurance (QA) triennium and each being recruited approximately three weeks ahead. Approximately 20 GPs participate each week, 50 weeks a year.

2.1 The sample frame

The source population includes all GPs who claimed a minimum of 375 general practice A1 Medicare items (items 1–51, 601, 602) in the most recently available three-month HIC data period. This equates with 1,500 Medicare claims a year and ensures inclusion of the majority of part-time GPs whilst 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 Sampling methods

The methods adopted by the General Practice Branch of the DHAC aim to provide a series of researchers with a random unbiased selection of GPs while minimising overlap with past samples. The method is a modification of Classic Synchronised Sampling and has been described in detail elsewhere (Calcino 1993).

For Classic Synchronised Sampling a uniformly distributed random number, between zero and one, is allocated to each of the GPs in the sample frame. Each GP retains the same random number for as long as this sampling system remains. The GPs in the list are sorted in ascending random number order. Commencing with the GP with the lowest random number, the sample for the first study is drawn. For the next sample, the next GP is the first to be selected and so on until the last GP on the list is reached and selection restarts at the beginning of the list. If new GPs enter the sample frame they are added to the list at the position indicated by their random number. Similarly, GPs no longer part of the sample frame are removed from the list.

While this method is theoretically sound, the study population usually varies between research studies. Study populations of successive surveys may intersect or be mutually exclusive. Calcino therefore developed a Modified Synchronised Sampling method. It follows the same initial processes described above. However, after each sample is drawn the following steps are undertaken:

1. The random number of the last GP selected is noted and subtracted from the random number of each GP in the study population previously drawn. This makes the random number of the last GP selected zero and the numbers for all GPs selected in the previous sample negative.
2. The value of one (1) is then added to all random numbers less than or equal to zero.
3. The list is again arranged in ascending order using the modified random numbers. This places the GPs selected in the previous sample at the high random number end of the list.
4. The next sample is again taken from the low end of the random number list.

With this modification all selections begin with the lowest random number and the concept of 'last GP selected' does not arise. New study populations can be defined with the knowledge that GPs recently selected will be at the high end of the random number range (Calcino 1993).

2.3 Recruitment methods

The randomly selected GPs are approached by letter with telephone follow-up. GPs who agree to participate are set an agreed recording date approximately three to four weeks ahead. A research pack is sent to each participant about ten days before their planned recording date. The research pack contains a covering letter, a project information sheet, a GP profile questionnaire, a pad of 105 recording forms (to allow for some error), a detailed set of instructions, a height and weight measure conversion (to metric) chart (for body mass index calculation), a sample completed form with explanation, a pictorial 'standard drinks' chart to help patients answer questions on alcohol intake, additional instructions for completing supplementary questions on each form, a reply-paid envelope and several copies of a patient information sheet. The patient information sheet gives patients the choice to 'opt out' and not have details of their consultation included in the study by informing their GP of this decision. A telephone reminder is made to each GP participant in the first days of the agreed recording period. Non-returns are followed up by regular telephone calls.

Each participating GP earns 25 audit points towards their RACGP QA requirements. As part of this QA process they receive an analysis of their own results compared with those of nine other unidentified practitioners who recorded at approximately the same time. Comparison with the national average and with targets relating to the National Health Priority Areas is 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.

2.4 Data elements

BEACH includes three inter-related 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 as Appendix 1. The GP characteristics questionnaire is included as 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, Aboriginal (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 this patient) and number of repeats. **Non-pharmacological management** of each problem includes counselling and therapeutic 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, membership of professional organisations, brand substitution behaviour, broad usage level of computers in the practice, practice accreditation status, after-hours arrangements for the practice and external pathologist normally used by the practice (Appendix 2).

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 information (see Appendix 1). The year-long data collection period is divided into 10 blocks, each of five 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 wellbeing, height and weight (for calculation of body mass index, BMI) and alcohol intake, 40 which have a single question about the patient's smoking status together with questions on other subjects nominated for that block, and 20 forms with other nominated questions. The results of topics in the SAND substudies for patient wellbeing, alcohol consumption, smoking status and BMI are included in this report. The results of other substudy topics conducted in BEACH will be the subject of separate publications.

2.5 The BEACH relational database

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

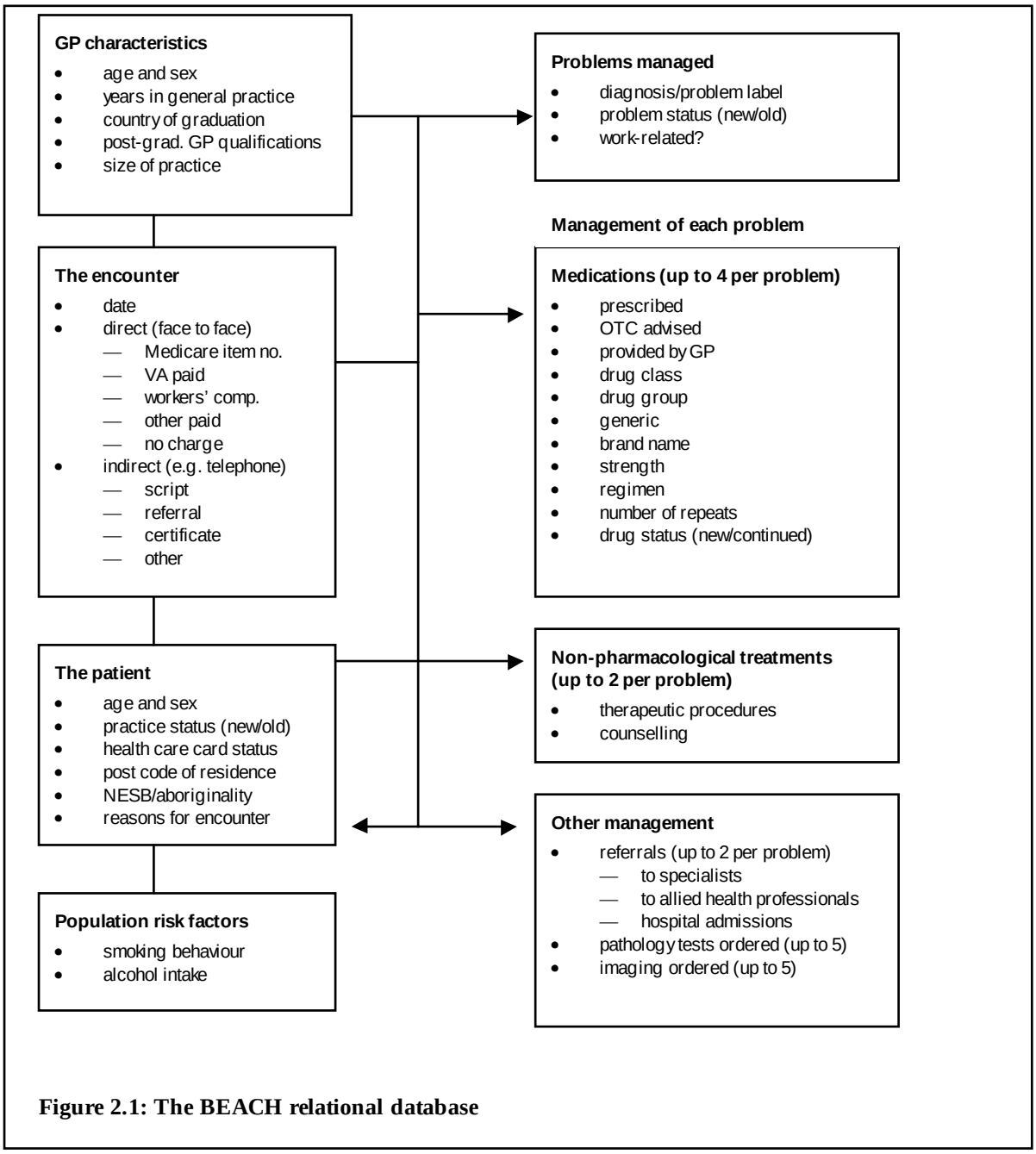


Figure 2.1: The BEACH relational database

2.6 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 only used 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 per cent 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 formulae.

Post-stratification weighting was also applied to the raw data before analysis. This procedure and the reasons for it are fully described in Chapter 3.

2.7 Classification of data

Patient reasons for encounter, problems managed, therapeutic procedures, other non-pharmacological treatments, referrals, and pathology and imaging ordered are coded using ICPC–2 PLUS (Britt 1997b). This is an extended vocabulary of terms classified according to the International Classification of Primary Care (Version 2) (ICPC–2), a product of WONCA (WICC 1997). The ICPC is regarded as the international standard for data classification in primary care.

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 while Component 7 covers diagnoses. These are independent in each chapter and either can be used for patient RFEs or for problems managed.

Components 2 to 6 cover the process of care and are common throughout all chapters, each rubric being equally able to be applied to any body system. 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).

2.7.1 ICPC–2 PLUS

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 measuring 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 GPs participating in the quality assurance option mentioned earlier.

Each term has its own extended code. For example, while the ICPC code A77 is 'Other viral illness', the PLUS terms provide a list of some 33 specific viral illnesses under A77 (e.g. Ross River Fever—A77 001). This allows far greater specificity in data entry and ensures high inter-coder reliability between staff. It also facilitates analyses of information about more specific problems when required (Britt 1997b).

In this report some grouping of ICPC–2 rubrics has been made to overcome differences in the level of specificity recorded by GPs in describing patient RFEs or ascribing problem labels. The issue of variance in labelling is discussed below. For example, results are reported for the problem label 'rash'. Individual analysis of 'localised' and 'generalised' rash may have meant that the relative frequencies of each were insufficient to report. Another example is osteoarthritis. There are multiple rubrics into which this problem may fall depending on its body location (i.e. osteoarthritis of the knee has a different ICPC–2 code to osteoarthritis of the shoulder). Osteoarthritis of the back is only a small part of a broader rubric. In this case the concept here reported as 'osteoarthritis' includes all the ICPC–2 PLUS terms associated with osteoarthritis rather than a number of ICPC–2 rubrics. The codes included in each grouped label are listed in Appendix 3.

2.7.2 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, for example, medication class, medication group, generic composition and brand name. CAPS is mapped to the Anatomical Therapeutic Chemical classification (ATC) (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.

2.7.3 Quality assurance

All morbidity and therapeutic data elements are automatically coded and classified by the computer as staff enters 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.

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; 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) as 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 2,977 GPs, and established with 2,678 (90%) of these. Of the 299 who could not be contacted (10% of those approached), there were 45 for whom telephone numbers could not be established, 146 had moved and were untraceable, were retired or deceased, and 34 were unavailable for other reasons (e.g. overseas, on maternity leave). A further 74 were unable to be contacted after five attempts by telephone recruiters. Of the 2,678 available practitioners, 1,215 (45.4%) agreed to participate but 168 (5.6%) failed to complete the study. The final participating sample consisted of 1,047 practitioners, representing 39.1% of those who were contacted and available, and 35.2% of those with whom contact was attempted (Table 3.1).

Table 3.1: Recruitment and participation rates

	Number	Per cent of approached (N=2,977)	Per cent of contacts established (N=2,678)
Letter sent and phone contact attempted	2,977	100.0	. .
No contact	299	10.0	. .
No phone number	45	1.5	. .
Moved/retired/deceased	146	4.9	. .
Unavailable	34	1.1	. .
No contact after 5 calls	74	2.5	. .
Telephone contact established	2,678	90.0	100.0
Declined to participate	1,463	49.2	55.0
Agreed but withdrew	168	5.6	6.3
Agreed and completed	1,047	35.2	39.1

3.2 The participating GPs

All participants returned a GP profile questionnaire although some were incomplete. Of the 1,047 participants, 69.9% were male and 58.9% were 45 years of age or older. Three-quarters of the participants (75.4%) had been in general practice for more than 10 years and 15.3% could be regarded as practising part time, working fewer than six sessions per week. Almost one fifth of participants were in solo practice (18.1%). The majority (73.3%) had graduated in Australia and almost one-third (31.0%) were Fellows of the RACGP. One in ten respondents (10.6%) conducted more than half of their consultations in a language other than English. Twenty-three GPs (2.2%) were currently undertaking the RACGP Training Program and 43.5% had already completed it.

Table 3.2: Characteristics of participating GPs

GP characteristic	Number[(a)]	Per cent of GPs[(a)] (n=1,047)
Sex		
Male	729	69.6
Female	318	30.4
Age (missing=4)		
<35 years	88	8.4
35–44 years	338	32.4
45–54 years	338	32.4
55+ years	279	26.7
Years in general practice (missing=8)		
<2 years	7	0.7
2–5 years	83	8.0
6–10 years	166	15.9
11–19 years	331	31.9
20+ years	452	43.5
Sessions per week (missing=6)		
<6 per week	159	15.3
6–10 per week	691	66.0
11+ per week	191	18.3
Size of practice (missing=5)		
Solo	189	18.1
2–4 GPs	480	46.1
5+ GPs	373	35.8
Place of graduation (missing=2)		
Australia	767	73.3
UK	89	8.5
Asia	99	9.4
Europe	20	1.9
Africa	25	2.4
New Zealand	16	1.5
Other	29	2.8
More than 50% consultations in languages other than English	105	10.6
Currently in RACGP Training Program	23	2.2
Completed RACGP Training Program	348	43.5
Fellow of RACGP	325	31.0
Member of RACGP	465	44.4
Member of AMA	469	44.8

(a) Missing data removed.

3.3 Comparison between 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 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 for 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, State or Territory, 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 of participants compared to non-participants reflected this age difference (results not shown). There was no statistically significant difference in activity level in the previous quarter (measured by the number of A1 Medicare items of service claimed) between participants and non-participants. In the annual report of BEACH activity for 1998–99, activity levels for the previous year were used for reporting and analysis (Britt et al. 1999c). For the 1999–2000 report, the activity level during the previous quarter was analysed as it gives a more reliable estimate of the GP's most recent activity. For example, maternity or other long-term leave at any time during the previous year would reduce the annual activity level.

Table 3.3: Comparison of characteristics of participating and non-participating GPs[a]

GP characteristics	Participants (n=1,047)		Non-participants (n=1,631)	
	Number	Per cent of GPs[b]	Number	Per cent of GPs[b]
Sex (χ^2=0.56, p=0.769)				
Male	729	69.6	1,157	70.9
Female	318	30.4	474	29.1
Age (χ^2=21.9, p=0.00007)				
<35 years	82	8.4	190	12.5
35–44 years	290	29.5	473	31.1
45–54 years	327	33.3	527	34.6
55+ years	283	28.8	333	21.9
Missing	65	. .	108	. .
Place of graduation (χ^2=1.2, p=0.562)				
Australia	776	74.1	1,238	76.0
Overseas	271	25.9	392	24.0
State (χ^2=11.1, p=0.133)				
New South Wales	390	37.2	559	34.3
Victoria	213	20.3	307	18.8
Queensland	211	20.2	335	20.5
South Australia	95	9.0	152	9.3
Western Australia	92	8.8	197	12.1
Tasmania	25	2.4	42	2.6
Australian Capital Territory	12	1.1	29	1.8
Northern Territory	9	0.9	10	0.6
RRMA (χ^2=12.5, p=0.052)				
Capital	679	64.9	1,073	65.8
Other metropolitan	77	7.4	133	8.2
Large rural	80	7.6	118	7.2
Small rural	66	6.3	124	7.6
Other rural	130	12.4	157	9.6
Remote centre	4	0.4	10	0.6
Other remote	9	0.9	4	0.2
Activity (χ^2=1.27, p=0.529)				
375–750 services in previous quarter	179	17.0	253	15.5
751–1,500 services in previous quarter	444	42.4	696	42.7
> 1,500 services in previous quarter	424	40.5	682	41.8

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

4 Representativeness

4.1 Comparison of BEACH GPs with the national GP population

The generalisability of a study sample is a function of its ability to represent the population from which the sample 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 into 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 impact on the findings of the study.

Comparisons of the characteristics of participants and non-participants were reported in Chapter 3 (Table 3.3). Statistical comparisons were then made between BEACH participants and all recognised GPs in Australia who claimed more than 1,500 general practice Medicare item numbers during 1999 using the chi-square statistic (χ^2) (Table 4.1). The GP characteristics data for the BEACH participants has 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 or place of graduation. However, BEACH participants were significantly less likely to be under 35 years of age (χ^2 =10.98; p=0.012). 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 NSW and Queensland compared with the national profile of GPs (χ^2 =15.02, p<003); however, there were no differences between participants and the national profile by RRMA (remote, rural or metropolitan area).

Analysis (not shown) of participating GPs aged less than 35 years suggests a different morbidity and management profile than GPs of other ages. Principally, there appeared to be a greater rate of the management of acute conditions and younger patients. Therefore any examination of the raw encounter details (RFEs, problems managed, medications, etc.) may provide lower precision of national estimates due to the under-representation of young GPs. For example, it could be speculated that the management rate of respiratory infections would be lower than the true rate in the overall GP population. Therefore, post-stratification, the sample of encounters should reflect the age mix of GPs in Australia when determining national estimates of GP encounter activity.

The data were only weighted 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. Post-stratification weighting of the raw data by age (stratified by sex) was therefore undertaken to adjust for the slight under-representation of younger GPs in the sample and this weighting combined with that for the activity level of the participating GPs (see section 4.3.2 below).

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

	BEACH[(a)]		Australia[(a)(b)(c)]	
Variable	**Number**	**% of GPs**	**Number**	**% of GPs**
Sex (χ^2=0.13; p=0.937)				
Males	729	69.6	10,832	70.2
Females	318	30.4	4,608	29.8
Age (χ^2=10.98; p=0.012)				
<35	88	8.4	1,760	11.4
35–44	338	32.4	4,946	32.0
45–54	338	32.4	5,037	32.6
55+	279	26.7	3,697	23.9
Place of graduation (χ^2=3.03; p=0.220)				
Australia	776	74.1	11,820	76.5
Overseas	271	25.9	3,635	23.5
State (χ^2=15.02; p=0.003)	. .	. .	. .	. .
New South Wales	391	37.4	5,359	34.7
Victoria	210	20.1	3,762	24.3
Queensland	211	20.2	2,764	17.9
South Australia	95	9.1	1,368	8.9
Western Australia	92	8.8	1,427	9.2
Tasmania	25	2.4	416	2.7
Australian Capital Territory	12	1.1	256	1.7
Northern Territory	9	0.9	103	0.7
RRMA (χ^2=9.82; p=0.132)				
Capital	679	64.9	10,525	68.1
Other metropolitan	77	7.4	1,180	7.6
Large rural	79	7.5	954	6.2
Small rural	64	6.1	967	6.3
Other rural	127	12.1	1,601	10.4
Remote centre	4	0.4	113	0.7
Other remote	10	1.0	115	0.7

(a) Missing data removed.
(b) Data provided by GP Branch, DHAC.
(c) All GPs who claimed at least 1,500 A1 Medicare items during the most recent 12-month period.

4.2 Comparison of BEACH consultations with all GP consultations in Australia

Another means of testing the extent to which the data are representative of general practice activity is to investigate whether the age–sex distribution of patients at the consultations is similar to the age–sex distribution for patients seen in all general practice Medicare-claimed consultations for the same period. It is difficult to track and access in a timely fashion the multiple funding streams of Australian general practice; however, the MBS provides funding for most consultation types in Australia. Comparable age–sex data for general practice items of service (A1 services) were provided by the General Practice Branch of the DHAC and compared with the BEACH data (Table 4.2).

The BEACH data includes patient encounters that are paid by funding sources other than the MBS and includes indirect (and some direct) encounters that cannot be or are not (by GP choice) claimed against any funding body. The age and sex distributions of the patients at encounter may therefore differ from those distributions in the MBS encounter data. Further, the BEACH data counts only a single Medicare item number for each encounter covered by the MBS while, in reality, more than one Medicare claim can result from a single encounter. However, comparison of the BEACH patient profile with that of the MBS may provide further insight into the differences between the two databases.

Due to the large size of the data sets used, any statistical comparison (e.g. χ^2) would generate statistical significance for even the most minor differences between the two sources of data. Therefore, it is necessary to consider whether any difference is likely to have a strong influence on the results and whether the precision of any estimate from BEACH complies with statistical standards. In determining whether any estimate is reliable, power calculations use a precision of 0.2 or 20% of the true proportion (or value). For example, if the true value were 15% then it would be desirable that any estimate was 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 only outside the acceptable range of 0.8–1.2 for males 75 years and older. Simply, BEACH contained proportionally more encounters with men 75 years and older than did the national MBS data. It is likely 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 of encounters not covered by the MBS (e.g. Department of Veterans' Affairs). The post-stratification sample will however more closely reflect the national profile of patients (see Section 4.3).

4.3 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 on the generalisability of the findings. Although there were significant differences between the MBS data and the BEACH sample in age of GPs and State only the most important factors thought to affect the profile of encounters were used in the weightings. These were GP age and GP activity level.

Table 4.2: Comparison of BEACH with age–sex distribution of patients at A1 services from the MBS

	BEACH [(a)]		Australia[(b)]		Precision
Variable	Number	%	Number	%	Ratio
Male	36,439	40.7	37,548,568	41.5	1.02
<1 year	1,123	1.3	1,138,265	1.3	1.00
1–4 years	2,423	2.7	2,859,056	3.2	1.17
5–14 years	3,106	3.5	3,660,191	4.0	1.17
15–24 years	3,332	3.7	3,495,839	3.9	1.04
25–44 years	8,293	9.3	8,920,376	9.9	1.06
45–64 years	9,035	10.1	9,688,685	10.7	1.06
65–74 years	4,807	5.4	4,789,781	5.3	0.99
75+ years	4,320	4.8	2,996,375	3.3	0.69
Female	53,154	59.3	52,968,496	58.5	0.99
<1 year	1,055	1.2	994,475	1.1	0.93
1–4 years	2,247	2.5	2,537,978	2.8	1.12
5–14 years	3,153	3.5	3,572,366	3.9	1.12
15–24 years	5,913	6.6	5,822,299	6.4	0.97
25–44 years	14,734	16.4	14,551,753	16.1	0.98
45–64 years	13,032	14.5	12,853,511	14.2	0.98
65–74 years	6,092	6.8	5,827,497	6.4	0.95
75+ years	6,928	7.7	6,808,617	7.5	0.97

(a) Unweighted data.
(b) Data provided by GP Branch, DHAC.
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; only encounters with a valid age and sex are included in the comparison.

4.3.1 GP age

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

4.3.2 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 that GPs provide in a given year. This may impact on 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 final sample weights were a multiplicative function of the GP age weighting and GP sampling fraction of services in the previous 12 months.

4.4 The weighted dataset

The final unweighted dataset from the second year of collection contained 104,700 encounters, 156,386 reasons for encounters, 156,576 problems managed and 113,555 medications. After stratification, the apparent number of encounters, reasons for encounter, problems managed and medications increased. However, the numbers of referrals, imaging and pathology were fewer after weighting.

Table 4.3: The BEACH dataset

Variable	Raw	Weighted
GPs	1,047	1,047
Encounters	104,700	104,856
Reasons for encounter	156,386	155,690
Problems managed	156,576	153,857
Medications	113,555	115,432
Other treatments	50,540	48,194
Referrals	12,651	11,760
Imaging	8,158	7,841
Pathology	29,836	27,613

5 The encounters

5.1 Overview of the dataset

Using weighted data there were 104,856 encounters from 1,048 GPs. An average of 149 patient reasons for encounter were described per 100 encounters. Of the 147 problems managed per 100 encounters, 45.3% were considered new problems 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 3.2 per 100 encounters.

Medications were prescribed, advised or supplied at a rate of 110.1 per 100 encounters. The prescription rate (93.8 per 100 encounters) does not take into account the number of repeats provided as part of a prescription. Patients were advised to use over-the-counter medications more frequently (9.4 per 100 encounters) than being given medications directly by the GP (6.9 per 100 encounters).

Non-pharmacological treatments were recorded less often than medications, with clinical non-procedural treatments (e.g. counselling, advice or psychotherapy) being recorded at a higher rate (33.5 per 100 encounters) than procedural treatments such as excisions and physical therapies (12.5 per 100 encounters).

Approximately 11 referrals were made per 100 encounters. These were to emergency departments, hospitals, specialists or allied health services. Specialist referrals were the most common (7.3 per 100 encounters), followed by those to allied health professionals (3.1 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 (26.3 per 100 encounters) than were referrals, while orders for imaging (e.g. x-rays, scans) occurred less often (7.5 per 100 encounters) (Table 5.1).

Table 5.1: Summary of morbidity and management

Variable	Number	Rate per 100 encounters	95% LCI	95% UCI	Rate per 100 problems	95% LCI	95% UCI
General practitioners	1,048	. .	. .	. .	. .	. .	. .
Encounters	104,856	. .	. .	. .	. .	. .	. .
Reasons for encounter	155,690	148.5	146.7	150.2	. .	. .	. .
Problems managed	153,857	146.7	144.9	148.6	. .	. .	. .
New problems	47,458	45.3	43.6	46.9	30.9	29.7	32.0
Old problems	106,399	101.5	99.0	103.9	69.2	68.0	70.3
Work-related	3,350	3.2	2.9	3.5	2.2	2.0	2.4
Medications	115,432	110.1	107.8	112.4	75.0	73.6	76.4
Prescribed	98,372	93.8	91.5	96.2	63.94	62.5	65.4
Advised OTC	9,842	9.4	8.6	10.2	6.4	5.8	7.0
GP supplied	7,218	6.9	5.8	7.9	4.7	4.0	5.4
Other treatments	48,194	46.0	44.1	47.8	31.3	30.1	32.5
Clinical	35,102	33.5	31.8	35.2	22.8	21.7	23.9
Procedural	13,092	12.5	11.9	13.0	8.5	8.1	8.9
Referrals	11,760	11.2	10.8	11.7	7.6	7.4	7.9
Emergency department	87	0.1	0.0	0.4	0.0	0.0	0.3
Hospital	744	0.7	0.5	0.9	0.5	0.4	0.6
Specialist	7,639	7.3	7.0	7.6	5.0	4.8	5.2
Allied health services	3,290	3.1	2.9	3.4	2.1	2.0	2.3
Pathology	27,613	26.3	25.2	27.5	18.0	17.2	18.7
Imaging	7,841	7.5	7.1	7.8	5.1	4.9	5.3

Note: UCI–upper confidence interval, LCI–lower confidence interval, OTC—over-the-counter.

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 96.7% of all encounters. These could result in no charge, a claim to Medicare, a workers' compensation claim, or a charge to another government funding program. By far the majority (93.0%) of consultations and 96.2% of direct consultations were claimable on 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.

At least 94% of Medicare-paid consultations (88.1% of 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). Standard surgery consultations were the most frequent

Medicare item recorded (78.1% of total encounters, and 84.0% of Medicare-claimable encounters). Hospital, nursing home and home visits were relatively rare, accounting for only 2.7% of all encounters and for 2.9% of Medicare-paid encounters. Workers' compensation claims represented 2.0% of all recorded encounters (2.1% of paid encounters). This appears lower than would be expected if all work-related problems (3.2 per 100 encounters and 2.2 per 100 problems) were being managed at encounters paid by workers' compensation (Table 5.1).

Indirect consultations (3.3 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 usually the result of a phone call by a patient. 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. Prescriptions were the most common result of an indirect consultation, occurring at 53.8 per 100 indirect consultations.

These results suggest that GP services provided free to patients (no charge and indirect consultations) make up approximately 4.6% of total GP clinical services 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.

Table 5.2: Type of encounter

Variable	Number	Rate per 100 encs[(a)]	95% LCI	95% UCI	Source as % of direct encs	Per cent of Medicare-paid
General practitioners	1,048	. .	. .	. .	. .	. .
Direct consultations	97,436	96.7	96.3	97.0	100.0	. .
No charge	1,345	1.3	0.9	1.7	1.4	. .
Medicare-claimable	93,698	93.0	92.4	93.5	96.2	100.0
Short surgery consultations	1,351	1.3	0.6	2.1	. .	1.4
Standard surgery consultations	78,761	78.1	77.1	79.1	. .	84.0
Long surgery consultations	8,137	8.1	7.4	8.7	. .	8.7
Prolonged surgery consultations	554	0.6	0.1	1.0	. .	0.6
Home visits	1,402	1.4	0.8	1.9	. .	1.5
Hospital	448	0.4	0.0	2.2	. .	0.5
Nursing home	906	0.9	0.0	1.8	. .	1.0
Other items	2,140	2.1	1.6	2.6	. .	2.2
Workers' compensation	2,005	2.0	1.7	2.3	2.1	. .
Other paid (hospital, State, etc.)	1,236	1.2	0.0	2.8	1.3	. .
Indirect consultations	3,367	3.3	2.8	3.8	. .	. .
Prescription	1,810	1.8	1.4	2.2	. .	. .
Referral	467	0.5	0.2	0.8	. .	. .
Certificate	113	0.1	0.0	0.4	. .	. .
Other	1,094	1.1	0.7	1.5	. .	. .
Missing	4,054	. .	. .	. .	. .	. .
Total encounters	104,856	. .	. .	. .	. .	. .

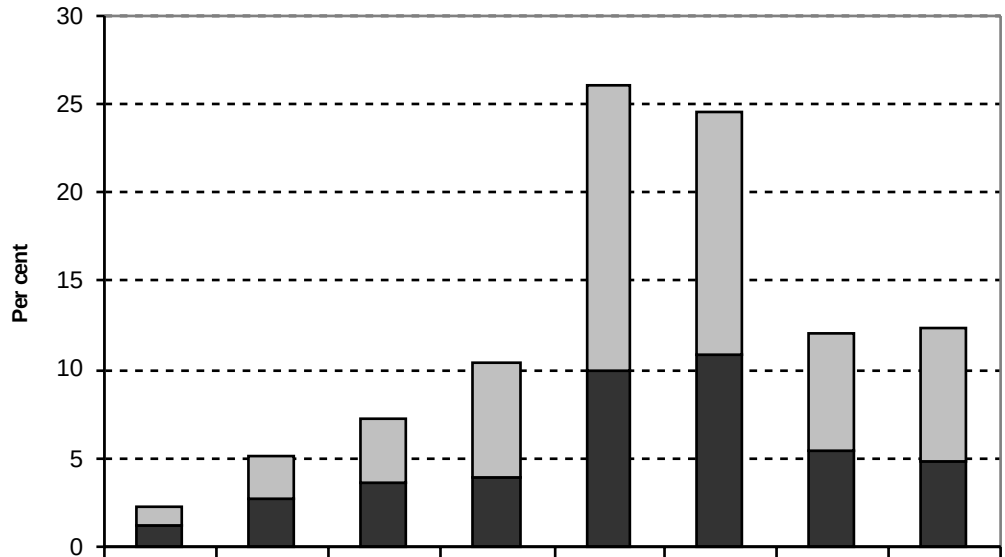
(a) Missing data for 4,054 encounters removed. Per cent base (N)=100,802.
(b) *Note:* Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

6 The patients

6.1 Patient characteristics

6.1.1 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 1.1% of encounters and sex was not recorded at 1.5% of encounters. Approximately one in seven encounters were with children aged less than 15 years (14.8%), one in ten were with young adults (10.4%), and approximately one in four with patients in each of the following age groups, 25–44 years (26.3%), 45–64 years (24.5%), and 65 years and older (24.1%) (Table 6.1).



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Female	1.1	2.4	3.6	6.4	16.1	13.7	6.5	7.4
Male	1.2	2.7	3.6	4.0	10.0	10.8	5.5	4.8

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

Figure 6.1: Age–sex distribution of patients at encounter

Overall there were more female than male patient encounters (57.3% compared with 42.7%). This was reflected across all age groups except for patients aged 1–4 years where there were slightly more male than female encounters. Sex differences were greatest in the reproductive years (25–44 year age group), and in the elderly (75+ years), where there are more females than males in the general population.

6.1.2 Other patient characteristics

For each encounter the GP indicated whether the patient was new to the practice or had been seen previously. The patient was new to the practice at 7.3% of encounters. Patients who held a health care card accounted for 38.6% of all encounters and persons who held a Department of Veterans' Affairs card a further 2.9%. At 8.0% of encounters the patient was from a non-English-speaking background (NESB), and at 0.7% the patient indicated they were an Aboriginal person and / or Torres Strait Islander.

Methodological issues

While the age and sex distributions of the patients paralleled those of the 1998–99 BEACH data year the relative rate of presentation of patients with specific characteristics varied considerably from the rates in the previous year. The relative rates for every one of the 'other characteristics' showed a downturn since the previous year. Of particular note is the significantly lower rate of new patients (7.3 per 100 encounters, 95% CIs 6.6–8.0 c.f. 9.2 per 100, 95% CIs 8.6–9.8), those holding a health care card (38.6, 95% CIs 37.0–40.2 c.f. 43.0 per 100, 95% CIs 41.7–44.5)[1] and those of a non-English-speaking background (8.0 per 100, 95% CIs 4.8–11.1 c.f. 14.9 per 100, 95% CIs 13.0–16.7).

The research team believes that these differences have resulted from a change in the recording form and that the results in 1998–99 are likely to be more reliable than those in 1999–2000.

In 1998–99 the questions on patient status to the practice, NESB status, Aboriginality and Torres Strait Islander status each had a 'Yes' and a 'No' box beside them and each was in its own section. It was consistently noted that participating GPs habitually only ticked the 'Yes' boxes and left 'No' boxes blank. In analyses blank (no response) was therefore counted as 'no' for each question rather than treated as missing data. As a result of this observation, in the second year these variables were listed underneath each other in a single section on the form. A single box was placed next to each (see Appendix 1). Participating GPs were instructed to tick the box beside each characteristic that applied to this patient.

The consistently lower rates of presentation for all these subgroups of patients, and particularly the statistically significant differences in presentations of new patients, NESB patients and those holding a health care card suggest that this change in form design had a significant negative impact on the extent to which GPs responded to these questions. This will be considered in the design of the form in the coming data year (2001–2002).

While this raises questions regarding the reliability of the estimates of rates of presentation of each subgroup of interest it does not negate the value of the morbidity and therapeutic data pertaining to each group. However, those doing research on any of the subgroups listed here should keep this likely under-recording of other patient characteristics in mind.

[1] *Note*: The figures for the proportion of persons who held a health care card reported in *'General Practice Activity in Australia 1998–99'* were incorrect. The proportion quoted here is correct.

Table 6.1: Characteristics of the patients at encounters

Patient variable	Number	% of encounters (N=104,856)	95% LCI	95% UCI
Sex				
Males	44,308	42.7	42.0	43.5
Females	59,366	57.3	56.5	58.0
Missing sex	1,182	. .	. .	. .
Age group				
<1 year	2,447	2.4	2.2	2.5
1–4 years	5,384	5.2	4.9	5.5
5–14 years	7,471	7.2	6.9	7.5
15–24 years	10,814	10.4	9.9	10.8
25–44 years	27,326	26.3	25.5	27.0
45–64 years	25,521	24.5	24.0	25.0
65–74 years	12,486	12.0	11.5	12.5
75+ years	12,603	12.1	11.4	12.9
Missing age	804	. .	. .	. .
Other characteristics				
New patient to practice	7,641	7.3	6.6	8.0
Health care card	40,452	38.6	37.0	40.2
Veterans' Affairs Gold Card	2,726	2.6	2.3	2.9
Veterans' Affairs White Card	304	0.3	0.0	0.6
Non-English-speaking background	8,356	8.0	4.8	11.1
Aboriginal	695	0.7	0.0	1.5
Torres Strait Islander	53	0.1	0.0	0.7
Aboriginal & Torres Strait Islander	3	**	0.0	1.4

** Less than 0.1%.
Note: UCI–upper confidence interval, LCI–lower confidence interval.

6.2 Patient reasons for encounter

Reasons for encounter (RFEs) are those concerns and expectations which patients bring to 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 has begun. These reflect the patient's view of the reasons for consulting the GP. RFEs can be expressed in terms of one or more symptoms (e.g. 'itchy eyes', 'chest pain'), 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).

The movement towards the patient-centred approach in turn stimulated increasing interest in the patient's role in the primary care setting, the way he/she reacts to pain, discomfort and stress; his/her attitudes to illness and disease and the factors which influence his/her decision to attend a medical practitioner (Barsky 1981; Stewart et al. 1975).

6.2.1 Nature of reasons for encounter

There were 155,690 patient RFEs recorded at a rate of 148.5 per 100 encounters.

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 shown in Table 6.2. Each chapter and individual RFE is expressed as a per cent of all RFEs and as a rate per 100 encounters with 95% confidence intervals.

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, neurological, endocrine and genital systems.

Almost one in five RFEs (19.5%, 29.0 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 for 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 25.3 per 100 encounters, the most common being cough, throat complaints and upper respiratory tract infection (URTI) (often expressed as a 'cold'). Requests for influenza vaccines presented at a rate of 1.8 per 100 encounters while asthma, nasal congestion, shortness of breath and acute bronchitis were also relatively common.

RFEs related to the musculoskeletal system were described at a rate of 16.6 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 (3.6 per 100 encounters), followed by those related to the knee, the foot/toe, the neck, shoulder and leg.

Reasons associated with the skin were described at a rate of 15.1 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 11.2 per 100 encounters. Patients also frequently presented for their hypertension or 'high blood pressure (BP)' problem.

Digestive problems accounted for 7.0% of all reasons described, arising at a rate of 10.4 per 100 encounters. Abdominal pain was most common, followed by diarrhoea and vomiting. Together these three symptoms represented approximately half of all digestive-related RFEs.

Less frequently recorded were RFEs of a psychological nature (7.2 per 100 encounters) and these were often described in terms of depression, insomnia and anxiety. The relative frequencies of the remaining ICPC–2 chapters for patient reasons for encounter are provided in Table 6.2.

Table 6.2: Distribution of patient reasons for encounter by ICPC–2 chapter and most frequent individual reasons for encounter within chapter

Patient reasons for encounter	Number	% total RFEs	Rate per 100 encs[(a)]	95% LCI	95% UCI
General & unspecified	**30,391**	**19.5**	**29.0**	**28.1**	**29.9**
Prescription NOS	6,299	4.1	6.0	5.6	6.5
Check-up NOS*	3,416	2.2	3.3	3.0	3.5
Results tests/procedures NOS	2,278	1.5	2.2	1.9	2.4
Fever	2,302	1.5	2.2	1.8	2.6
Immunisation/vaccination–general	2,044	1.3	2.0	1.7	2.1
Weakness/tiredness	1,559	1.0	1.5	1.3	1.7
Chest pain NOS	1,336	0.9	1.3	1.2	1.4
Administrative procedure NOS	1,163	0.8	1.1	0.9	1.3
Trauma/injury NOS	847	0.5	0.8	0.7	0.9
Blood test NOS	825	0.5	0.8	0.5	1.0
Respiratory	**26,492**	**17.0**	**25.3**	**24.3**	**26.2**
Cough	7,329	4.7	7.0	6.5	7.5
Throat complaint	4,368	2.8	4.2	3.8	4.5
URTI	2,849	1.8	2.7	2.3	3.1
Immunisation/vaccination–respiratory	1,905	1.2	1.8	1.2	2.4
Nasal congestion/sneeze	1,731	1.1	1.7	1.2	2.1
Asthma	1,205	0.8	1.2	1.0	1.3
Shortness of breath, dyspnoea	966	0.6	0.9	0.8	1.1
Influenza	851	0.6	0.8	0.4	1.2
Acute bronchitis/bronchiolitis	738	0.5	0.7	0.5	0.9
Musculoskeletal	**17,381**	**11.2**	**16.6**	**16.1**	**17.1**
Back complaint*	3,804	2.4	3.6	3.4	3.8
Knee complaint	1,361	0.9	1.3	1.2	1.4
Foot/toe complaint	1,249	0.8	1.2	1.1	1.3
Neck complaint	1,134	0.7	1.1	1.0	1.2
Shoulder complaint	1,085	0.7	1.0	0.9	1.1
Leg/thigh complaint	1,003	0.6	1.0	0.9	1.1
Skin	**15,860**	**10.2**	**15.1**	**14.7**	**15.6**
Rash*	2,844	1.8	2.7	2.6	2.9
Skin complaint	1,305	0.8	1.2	1.1	1.4
Swelling*	1,109	0.7	1.1	0.9	1.2
Check-up*	820	0.5	0.8	0.6	1.0
Circulatory	**11,747**	**7.5**	**11.2**	**10.6**	**11.8**
Check-up*	5,840	3.8	5.6	5.1	6.0
Hypertension/high BP*	1,764	1.1	1.7	1.2	2.2

(continued)

Table 6.2 (continued): Distribution of patient reasons for encounter by ICPC–2 chapter and most frequent individual reasons for encounter within chapter

Patient reasons for encounter	Number	% total RFEs	Rate per 100 encs[(a)]	95% LCI	95% UCI
Digestive	**10,891**	**7.0**	**10.4**	**10.0**	**10.7**
Abdominal pain*	2,172	1.4	2.1	1.9	2.2
Diarrhoea	1,397	0.9	1.3	1.2	1.5
Vomiting	1,230	0.8	1.2	1.0	1.3
Psychological	**7531**	**4.8**	**7.2**	**6.8**	**7.6**
Depression*	1,793	1.2	1.7	1.6	1.9
Insomnia	1,270	0.8	1.2	1.1	1.4
Anxiety*	1,026	0.7	1.0	0.8	1.2
Endocrine & metabolic	**5,650**	**3.6**	**5.4**	**5.1**	**5.7**
Diabetes (non-gestational)*	799	0.5	0.8	0.6	1.0
Female genital system	**5585**	**3.6**	**5.3**	**4.9**	**5.7**
Check-up/Pap smear*	1,734	1.1	1.7	1.4	1.9
Menstrual problems*	929	0.6	0.9	0.7	1.0
Neurological	**5,864**	**3.8**	**5.6**	**5.4**	**5.8**
Headache	2,250	1.5	2.2	2.0	2.3
Vertigo/dizziness	1,287	0.8	1.2	1.1	1.3
Ear	**4,363**	**2.8**	**4.2**	**4.0**	**4.4**
Ear pain	1,954	1.3	1.9	1.7	2.0
Pregnancy & family planning	**4,019**	**2.6**	**3.8**	**3.5**	**4.2**
Pre-postnatal check*	1,376	0.9	1.3	0.8	1.8
Oral contraception*	1,059	0.7	1.0	0.8	1.2
Eye	**2,973**	**1.9**	**2.8**	**2.7**	**3.0**
Eye pain	595	0.4	0.6	0.4	0.7
Urology	**2,738**	**1.8**	**2.6**	**2.5**	**2.8**
Blood	**2,162**	**1.4**	**2.1**	**1.9**	**2.3**
Male genital system	**1,049**	**0.7**	**1.0**	**0.9**	**1.1**
Social problems	**996**	**0.6**	**1.0**	**0.8**	**1.1**
Total RFEs	**155,690**	**100.0**	**148.5**	**146.7**	**150.2**

(a) Figures do not total 100.0 as more than one RFE can be recorded at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: UCI–upper confidence interval, LCI–lower confidence interval, NOS–not otherwise specified.

Table 6.3: Most frequent patient reasons for encounter

Patient reason for encounter	Number	% total RFEs	Rate per 100 encs [(a)]	95% LCI	95% UCI
Check-up—all*	14,891	9.6	14.2	13.5	14.9
Prescription—all*	10,082	6.5	9.6	9.1	10.2
Cough	7,329	4.7	7.0	6.5	7.5
Immunisation/vaccination—all*	4,421	2.8	4.2	3.8	4.6
Throat complaint	4,368	2.8	4.2	3.8	4.5
Test results*	4,157	2.7	4.0	3.7	4.3
Back complaint*	3,804	2.4	3.6	3.4	3.8
URTI	2,849	1.8	2.7	2.3	3.1
Rash*	2,844	1.8	2.7	2.6	2.9
Fever	2,302	1.5	2.2	1.8	2.6
Headache	2,250	1.5	2.2	2.0	2.3
Abdominal pain*	2,172	1.4	2.1	1.9	2.2
Ear pain	1,954	1.3	1.9	1.7	2.0
Depression*	1,793	1.2	1.7	1.6	1.9
Hypertension/high blood pressure*	1,764	1.1	1.7	1.2	2.2
Nasal congestion/sneeze	1,731	1.1	1.7	1.2	2.1
Weakness/tiredness general	1,559	1.0	1.5	1.3	1.7
Diarrhoea	1,397	0.9	1.3	1.2	1.5
Knee complaint	1,361	0.9	1.3	1.2	1.4
Chest pain NOS	1,336	0.9	1.3	1.2	1.4
Skin complaint	1,305	0.8	1.2	1.1	1.4
Vertigo/dizziness	1,287	0.8	1.2	1.1	1.3
Insomnia	1,270	0.8	1.2	1.1	1.4
Foot/toe complaint	1,249	0.8	1.2	1.1	1.3
Vomiting	1,230	0.8	1.2	1.0	1.3
Asthma	1,205	0.8	1.2	1.0	1.3
Administrative procedure NOS	1,163	0.8	1.1	0.9	1.3
Neck complaint	1,134	0.7	1.1	1.0	1.2
Swelling*	1,109	0.7	1.1	0.9	1.2
Shoulder complaint	1,085	0.7	1.0	0.9	1.1
Subtotal	*86,401*	*55.5*	. .	. .	. .
Total RFEs	**155,690**	**100.0**	**146.3**	**144.6**	**148.0**

(a) Figures do not total 100.0 as more than RFE can be recorded at each encounter.
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–upper confidence interval, LCI—lower confidence interval, NOS-not otherwise specified

Most frequent patient reasons for encounter

The thirty most commonly recorded RFEs, listed in order of frequency in Table 6.3 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.

The need for a check-up was by far the most common RFE, accounting for almost 10% of all RFEs recorded at a rate of 14.2 per 100 encounters. Requests for medication were also frequent (9.6 per 100 encounters). It is notable that RFEs described as 'hypertension' and 'high BP' also arose at a rate of 1.7 per 100 encounters and these are likely to be closely associated with the need for a check-up and/or medication. RFEs associated with the need for immunisation or vaccination were the fourth most often expressed RFE (4.2 per 100 encounters), perhaps reflecting an increasing understanding of the advantages of such preventive care.

The remaining RFEs in the top 30 were largely symptom-based, led by cough (7.0 per 100) and throat complaints (4.2 per 100), back complaints, URTI (often described as 'a cold') and rash. Undifferentiated symptoms such as fever, headache, abdominal pain, ear pain, weakness/tiredness, diarrhoea and chest pain were also common. Many musculoskeletal symptoms also appeared in the top 30 RFEs. It is interesting to note that chronic conditions such as asthma, depression and insomnia were frequently described in diagnostic terms by patients when giving their reasons for encounter.

6.3 The inter-relationship of RFEs with other variables. Example: abdominal pain

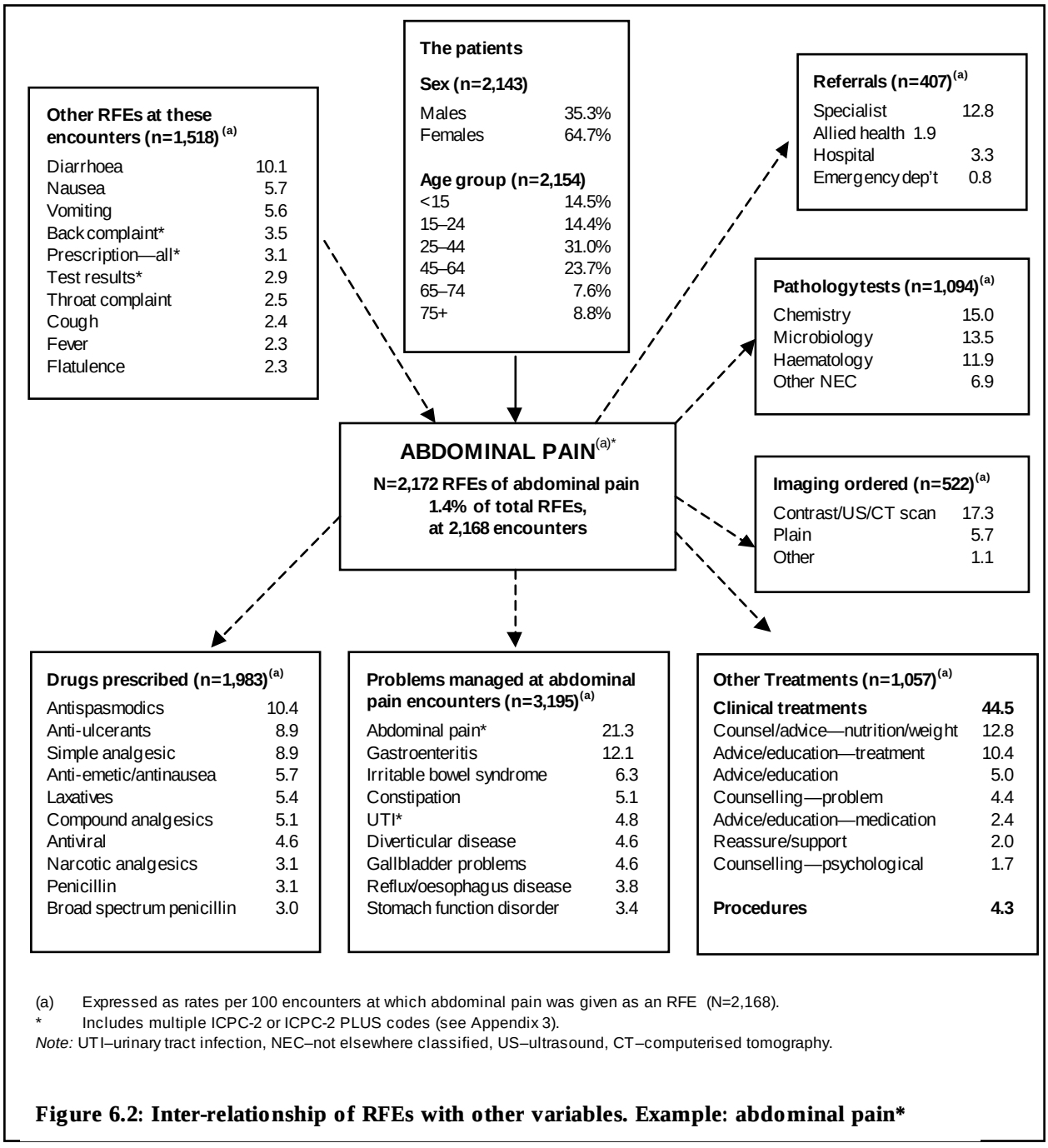
An RFE was classified as 'abdominal pain' if the patient described their reason for the encounter in terms of any of the labels classified under the ICPC–2 rubric D01 (Pain/cramps, abdominal general) or D06 (Pain, abdominal localised, other). In ICPC–2 PLUS these rubrics include a number of more specific symptom and complaint codes such as 'cramps; abdominal' and 'intestinal colic'**.** As multiple ICPC–2 PLUS codes fall into the general abdominal pain group, in cases where a patient used more than one of these terms at an encounter, the RFE would have been counted twice.

Abdominal pain was the twelfth most frequently recorded patient RFE (Table 6.3). It was described on 2,172 occasions, represented 1.4% of all RFEs and occurred at a rate of 2.1 per 100 encounters. Encounters involving at least one RFE of this type numbered 2,168 (2.1% of all encounters).

Figure 6.2 illustrates the relationship of an RFE of abdominal pain with other information collected at that general practice encounter. The RFE of abdominal pain can be directly linked to patient characteristics such as age and sex (solid arrows). However a RFE can only be indirectly linked (dotted arrows) to the problems and managements (i.e. prescriptions written, tests and investigations ordered, and referrals transcribed) provided at the encounter. In addition, other RFEs presenting with abdominal pain have also been included to give an indication of concurrent reasons for attendance at these encounters.

Age and sex distribution of patients

Of the 2,168 encounters at which abdominal pain was described as a reason for encounter over two-thirds were with female patients. Patients presenting with abdominal pain tended to be somewhat younger than the total sample. Only 16% of these patients were aged 65 years and over compared with about 24% of patients at all encounters.



(a) Expressed as rates per 100 encounters at which abdominal pain was given as an RFE (N=2,168).

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

Note: UTI–urinary tract infection, NEC–not elsewhere classified, US–ultrasound, CT–computerised tomography.

Figure 6.2: Inter-relationship of RFEs with other variables. Example: abdominal pain*

Other reasons for encounter

At each encounter where a RFE of abdominal pain was described, up to two other patient RFEs could be recorded. A total of 1,518 other RFEs were described at these encounters. At one in ten encounters diarrhoea was concurrently described with the abdominal pain, while some patients described nausea (5.7 per 100 abdominal pain encounters) and / or vomiting (5.6 per 100). Other symptoms described include throat complaints, cough, fever and flatulence. Requests for a prescription and for test results were also relatively common.

Problems managed

Multiple problems could be managed at an encounter, some of which may have been unrelated to the RFE of abdominal pain. However, while there is not a direct link between a single RFE and a single diagnosis, certain diagnostic groups stand out at these encounters and a relationship between the demand for care and the diagnostic label can be generally assumed (Britt et al. 1994).

At the 2,168 encounters where abdominal pain was recorded as a RFE the number of problems managed was 3,195. This rate was the same as the average for all encounters (147 per 100). The most common problem managed at these encounters was described in the same symptomatic terms. That is, at one in five in (21.3 per 100) encounters no further definition of the underlying problem could yet be determined. This was followed by problems with more specific labels such as gastroenteritis (12.1 per 100 encounters), irritable bowel syndrome (6.3) and constipation (5.1).

Prescriptions and other treatments

Medications were prescribed at these encounters at a rate of 91.5 per 100 encounters, a similar rate to the average for all encounters (93.8 per 100). Antispasmodics were the most frequently prescribed medication group (10.4 per 100 encounters), followed by anti-ulcerants (8.9 per 100). Simple, compound and narcotic analgesics all rated in the top ten medication groups prescribed at these encounters as did anti-emetics / antinauseants, laxatives, antivirals and penicillins.

There were 1,057 clinical treatments recorded at these encounters, recorded at a rate of 44.5 clinical treatments per 100 encounters, a higher rate than in the total dataset (33.5 per 100). Counselling or advice about nutrition / weight was most common (12.8 per 100 abdominal pain encounters). Advice about treatment was also frequently given (10.4 per 100, followed by psychological counselling and counselling of an unspecified nature. Procedures were rarely undertaken at these encounters

Referrals, tests and investigations

Referrals numbered 407 (18.8 per 100 abdominal pain encounters). Over two-thirds of these were to specialists (12.8 per 100 abdominal pain encounters) and such referrals were made at almost double the overall average rate (7.3 per 100 encounters). Encounters involving a RFE of abdominal pain generated high pathology test ordering rates. There were 1,094 pathology test orders (or groups of tests such as FBC) at these encounters, a rate of 50.5 per 100 encounters. This compares with an overall rate of 26.3 orders per 100 encounters. Orders for imaging were also high (24.1 per 100 encounters) compared with the overall rate 7.5 per 100). Contrast / US / CT imaging was most commonly ordered at a rate of 17.3 per 100 encounters involving a RFE of abdominal pain and this was a far higher rate than average (2.6 per 100).

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 description of the problem managed may at times be limited to the level of presenting 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 GPs are not asked to report the relative 'importance' of each problem in an encounter, and the order in which the problems is reported has no significance. This contrasts with the way in which diagnoses are reported in hospital morbidity data, in which one diagnosis is designated as the principal diagnosis, and other diagnoses are generally listed in order of significance.

Problems were coded using ICPC–2 PLUS, an extension of the internationally recognised 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 per cent 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) it must be remembered 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 while a rate per 100 encounters for a single ungrouped problem (e.g. asthma, 3.2 per 100 encounters) can be regarded as equivalent to 'asthma is managed at 3.2% of encounters or at 32 per 1,000 encounters', such a statement cannot be made for grouped concepts.

7.1 Number of problems managed at encounter

A total of 153,857 problems were managed at the 104,856 patient encounters, at an average rate of 146.7 problems per 100 encounters. At the majority of encounters (65.4%) only one problem was managed, while three or more problems were managed at almost 10% of encounters (Table 7.1).

Table 7.1: Number of problems managed at an encounter

Number of problems managed at encounter	Number of encounters	Col %	95% LCI	95% UCI
One problem	68,591	65.4	64.3	66.5
Two problems	25,849	24.7	24.0	25.3
Three problems	8,096	7.7	7.3	8.1
Four problems	2,320	2.2	1.9	2.5
Total encounters	**104,856**	**100.0**	**..**	**..**
Total problems managed	**153,857**	**..**	**..**	**..**

Note: UCI–upper confidence interval, LCI–lower confidence interval.

7.2 Nature of morbidity

7.2.1 Problems managed by ICPC–2 chapter

Table 7.2 presents (in decreasing order) 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 represent more than 0.5% of all problems managed. Each ICPC–2 chapter and problem managed is expressed as a per cent of all problems managed and as a rate per 100 encounters with 95% confidence intervals.

Overall, half of the problems managed in general practice related to four major body systems—the respiratory, skin, musculoskeletal and circulatory systems. Other common problems were related to the digestive, endocrine/metabolic, or female genital systems. Problems least frequently presented related to the blood and blood-forming organs and the male genital system or were of a social nature. Almost 10% of problems managed were not simply related to a specific body system and were classified in the general and unspecified chapter.

At a chapter level, respiratory problems were the most frequently managed at a rate of 24.2 per 100 encounters, accounting for nearly a fifth (16.5%) 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 rates for skin problems (17.0 per 100 encounters) and for problems related to the musculoskeletal system (16.9 per 100 encounters) were equivalent. For skin problems, contact dermatitis (including non-specific dermatitis and eczema) was most common (1.9 per 100 encounters), followed by solar keratosis, then injuries to the skin (such as lacerations and cuts) and malignant skin neoplasms.

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

Problem managed	Number	% total problems	Rate per 100 encs[(a)]	95% LCI	95% UCI
Respiratory	**25,375**	**16.5**	**24.2**	**23.5**	**24.9**
URTI	7,527	4.9	7.2	6.7	7.7
Asthma	3,365	2.2	3.2	3.0	3.4
Acute bronchitis/bronchiolitis	3,319	2.2	3.2	2.9	3.4
Immunisation/vaccine respiratory	2,057	1.3	2.0	1.3	2.6
Sinusitis acute/chronic	1,653	1.1	1.6	1.4	1.7
Tonsillitis*	1,351	0.9	1.3	1.1	1.5
Allergic rhinitis	1,116	0.7	1.1	0.8	1.3
Chronic obstructive pulmonary disease	872	0.6	0.8	0.6	1.0
Skin	**17,865**	**11.6**	**17.0**	**16.6**	**17.5**
Contact dermatitis	1,967	1.3	1.9	1.8	2.0
Solar keratosis/sunburn	1,161	0.8	1.1	0.9	1.3
Laceration/cut	945	0.6	0.9	0.8	1.0
Malignant skin neoplasm	951	0.6	0.9	0.7	1.1
Musculoskeletal	**17,766**	**11.6**	**16.9**	**16.4**	**17.4**
Back complaint*	2,880	1.9	2.8	2.6	2.9
Osteoarthritis*	2,346	1.5	2.2	2.0	2.4
Sprain/strain*	1,878	1.2	1.8	1.6	2.0
Fracture*	1,032	0.7	1.0	0.9	1.1
Arthritis*	843	0.6	0.8	0.6	1.0
Circulatory	**17,074**	**11.1**	**16.3**	**15.5**	**17**
Hypertension*	8,821	5.7	8.4	7.9	8.9
Ischaemic heart disease*[(b)]	1,650	1.1	1.6	1.3	1.8
Cardiac check-up*	1,407	0.9	1.3	1.0	1.6
Heart failure	893	0.6	0.9	0.6	1.1
General & unspecified	**14,622**	**9.5**	**13.9**	**13.4**	**14.5**
Preventive immunisation/medication NOS	2,253	1.5	2.2	1.9	2.4
General check-up*	1,845	1.2	1.8	1.6	1.9
Viral disease, other/NOS	1,608	1.1	1.5	1.2	1.8
Medication/script/request/renew/inject NOS	1,333	0.9	1.3	0.9	1.6
Psychological	**11,025**	**7.2**	**10.5**	**10**	**11.1**
Depression*	3,595	2.3	3.4	3.2	3.6
Anxiety*	1,825	1.2	1.7	1.5	1.9
Sleep disturbance	1,620	1.1	1.5	1.4	1.7

(continued)

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

Problem managed	Number	% total problems	Rate per 100 encs[(a)]	95% LCI	95% UCI
Digestive	**10,533**	**6.9**	**10.1**	**9.7**	**10.3**
Oesophageal disease	1,682	1.1	1.6	1.5	1.8
Gastroenteritis, presumed infection	1,030	0.7	1.0	0.8	1.2
Endocrine & metabolic	**9,572**	**6.2**	**9.1**	**8.7**	**9.6**
Diabetes, non-gestational*	2,791	1.8	2.7	2.4	2.9
Lipid disorder	2,765	1.8	2.6	2.4	2.9
Female genital system	**6,461**	**4.2**	**6.2**	**5.8**	**6.6**
Female genital check-up/Pap smear*	1,628	1.1	1.6	1.3	1.8
Menopausal complaint	1,429	0.9	1.4	1.2	1.5
Menstrual problems*	844	0.6	0.8	0.7	0.9
Ear	**4,679**	**3.0**	**4.5**	**4.3**	**4.7**
Acute otitis media/myringitis	1,681	1.1	1.6	1.4	1.8
Pregnancy & family planning	**4,512**	**2.9**	**4.3**	**4.0**	**4.6**
Pre-postnatal check-up*	1,189	0.8	1.1	0.7	1.6
Oral contraception*	1,090	0.7	1.0	0.9	1.2
Neurological	**4,098**	**2.7**	**3.9**	**3.7**	**4.1**
Migraine	918	0.6	0.9	0.7	1.0
Urology	**3,185**	**2.1**	**3.0**	**2.9**	**3.2**
Urinary tract infection*	1,843	1.2	1.8	1.6	1.9
Eye	**2,875**	**1.9**	**2.7**	**2.6**	**2.9**
Infectious conjunctivitis	871	0.6	0.8	0.7	0.9
Blood	**1,781**	**1.2**	**1.7**	**1.5**	**1.9**
Male genital system	**1,467**	**1.0**	**1.4**	**1.3**	**1.5**
Social problems	**968**	**0.6**	**0.9**	**0.7**	**1.1**
Total problems	**153,857**	**100.0**	**146.7**	**144.9**	**148.6**

(a) Figures do not total 100.0 as more than one problem can be managed at each encounter.
(b) This includes both ischaemic heart disease (IHD) with angina and IHD without angina specified. The results presented in the 1998–1999 BEACH report were for IHD without angina. IHD without angina in 1999–2000 were n=1,108, 0.7 % of problems managed (95% CI: 0.5–0.9) at a rate of 1.1 per 100 encounters (95% CI: 0.8–1.3).
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval, NOS–not otherwise specified.

Hypertension (8.4 per 100 encounters) constituted over half of all circulatory problems (16.3 per 100 encounters) and was the most frequently managed problem, accounting for 5.7% of all problems. Cardiac related check-ups, ischaemic heart disease and heart failure were other circulatory conditions reported 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.

7.2.2 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 (65.5%) were described in terms of a diagnosis or disease (e.g. hypertension, depression, asthma) at an average rate of 96.1 per 100 encounters. Problems described in terms of a symptom or complaint (e.g. febrile) represented almost a quarter of all problems managed and were recorded at a rate of 31.9 per 100 encounters. Diagnostic screening and preventive procedures occurred at a rate of 13.1 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 3.1 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	% of total problems	Rate per 100 encs[(a)]	95% LCI	95% UCI
Diagnosis, diseases	100,788	65.5	96.1	94.4	97.8
Symptoms & complaints	33,491	21.8	31.9	31.1	32.7
Diagnostic & preventive procedures	13,700	8.9	13.1	12.4	13.7
Medications, treatments & therapeutics	3,257	2.1	3.1	2.8	3.4
Referral & other RFE	1,347	0.9	1.3	1.1	1.5
Results	822	0.5	0.8	0.6	1.0
Administrative	451	0.3	0.4	0.2	0.6
Total problems	**153,857**	**100**	**146.7**	**144.9**	**148.6**

(a) Figures do not total 100.0 as more than one problem can be managed at each encounter.
Note: Encs–encounters, RFE–reason for encounter, UCI–upper confidence interval, LCI–lower confidence interval.

7.2.3 Most frequent problems managed

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 grouped to all other similar concepts. For example, immunisation/vaccination includes influenza vaccinations (from chapter R) as well as those for childhood immunisation (chapter A), hepatitis immunisation (chapter D) and neurological immunisations such as tetanus (chapter N).

The 30 most frequently managed problems accounted for almost half of all problems managed. Hypertension was the most common, accounting for 5.7% of all problems managed, at a rate of 8.4 per 100 encounters. This was followed by URTI, which was recorded at a rate of 7.2 per 100 encounters and immunisation/vaccination (4.6 per 100 encounters). Together these top three problems accounted for nearly 15% of all problems managed and their relative frequency was notably higher than that of all other problems managed.

Depression was the fourth most commonly managed problem (3.4 per 100 encounters), followed closely by asthma, bronchitis and back complaint. A number of chronic conditions followed, including diabetes, lipid disorders and osteoarthritis at a rate of 2.7, 2.6 and 2.2 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, otitis media was among the top 30 problems managed. Similarly, while urological problems were relatively infrequent overall (only 2.1% of total problems—Table 7.2), urinary tract infections were among the most frequent 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 systems specific check-ups (female genital, reproductive and circulatory chapters) and medication provision or review.

Table 7.4: Most frequently managed problems

Problem managed	Number	% of total problems	Rate per 100 encs[(a)]	95% LCI	95% UCI
Hypertension*	8,821	5.7	8.4	7.9	8.9
URTI	7,527	4.9	7.2	6.7	7.7
Immunisation/vaccination—all*	4,818	3.1	4.6	4.2	5.0
Depression*	3,595	2.3	3.4	3.2	3.6
Asthma	3,365	2.2	3.2	3.0	3.4
Acute bronchitis/bronchiolitis	3,319	2.2	3.2	2.9	3.4
Back complaint*	2,880	1.9	2.8	2.6	2.9
Diabetes*	2,808	1.8	2.7	2.5	2.9
Lipid disorder	2,765	1.8	2.6	2.4	2.9
Osteoarthritis*	2,346	1.5	2.2	2.0	2.4
Contact dermatitis	1,967	1.3	1.9	1.8	2.0
Sprain/strain*	1,878	1.2	1.8	1.6	2.0
Prescription—all*	1,858	1.2	1.8	1.5	2.1
General check-up*	1,845	1.2	1.8	1.6	1.9
UTI*	1,843	1.2	1.8	1.6	1.9
Anxiety*	1,825	1.2	1.7	1.5	1.9
Oesophageal disease	1,682	1.1	1.6	1.5	1.8
Acute otitis media/myringitis	1,681	1.1	1.6	1.4	1.8
Sinusitis acute/chronic	1,653	1.1	1.6	1.4	1.7
Ischaemic heart disease*	1,650	1.1	1.6	1.3	1.8
Female genital check-up*	1,628	1.1	1.6	1.3	1.8
Sleep disturbance	1,620	1.1	1.5	1.4	1.7
Viral disease NOS	1,608	1.1	1.5	1.2	1.8
Menopausal complaint	1,429	0.9	1.4	1.2	1.5
Cardiac check-up*	1,407	0.9	1.3	1.0	1.6
Tonsillitis*	1,351	0.9	1.3	1.1	1.5
Pre-postnatal check-up*	1,189	0.8	1.1	0.7	1.6
Solar keratosis/sunburn	1,161	0.8	1.1	0.9	1.3
Allergic rhinitis	1,116	0.7	1.1	0.8	1.3
Oral contraception*	1,090	0.7	1.0	0.9	1.2
Subtotal	73,726	47.9	. .	. .	. .
Total problems	**153,857**	**100.0**	**146.7**	**144.9**	**148.6**

(a) Figures do not total 100.0 as more than one problem can be managed at each encounter and only per cents >=0.5% are included.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence intervals, NOS–not otherwise specified.

7.3 The inter-relationship of problems managed with other variables

7.3.1 Problem inter-relationship example 1: URTI

A problem was classified as an acute upper respiratory infection (URTI) if the GP recorded it in the diagnosis / problem section of the form in terms such as: common cold, coryza, pyrexial cold, head cold, nasal or throat infection, acute pharyngitis, acute rhinitis or URTI (ICPC–2 Rubric R74).

URTI was the second most common problem managed in general practice. It was recorded on 7,485 occasions (at a rate of 7.2 per 100 encounters), accounting for 4.9% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would suggest there are approximately 7.4 million encounters per year in which GPs manage URTI.

Figure 7.1 illustrates the relationship of URTI with other variables that are collected at the general practice encounter. URTI can be directly linked to patient characteristics such as age and sex, treatments provided, prescriptions written, tests and investigations ordered, and referrals transcribed (solid arrows). URTI can also be indirectly related to patient RFEs (dotted arrow). In addition, other problems that were managed at an 'URTI encounter' have been included to give an indication of comorbidities managed with URTI.

Age and sex distribution of patients

Patients managed for URTI were more likely to be female (55.1%), in line with the sex distribution in the study overall (57.3%). Younger patients were over-represented in URTI encounters (51.5% were under 25) compared with the proportion of patients under 25 (25.1%) in the sample as a whole.

Reasons for encounter

At the 7,485 encounters where URTI was managed, a total of 12,895 patient RFEs were described (172 per 100 URTI encounters), somewhat more than in the total sample (148 per 100 total encounters). However, the RFEs at an URTI encounter were almost exclusively for URTI (28.1 per 100 URTI encounters) and symptoms related to URTI, such as cough (33.6 per 100 URTI encounters), throat complaint (32.3 per 100 URTI encounters), and nasal congestion (10.8 per 100 URTI encounters). This would be expected, given the acute nature of URTI symptoms.

Other problems managed

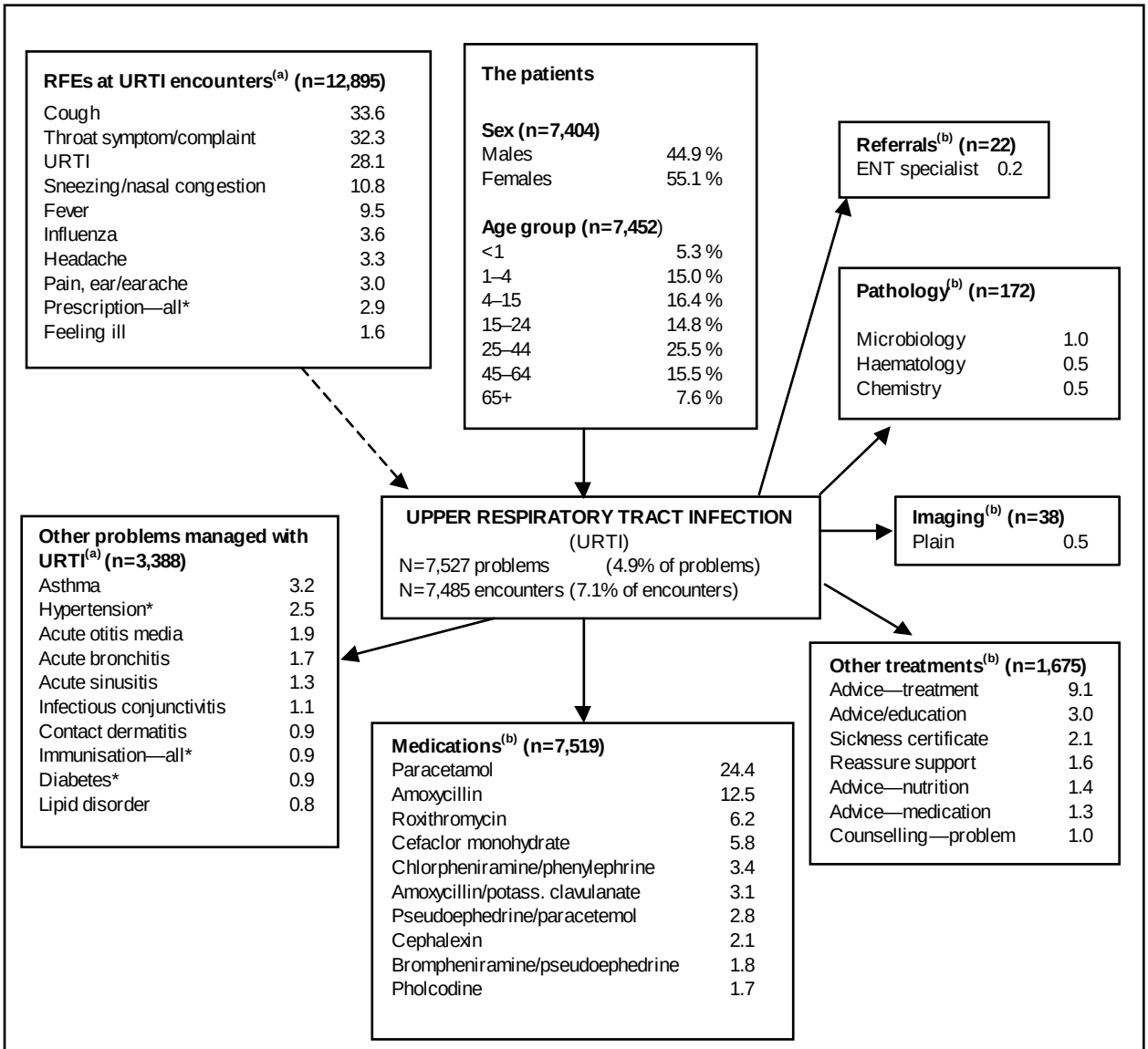
At each encounter where URTI was managed a range of other problems was also reported. A total of 3,388 other problems were managed by the GP where URTI occurred. The most common co-morbidity managed with URTI were the most common problems found in the study as a whole. However, problems related to URTI such as the rates of asthma (3.2 per 100 URTI encounters) and acute otitis media (1.9 per 100 URTI encounters) were somewhat higher than the rates found for encounters overall, while hypertension (2.5 per 100 URTI encounters) was managed at less than half the rate at URTI encounters than for encounters overall (8.7 per 100 encounters). These differences can be understood in terms of the relatively young age of URTI patients.

Prescriptions and other treatments

The top ten medications for URTI included analgesics, antibiotics and cold preparations. Paracetamol was the most common medication prescribed / advised / supplied at a rate of 24.4 per 100 URTI problems. Antibiotics were prescribed at a rate of 34.9 per 100 URTI contacts, broad spectrum penicillins accounting for 61.6% of these. Amoxycillin (including in combination with potassium clavulanate) was most commonly chosen (15.6 per 100 URTI). Cephalosporins were also relatively common, being prescribed / supplied at a rate of 7.9 per 100 URTI contacts.

Referrals, tests and investigations

The patient was referred in only 22 cases, and 14 of these were referred to an ENT specialist. Rates for pathology and imaging orders were very low, with a total of 172 pathology tests and 38 imaging orders.



(a) Expressed as rates per 100 encounters at which URTI was managed (N=7,485).
(b) Expressed as rates per 100 problems at which URTI was managed (N=7,527).
* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 3).
Note: ENT–ear nose throat.

Figure 7.1: Inter-relationship of a problem managed with other variables. Example: URTI

7.3.2 Problem inter-relationship example 2: malignant skin neoplasm

A problem was classified as 'malignant skin neoplasm' if the GP recorded it in the diagnosis / problem section of the form in terms such as basal cell carcinoma, squamous cell carcinoma, skin carcinoma, Bowen's disease, melanoma, malignant mole, rodent ulcer, malignant naevus or malignant skin neoplasm (ICPC–2 Rubric S77).

Malignant skin neoplasm was the forty-ninth most common problem managed in general practice. It was recorded on 951 occasions (at a rate of 0.9 per 100 encounters), accounting for 0.6% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would then suggest there are approximately 900,000 encounters per year in which GPs manage malignant skin neoplasm.

Figure 7.2 illustrates the relationship of malignant skin neoplasm with other variables that are collected at the general practice encounter. Malignant skin neoplasm can be directly linked to patient characteristics such as age and sex, treatments provided, prescriptions written, tests and investigations ordered, and referrals transcribed (solid arrows). Malignant skin neoplasm can also be indirectly related to patient RFEs (dotted arrow). In addition, other problems that were managed at a 'malignant skin neoplasm encounter' have been included to give an indication of comorbidities managed with malignant skin neoplasm.

Age and sex distribution of patients

A higher proportion of patients managed for malignant skin neoplasm were male (54.6%), compared with the proportion of males in the study overall (42.7%). The majority of patients (88.4%) at malignant skin neoplasm encounters were 45 years or older compared with 48.6% in the sample as a whole.

Reasons for encounter

At the 943 encounters where malignant skin neoplasm was managed, a total of 1,536 patient RFEs were described (163 per 100 malignant skin neoplasm encounters), occurring somewhat more than in the total sample (148 RFEs per 100 total encounters). Skin complaints or symptoms (including, skin neoplasm, sunburn / solar keratosis and swelling) were given as RFEs at a rate of 52 per 100 malignant skin neoplasm encounters. Skin check-up was given as a RFE at a rate of 8.4 per 100 malignant skin neoplasm encounters.

Other problems managed

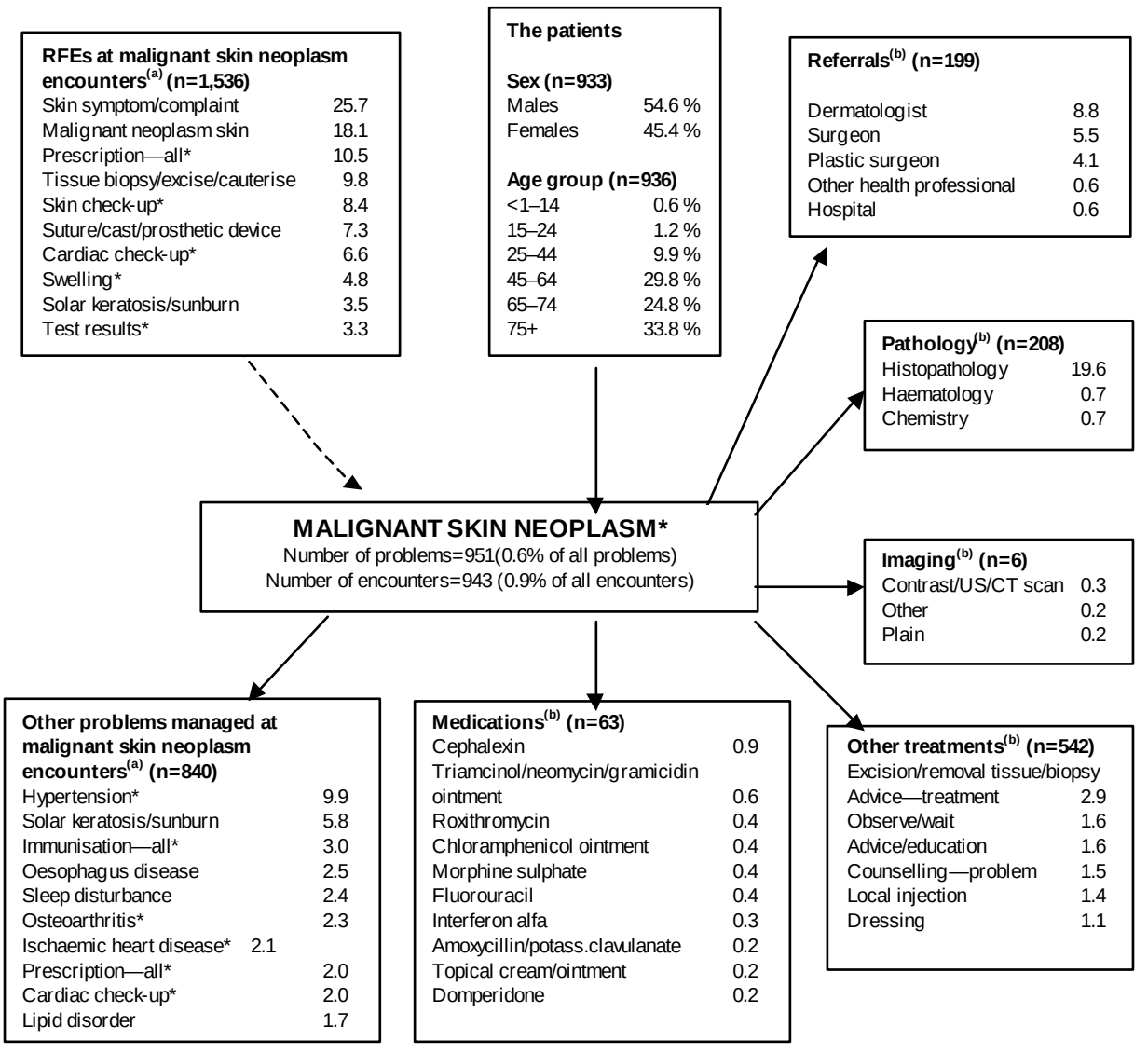
A total of 840 other problems were managed by the GP where malignant skin neoplasm occurred. Hypertension was the most frequent other problem managed (9.9 per 100 malignant skin neoplasm encounters) at a somewhat higher rate than for the sample overall (8.4 per 100 encounters). Sunburn / solar keratosis was also managed at a rate of 5.8 per 100 malignant skin neoplasm encounters.

Prescriptions and other treatments

The most common treatment for malignant skin neoplasm was removal of tissue/biopsy (7.8 per 100 malignant skin neoplasm problems). There were relatively few medications for malignant skin neoplasm (6.6 per 100 problems). Cephalexin was the most common medication (0.9 medications per 100 malignant skin neoplasm problems).

Referrals, tests and investigations

Referrals were made at a rate of 20.9 per 100 problems. Patients were most commonly referred to a dermatologist (8.8 referrals per 100 malignant skin neoplasm problems) surgeon (5.5 per 100 problems) or plastic surgeon (4.1 referrals per 100 problems). There were 208 pathology orders, mostly histopathology (ordered at a rate of 19.6 per 100 malignant skin neoplasm problems).



(a) Expressed as rates per 100 encounters at which malignant skin neoplasm was managed (N=943).
(b) Expressed as rates per 100 malignant skin neoplasm problems (N=951).
* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 3).
Note: US–ultrasound, CT–computerised tomography.

Figure 7.2: Inter-relationship of a problem managed with other variables. Example: malignant skin neoplasm

7.3.3 Problem inter-relationship example 3: asthma

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

Asthma was the fifth most common problem managed in general practice. It was recorded on 3,363 occasions (at a rate of 3.2 per 100 encounters), accounting for 2.2% of all problems managed. A simple extrapolation based on approximately 103 million Medicare-claimed general practice consultations would then suggest there are approximately 3.5 million encounters per year in which GPs manage asthma.

Figure 7.3 illustrates the relationship of asthma with other variables that are collected at the general practice encounter.

Age and sex distribution of patients

Patients managed for asthma were more likely to be female (53.7%). A large proportion of asthma patients (40.7%) were aged under 25 years. Comparison with the age distribution for total encounters (25.1% under 25 years) indicate that young patients were over-represented at asthma encounters. Since 46.3% of asthma patients were male compared with 42.7% for the sample as a whole, males were slightly over-represented at asthma encounters.

Reasons for encounter

At the 3,363 encounters where asthma was managed, a total of 5,627 patient RFEs were described (167 per 100 asthma encounters), somewhat more than in the total dataset (146 per 100 total encounters). For a third of these encounters the patients described their reason for the encounter as asthma. Cough was another major reason for encounter (27.2 per 100 asthma encounters). Requests for medication (not necessarily for asthma) were also a frequent RFE presenting at a rate of 15.3 per 100 asthma encounters. Other respiratory complaints such as shortness of breath (6.6 per 100), wheezing (5.8 per 100) and upper respiratory tract infection (3.4 per 100) were frequent RFEs. Other RFEs included respiratory follow-up (6.6 per 100) and respiratory check-up (3.7 per 100).

Other problems managed

At each encounter where asthma was managed a number of other problems may have been managed. Overall, a total of 2,627 other problems were managed by the GP where an asthma contact occurred. There were some differences in the most common comorbidities managed with asthma compared with the total dataset. Upper respiratory tract infection was the most common other problem at an asthma encounter (7.2 per 100 asthma encounters), managed at the same rate as for the sample overall (7.2 per 100 encounters). Hypertension (5.3 per 100 asthma encounters), however, was managed less frequently than for the sample overall (8.4 per 100 encounters), perhaps reflecting the relatively young age of asthma patients. Acute bronchitis / bronchiolitis presented more frequently at asthma encounters (4.3 per 100) than for the sample overall (3.2 per 100 encounters).

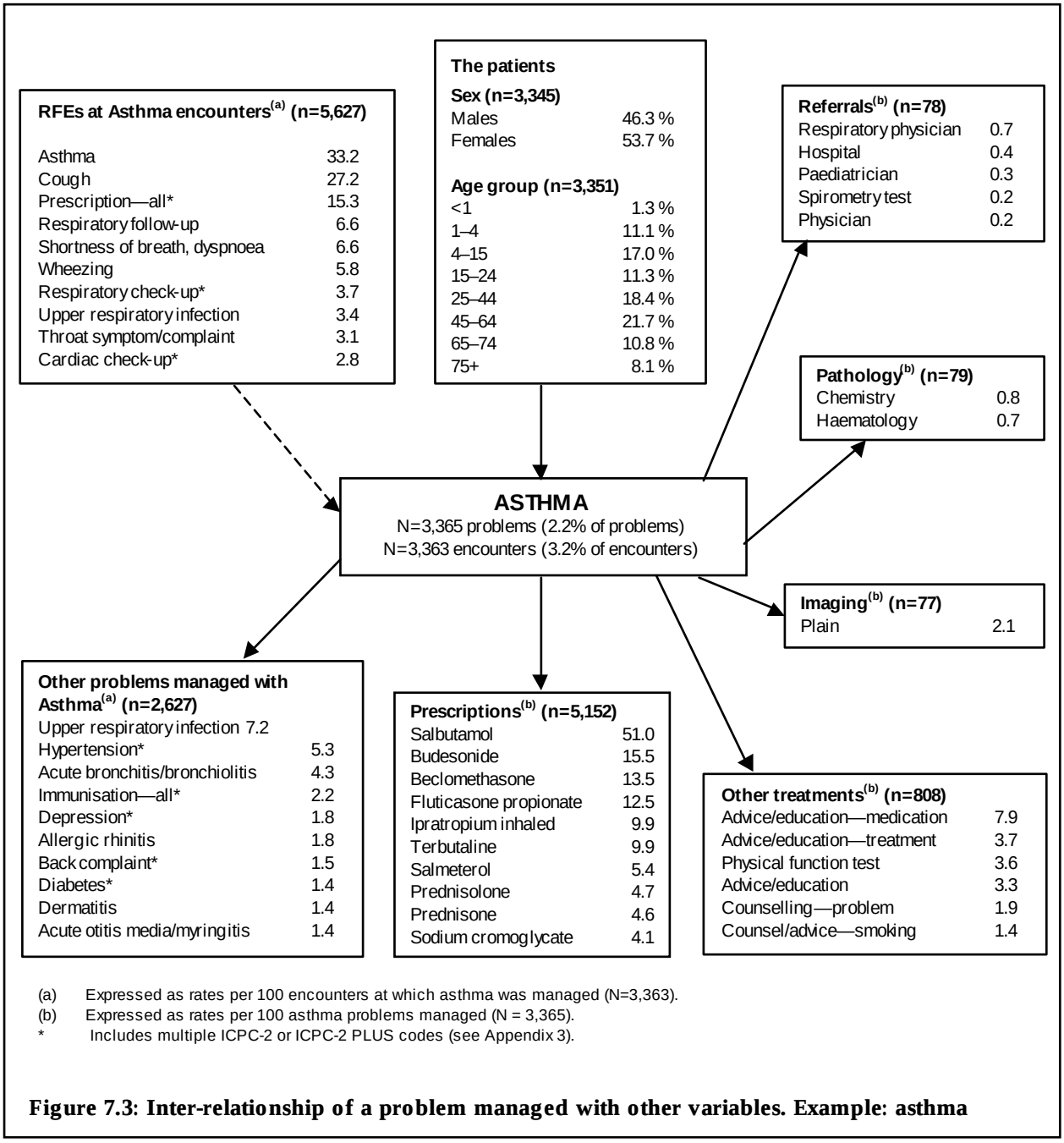
Prescriptions and other treatments

Medication was by far the most common treatment for asthma; 5,152 medications were prescribed / advised or supplied at a rate of 153 medications per 100 asthma problems. Salbutamol was the most frequent medication (51.0 medications per 100 asthma problems). The other top medications included budesonide (15.5 per 100 asthma problems), beclomathasone (13.5 per 100) and fluticasone propionate (12.5 per 100).

Advice about medication (7.9 per 100 asthma problems) and treatment (3.7 per 100 asthma problems) were the most common forms of management other than medication.

Referrals, tests and investigations

Referral rates for asthma were very low (2.3 per 100 asthma problems) compared with the total data set (7.6 per 100 problems). Referral to a respiratory physician (0.7 per 100 problems) was the most common. Less than one (0.4) in a hundred asthma problems were referred to hospital. There were few pathology (79) or imaging tests (77) ordered in the management of asthma.



(a) Expressed as rates per 100 encounters at which asthma was managed (N=3,363).
(b) Expressed as rates per 100 asthma problems managed (N = 3,365).
* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 3).

Figure 7.3: Inter-relationship of a problem managed with other variables. Example: asthma

8 Overview of management

The BEACH survey form allowed GPs to record several aspects of patient management initiated for each problem managed at each encounter. Pharmaceutical management was recorded in detail and linked to a patient problem. Other modalities such as counselling, procedures and other treatments were recorded briefly in the GP's own words and were also related to a single problem. Referrals and hospital admissions were similarly related to a single problem. Provision was made on the form for pathology and imaging orders to be related to multiple problems.

A total of 210,840 management activities were undertaken by GPs at a rate of 201 per 100 encounters and 137 per 100 problems. The most common management activity was medication prescribed, advised or supplied, at a rate of 110.1 per 100 encounters or 75 per 100 problems. Other treatments took place at the rate of 46 per 100 encounters, referrals at a rate of 11.2, pathology orders at a rate of 26.3 and imaging at a rate of 7.5 per 100 encounters (Table 8.1).

Table 8.1: Summary of management

Management type	Number	Rate per 100 encounters	95% LCI	95% UCI	Rate per 100 problems	95% LCI	95% UCI
Medications	115,432	110.1	107.8	112.4	75.0	73.6	76.4
Prescribed	98,372	93.8	91.5	96.2	63.9	62.5	65.4
Advised OTC	9,842	9.4	8.6	10.2	6.4	5.8	7.0
GP supplied	7,218	6.9	5.8	7.9	4.7	4.0	5.4
Other treatments	48,194	46.0	44.1	47.8	31.3	30.1	32.5
Clinical	35,102	33.5	31.8	35.2	22.8	21.7	23.9
Procedural	13,092	12.5	11.9	13.0	8.5	8.1	8.9
Referrals	11,760	11.2	10.8	11.7	7.6	7.4	7.9
Specialist	7,639	7.3	7.0	7.6	5.0	4.8	5.2
Allied health	3,290	3.1	2.9	3.4	2.1	2.0	2.3
Hospital	744	0.7	0.5	0.9	0.5	0.4	0.6
Emergency dept	87	0.1	0.0	0.4	0.0	0.0	0.3
Pathology	27,613	26.3	25.2	27.5	18.0	17.2	18.7
Imaging	7,841	7.5	7.1	7.8	5.1	4.9	5.3
Total management activities	**210,840**	**201.1**	**..**	**..**	**137.0**	**..**	**..**

Note: UCI–upper confidence interval, LCI–lower confidence interval, OTC–over-the-counter.

Another perspective emerges in analysis of the number of encounters or problems managed for which at least one form of management was initiated by the GP. For example, at least one medication was given at more than two-thirds of encounters and for 58.1% of problems. At least one non-pharmacological treatment was given at 36.2% of encounters and for 28% of problems. A referral was made in 10,925 encounters (10.4%) and for 7.4% of problems. At least one investigation was ordered at 19% of encounters and for 14.3% of problems. These were most commonly pathology orders, which occurred at 13.8% of encounters (10.4% of problems). Imaging orders were placed less frequently at 6.7% of encounters and for 4.7% of problems (Table 8.2).

Table 8.2: Encounters and problems in which treatments occurred

Treatment type	Number of encounters	Per cent of total encounters[(a)] (N=104,856)	Number of problems	Per cent of total problems[(a)] (N=153,857)
At least one treatment type	**87,892**	**83.8**	**116,184**	**75.5**
At least one medication	**71,781**	**68.5**	**89,401**	**58.1**
At least one prescription	62,988	60.1	78,792	51.2
At least one OTC advised	8,705	8.3	8,870	5.8
At least one GP supplied	5,325	5.1	5,645	3.7
At least one non-pharmacological treatment	**37,961**	**36.2**	**43,069**	**28.0**
At least one clinical treatment	28,269	27.0	31,885	20.7
At least one therapeutic procedure	11,990	11.4	12,373	8.0
At least one referral	**10,952**	**10.4**	**11,386**	**7.4**
At least one referral to a specialist	7,274	6.9	7,539	4.9
At least one referral to allied health	3,140	3.0	3,201	2.1
At least one referral to hospital	730	0.7	744	0.5
At least one referral to emergency dept	87	0.1	87	0.1
At least one investigation	**19,854**	**19.0**	**21,968**	**14.3**
At least one pathology order	14,426	13.8	15,940	10.4
At least one imaging order	7,019	6.7	7,242	4.7

(a) Figures will not total 100.0% as multiple events may occur in one encounter or in the management of one problem at encounter.

9 Medications

9.1 Source of medications

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

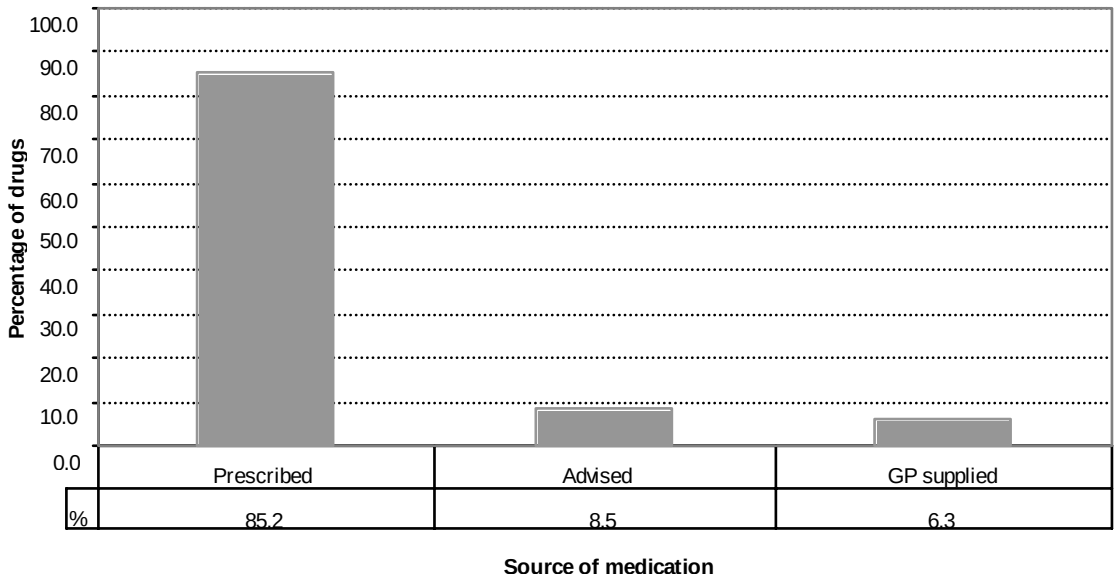


Figure 9.1: Percentage of medications prescribed, advised and supplied by GP

A total of 115,425 medications were recorded during this year of the BEACH survey, at a rate of 110 per 100 encounters and 75 per 100 problems managed. Most medications (85.2%) were prescribed. However, 8.5% of medications were recommended by the GP for over-the-counter purchase and 6.3% supplied to the patient by the GP. Extrapolated to the whole general practice population, this represents 8.5 million occasions per annum on which medications were recommended by GPs to their patients for over-the-counter purchase. On a further 6.3 million occasions per annum at least one medication was supplied by the general practitioner. These areas of medication supply have been largely unexplored in other studies (Figure 9.1).

9.2 The inter-relationship of medications with other variables

Figures 9.2 to 9.4 demonstrate the relationship between medications and other variables collected in the survey. These examples demonstrate the wealth of information which can be inter-related in studying medications used in general practice. On the charts solid arrows indicate a direct relationship and dotted arrows an indirect one.

9.2.1 Medication inter-relationship example 1: lipid-lowering medications

Figure 9.2 shows the relationship between prescribed or supplied lipid-lowering agents and other variables.

Rate of prescription or supply

Lipid-lowering medications were prescribed or supplied at a rate of 2.8 per 100 total GP encounters and at a rate of 1.9 per 100 total problems. Simvastatin and atorvastatin were the most common, accounting for three-quarters of all lipid-lowering medications.

Prescribed daily dose

Prescribed daily doses (PDD) are reported as medians reflecting the middle point of prescribing regimes. The median provides a measure of central tendency that is not heavily influenced by outliers, as is the mean. Simvastatin, a medication which is available in tablets of strengths from 5 mg to 80 mg had a median PDD of 20 mg. Atorvastatin also had a median PDD of 20mg, which is the mid-range of dosage suggested in MIMS (MIMS Australia 1999).

Age and sex distribution of patients

Patients between 45 and 64 years of age were the most frequent recipients of lipid-lowering medication, accounting for 44.7% of all patients receiving the medications. They were followed by those in the 65–74 age group. This reflects the age groups in which hyperlipidemia occurs. The sex distribution of the patients showed an over-representation of males when compared with the general GP patient population.

Reasons for encounter

The most commonly described patient reason for encounter was a request for prescription, recorded at a rate of 37.6 per 100 encounters at which lipid-lowering medications were prescribed or given. A cardiac check up, lipid disorder and a need for test results were also relatively frequent RFEs.

Problems managed

As one would expect, the problem under management with lipid-lowering medications was most commonly labelled 'lipid disorder' (76.0%). However, these medications were also used in the management of ischaemic heart disease (6.6%) and hypertension (3.2%). In these cases the GP probably viewed the lipid management as part of the broader problem.

Other medications prescribed or supplied

Other medications were prescribed or supplied at the same encounter and for the same problem for which lipid-lowering medications were given on 794 occasions at a rate of 33.5 per 100 of these problems. Antihypertensives made up a large proportion of these co-medications.

Other treatments

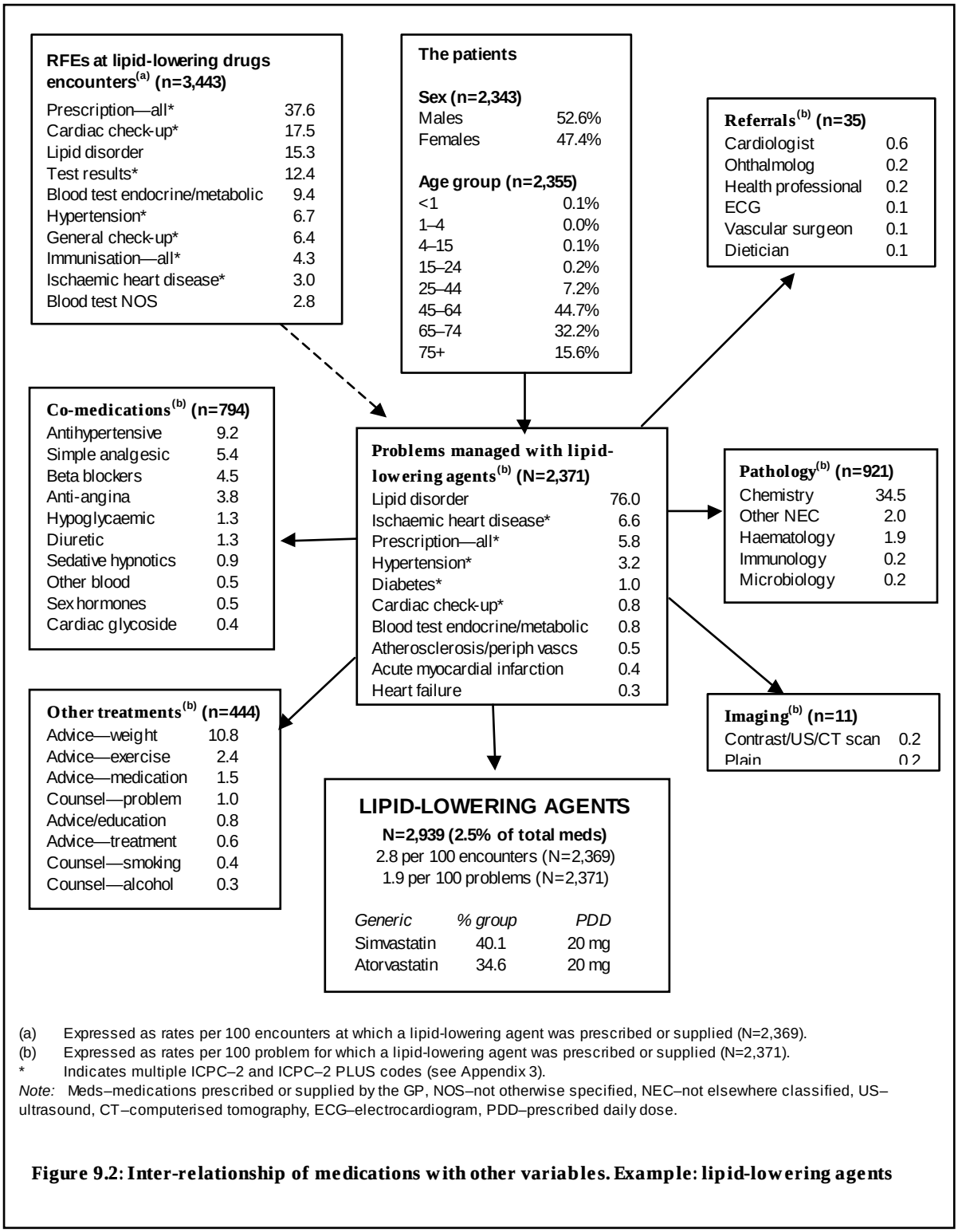
Other treatments were less frequently utilised for problems managed with lipid-lowering medications (18.7 per 100 problems) than in the total dataset (31.3 per 100 problems). All of the most common other treatments involved advice or counselling, with advice about diet and nutrition being given in over 10% of cases.

Pathology and imaging

Pathology was ordered at a rate of 31.5 per 100 problems managed with lipid-lowering medications, much higher than the overall rate of 18.0. Orders for blood chemistry were by far the most common, reflecting the regular monitoring of the effect of such medications. Imaging was ordered much less frequently, at a rate of 1.2 per 100 problems compared with 5.1 for the total data.

Referrals

The patient was referred to other services for these problems infrequently (1.5 per 100 problems) compared with a rate of 7.6 for all problem types.



(a) Expressed as rates per 100 encounters at which a lipid-lowering agent was prescribed or supplied (N=2,369).
(b) Expressed as rates per 100 problem for which a lipid-lowering agent was prescribed or supplied (N=2,371).
* Indicates multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Meds–medications prescribed or supplied by the GP, NOS–not otherwise specified, NEC–not elsewhere classified, US–ultrasound, CT–computerised tomography, ECG–electrocardiogram, PDD–prescribed daily dose.

Figure 9.2: Inter-relationship of medications with other variables. Example: lipid-lowering agents

9.2.2 Medication inter-relationship example 2: benzodiazepines

Figure 9.3 shows the relationship between benzodiazepines and other variables.

Rate of prescription or supply

There were 4,263 occasions on which benzodiazepines were recorded by GPs, accounting for 3.7% of all medications recorded. They were given at a rate of 4.1 per 100 total encounters and at a rate of 2.8 per 100 total problems. Temazepam and diazepam were the most common of these.

Prescribed daily dose

Temazepam had a median PDD of 10 mg which falls at the mid-point of the recommended range. Diazepam had a median PDD of 5 mg which is the lowest adult dose suggested in MIMS (MIMS Australia 1999).

Age and sex distribution of patients

Patients between 45 and 64 years of age were the most likely to be prescribed benzodiazepines, accounting for 30.7% of all patients receiving them. Patients in the 25–44 age group were slightly less likely to receive these medications. The sex distribution of the patients was similar to that of the general GP patient population.

Reasons for encounter

The most commonly described patient reason for encounter was a request for prescription, described at a rate of 38.1 per 100 encounters at which benzodiazepines were prescribed or given. Sleep disturbance was also a commonly cited reason, at 19.7 per 100, followed by anxiety at 11.9 per 100 encounters.

Problems managed

Sleep disturbance was the most common problem managed with benzodiazepines, accounting for almost a third of such problems. Anxiety was also common and made up 22.3% of problems.

Other medications prescribed or supplied

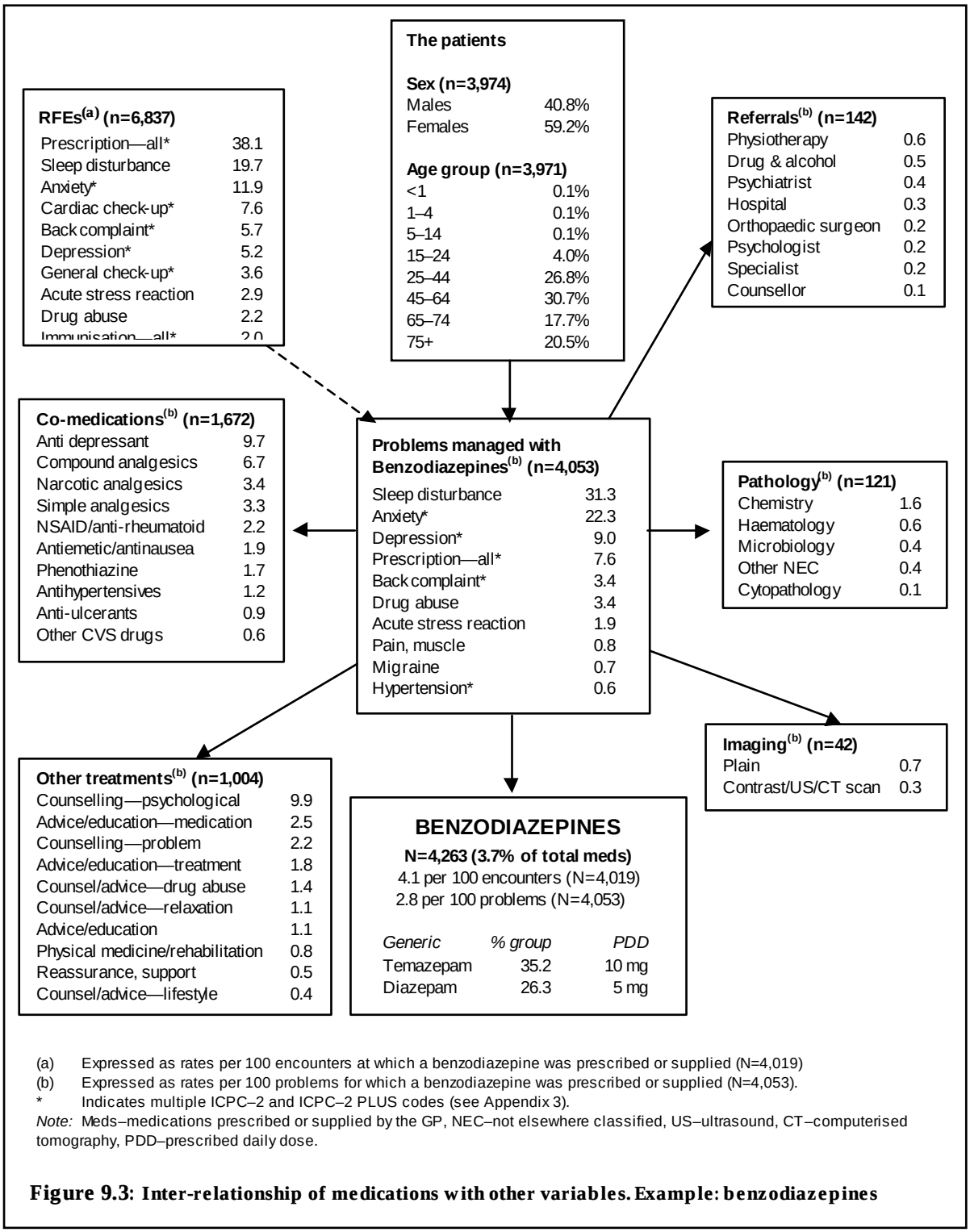
A total of 1,672 medications were prescribed or supplied at the same encounter and for the same problem for which benzodiazepines were given. Antidepressants were the most common co-medications, at a rate of 9.7 per 100 of these problems

Other treatments

Other treatments were less frequently utilised for problems managed with benzodiazepines (23.6 per 100 problems) than in the total dataset (31.3 per 100 problems). Psychological counselling was the most frequent non-pharmacological treatment, given at a rate of 9.9 per 100 of these problems.

Referrals, tests and investigation

The patient was referred to other health professionals for these problems at a rate of 3.3 per 100 problems compared with a referral rate of 7.6 in the total data. Pathology was ordered at a rate of 2.8 per 100 problems managed with benzodiazepines, much lower than the overall rate of 18.0. Imaging was also ordered infrequently, at a rate of 1.0 per 100 problems.



(a) Expressed as rates per 100 encounters at which a benzodiazepine was prescribed or supplied (N=4,019)
(b) Expressed as rates per 100 problems for which a benzodiazepine was prescribed or supplied (N=4,053).
* Indicates multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Meds–medications prescribed or supplied by the GP, NEC–not elsewhere classified, US–ultrasound, CT–computerised tomography, PDD–prescribed daily dose.

Figure 9.3: Inter-relationship of medications with other variables. Example: benzodiazepines

9.2.3 Medication inter-relationship example 3: antisecretory agents

Figure 9.4 shows the relationship between antisecretory medications and other variables.

Rate of prescription or supply

A total of 2,097 antisecretory medications were recorded by GPs, accounting for 1.8% of all medications recorded. They were given at a rate of 2.0 per 100 total encounters and at a rate of 1.4 per 100 total problems. Ranitidine was the most common antisecretory medication. Ranitidine had a median PDD of 300mg which accords with the recommended usual dose (MIMS Australia 1999).

Age and sex distribution of patients

Patients between 45 and 64 years of age were most likely to be prescribed antisecretory medications, accounting for 33.0% of all patients receiving them. Patients in the 65–74 age group were somewhat less likely to receive the medications, (23.3%). The sex distribution of the patients showed a higher proportion of males compared with the general GP patient population.

Reasons for encounter

The most commonly described patient reason for encounter was a request for prescription, described at a rate of 31.5 per 100 encounters at which antisecretory medications were prescribed or given. Oesophageal disease was the next most common reason (10.4 per 100 encounters). Epigastric pain and abdominal pain were also frequently cited reasons for encounter.

Problems managed

Oesophageal disease was the most common problem managed with an antisecretory medication, accounting for more than half of such problems. Other problems, which were far less frequent, included peptic ulcers (9%) and dyspepsia (7.6%).

Other medications prescribed or supplied

A total of 504 co-medications were prescribed or supplied for the same problem for which antisecretory medications were given. Antispasmodics were the most common of these, recorded at a rate of 4.1 per 100 of these problems. NSAID / anti-rheumatoids were the second most frequent, demonstrating a relationship between antisecretory medications and NSAIDs.

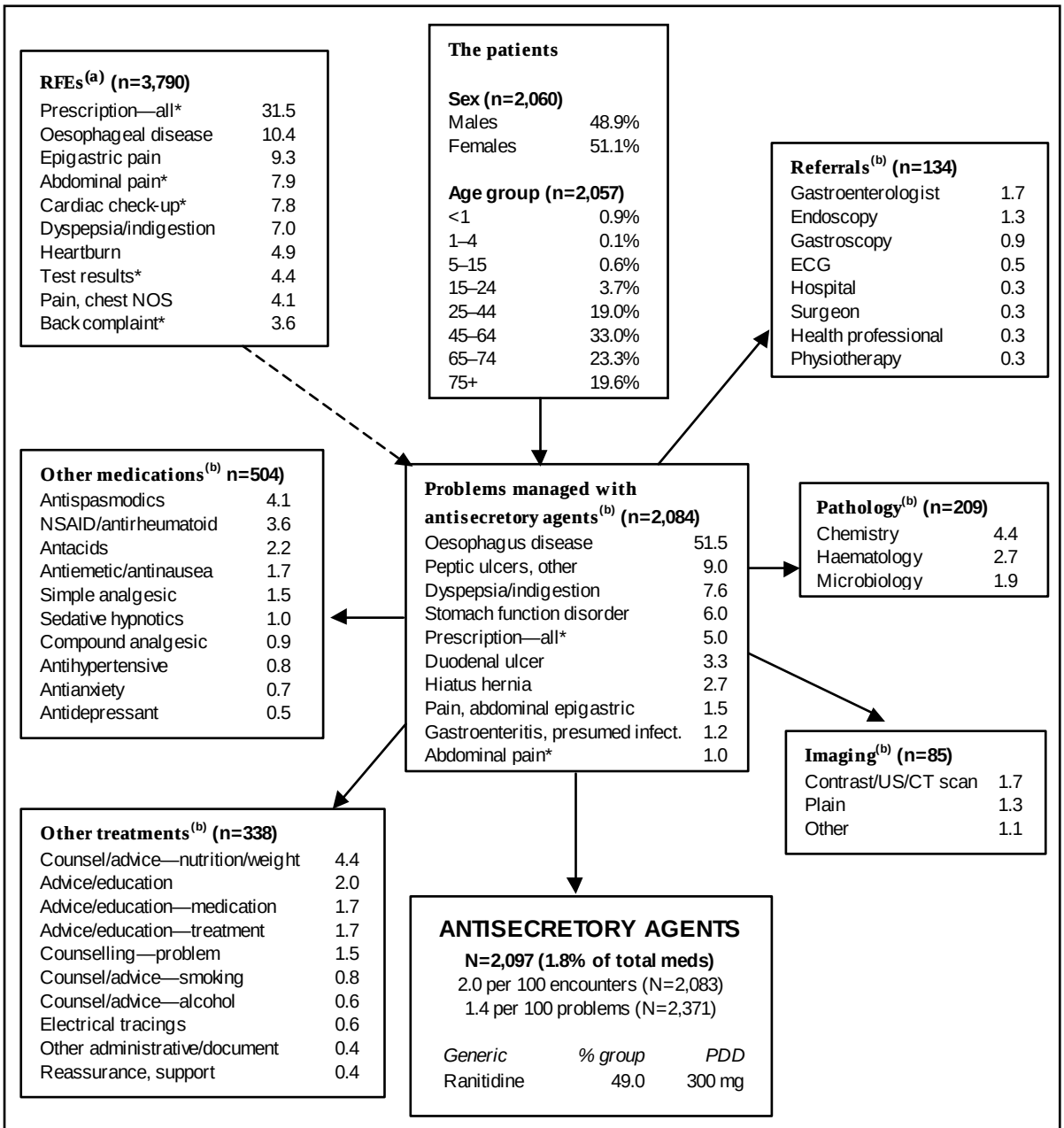
Other treatments

Other treatments were given for problems managed with antisecretory medications at a rate of 16.1 per 100 problems managed. This is half the rate of other treatments in the total dataset. Counselling nutrition/ weight, given at a rate of 4.4 per 100 of these problems, was the most frequent non-pharmacological treatment.

Referrals, tests and investigations

The patient was referred to other services for these problems at a similar rate to the total data (6.4 per 100 problems). As might be expected, the most common referral was to a gastroenterologist. Pathology was ordered at a rate of 10.0 per 100 problems managed with

antisecretory medications. Imaging occurred, at a similar rate to that of the total data, 4.1 per 100 problems managed.



(a) Expressed as rates per 100 encounters at which an antisecretory agent was prescribed or supplied (N=2,083).
(b) Expressed as rates per 100 problem at which an antisecretory agent was prescribed or supplied (N=2,371).
* Indicates multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Meds–medications prescribed or supplied by the GP, NOS–not otherwise specified, US–ultrasound, CT–computerised tomography, ECG–electrocardiogram, PDD–prescribed daily dose.

Figure 9.4: Inter-relationship of medications with other variables. Example: antisecretory

9.3 Prescribed medications

There were 98,371 prescriptions recorded, at a rate of 93.8 per 100 encounters and 63.9 per 100 problems managed. At least one prescription was recorded at 60.0% of encounters and for half (50.5%) the problems managed.

The survey form allowed GPs to record up to four medications for each of four problems. A maximum of 16 medications could therefore be recorded at each encounter.

However, no medications were prescribed at 40.0% of encounters, one medication at 38.4% of encounters, two at 13.9% and three at 5.0%. Four or more medications were prescribed at only 2.7% of encounters (Figure 9.5).

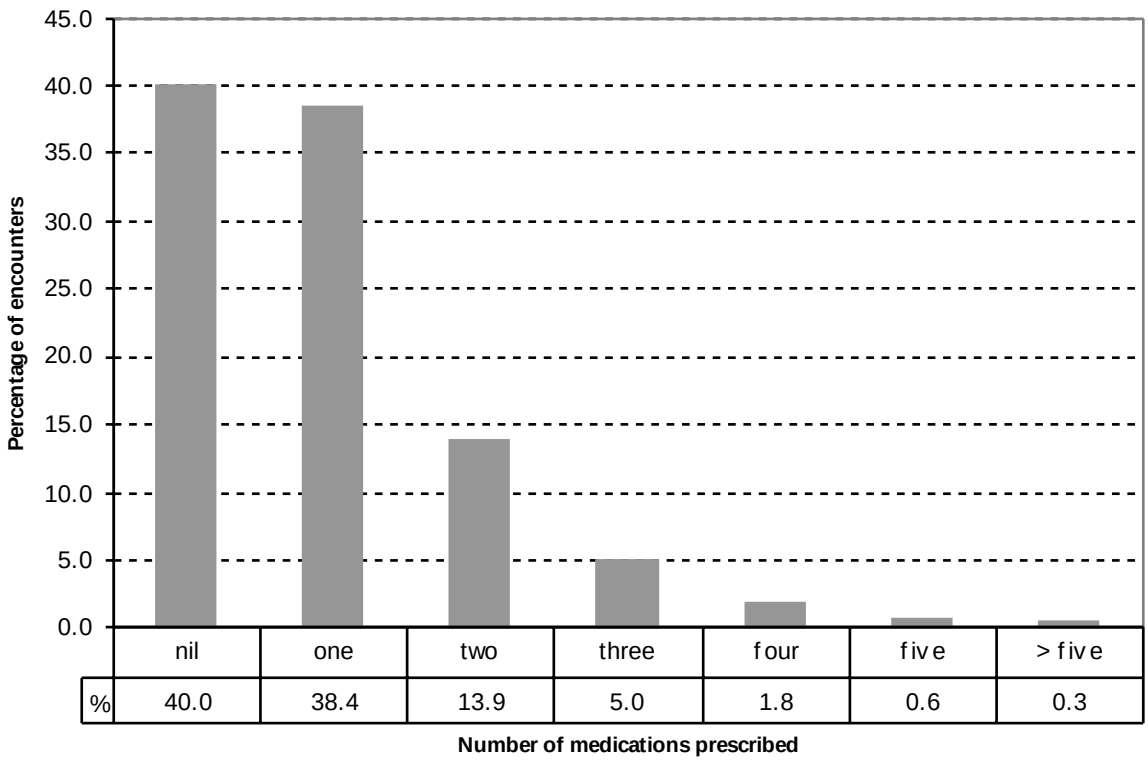


Figure 9.5: Number of medications prescribed per encounter

No prescription was given for almost half (49.5%) of all problems managed, one for 40.2%, two for 7.9% and three or more for only 2.5% (Figure 9.6).

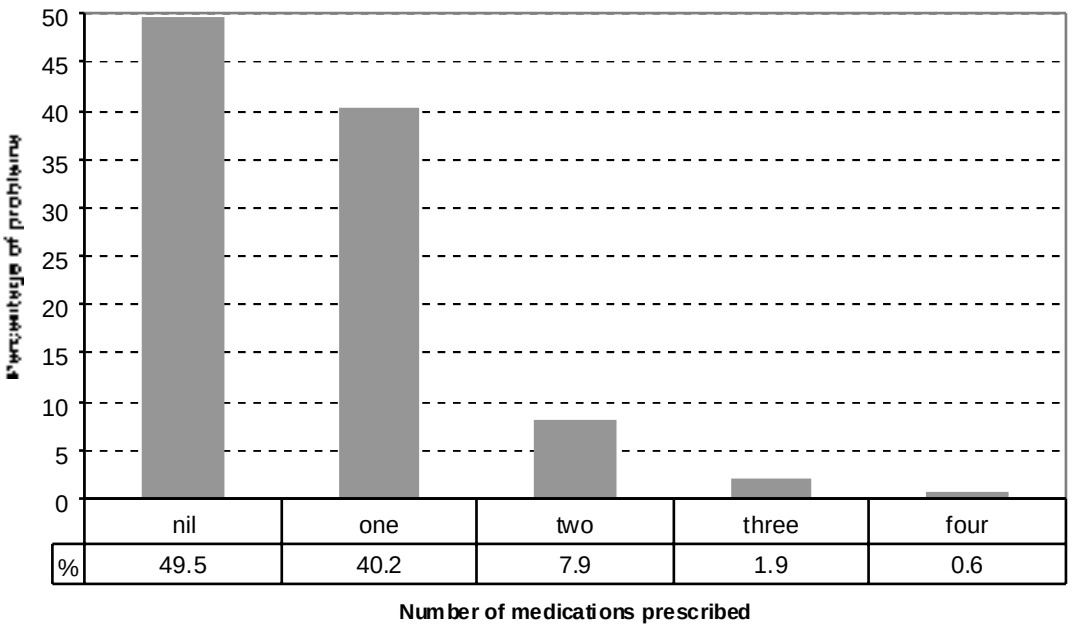


Figure 9.6: Number of medications prescribed per problem

9.3.1 Number of repeats

GPs were also asked to record the number of repeat prescriptions ordered for each prescribed medication. There was a very high level of missing data in this field. For 53,834 prescriptions (54.7%) there was nothing recorded. For the remaining 44,537 prescriptions the distribution of the specified number of repeats (from specified zero to 6+) is provided in Figure 9.7. For almost one-third of these prescriptions the GP specified that no repeats had been prescribed while for one quarter of prescriptions five repeats were ordered. The latter proportion reflects the PBS provision of one month's supply and five repeats for many medications used for chronic conditions such as hypertension. Ordering two repeats was not unusual (16.3%) but ordering three repeats, or six or more repeats, was relatively rare.

The level of missing data makes it difficult to reliably extrapolate to the total number of intended prescriptions (i.e. original plus repeats). The extrapolations can be based on two possible assumptions:

- for all missing repeat data the GP intended that no repeats be given (i.e. that the GPs assumed blank=zero), or
- the missing data are random and distributed across all medication types in a similar manner to those for which repeat status was recorded.

The first assumption (missing=zero repeats) would suggest that the total number of original prescriptions plus the repeats ordered by these GPs amounted to approximately 188,200 for the year. Assuming approximately 103 million GP-patient Medicare-paid encounters nationally per year, this extrapolates to about 190 million orders by recognised GPs for medications to be dispensed.

If the missing data are assumed to be random in nature the extrapolation should be based on the pattern of repeats that were recorded. This method would suggest that the

participating GPs intended a total 297,590 medications to be dispensed as a result of these prescriptions. This extrapolates to about 300 million orders by recognised GPs in Australia per year.

The distribution across group and subgroup of medications prescribed where the 'repeat' section was left empty was compared with the distribution for all medications for which the number of repeats was specified. The distributions differed markedly, suggesting that the missing repeats data were not distributed evenly across different types of medications. It could therefore be best assumed that the missing data in some cases means 'no repeats' and in others is truly missing. On this assumption one can only say that the number of orders by recognised GPs for medications to be dispensed would be at least 190 and could be up to 300 million per year across the country.

However in the 1999 calendar year only 123,510,334 dispensed prescriptions from recognised GPs were recorded in the Pharmaceutical Benefits Scheme data (personal communication McManus, DHAC from HIC data). While it could be expected that some prescriptions are not presented for dispensing, the non-redemption rates for prescriptions in overseas studies have varied between 5.2% in the UK (Beardon et al. 1993) and 13% in a more comparable health system in New Zealand (Gardner et al. 1996) These non-redemption rates are not sufficient to explain the difference. The main cause of this huge discrepancy appears to be the lack of recording in the PBS data of medications that fall below the subsidy threshold and the lack of data on private prescriptions. This suggests that PBS data should not be used alone to monitor significant areas of general practice therapeutic management.

The high level of missing repeat data in this second year of BEACH is disappointing. The research team is developing some better examples and more explicit instructions for participating GPs in an attempt to improve the response rate to this question in the coming (fourth) BEACH year.

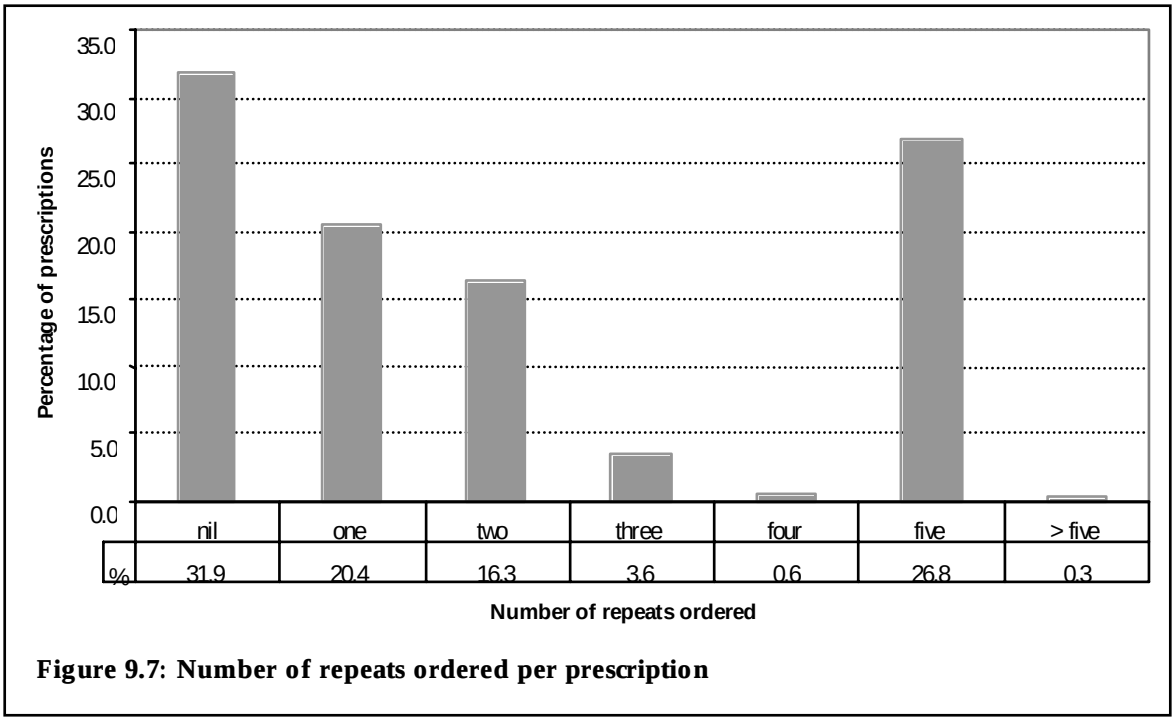


Figure 9.7: Number of repeats ordered per prescription

9.3.2 Age–sex-specific rates of prescribed medications

Age–sex-specific charts show the prescription rate per 100 encounters for all the male or female patients respectively in the age group under consideration. Figure 9.8 shows the well described tendency for the number of prescriptions written at each encounter to rise with advancing age. Figure 9.9, however, demonstrates that the age-based increase almost disappears if the prescription rate is related to problems. This suggests that the increased prescription rate in older patients is largely accounted for by the increased number of health problems to which they are subject. Compared with BEACH 1998, there was a higher rate of prescription both per encounter and per problem managed for infants and young children. In particular, the rates for females aged less than one has risen from 69 to 82 per 100 encounters and from 58 to 69 per 100 problems. For 1–4 year old females, rates rose from 73 to 80 per 100 encounters and from 62 to 69 per 100 problems managed. Conversely, the rate per 100 problems for females older than 75 years dropped from 75 to 70. These differences are descriptive only. They have not been statistically tested and may purely reflect insignificant data variation. For reliable trend analysis a third year of BEACH data are required.

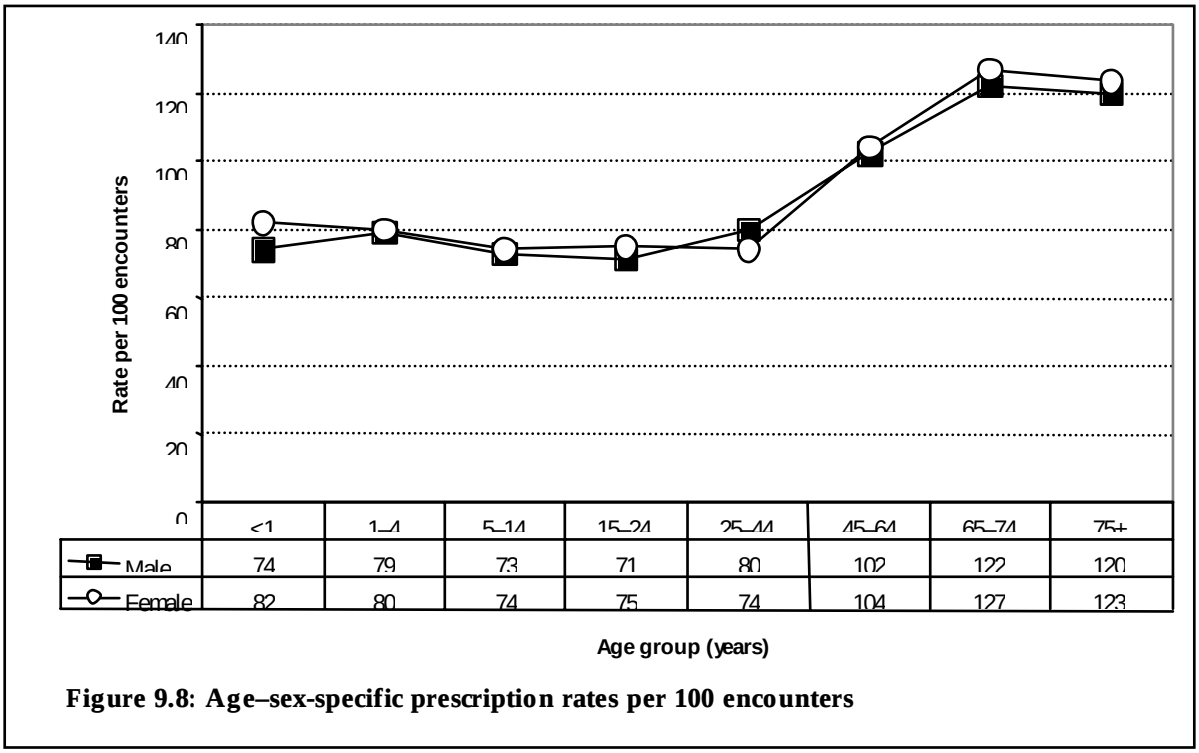
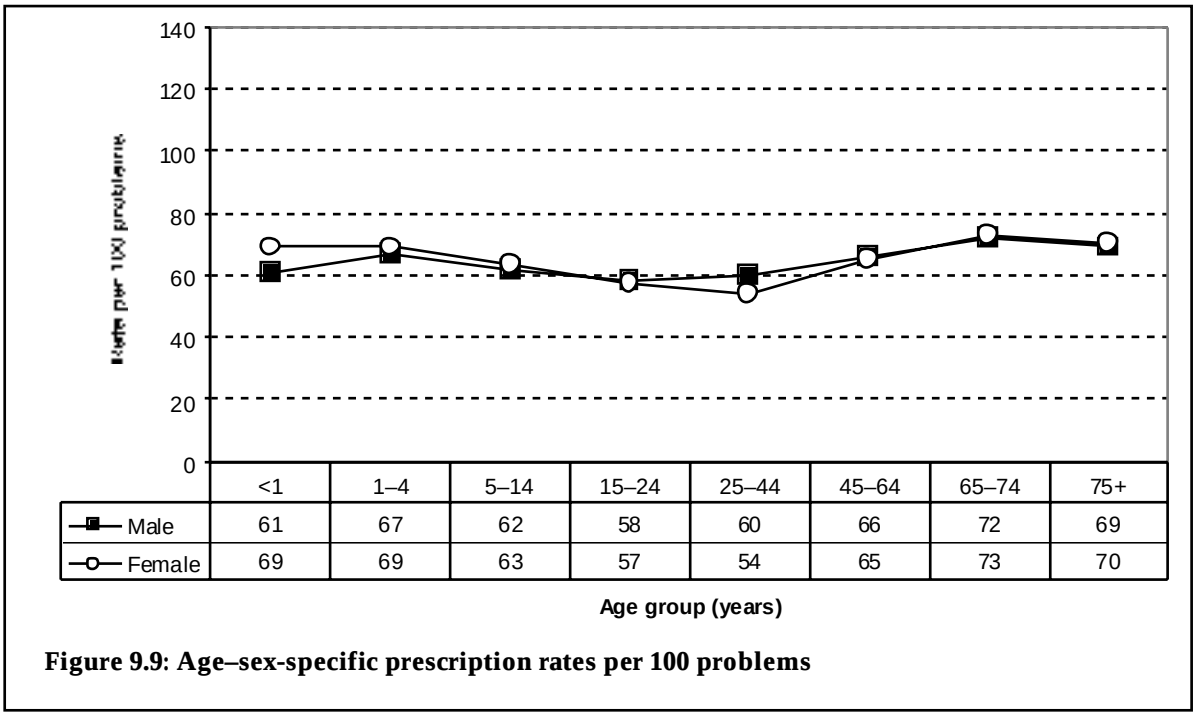
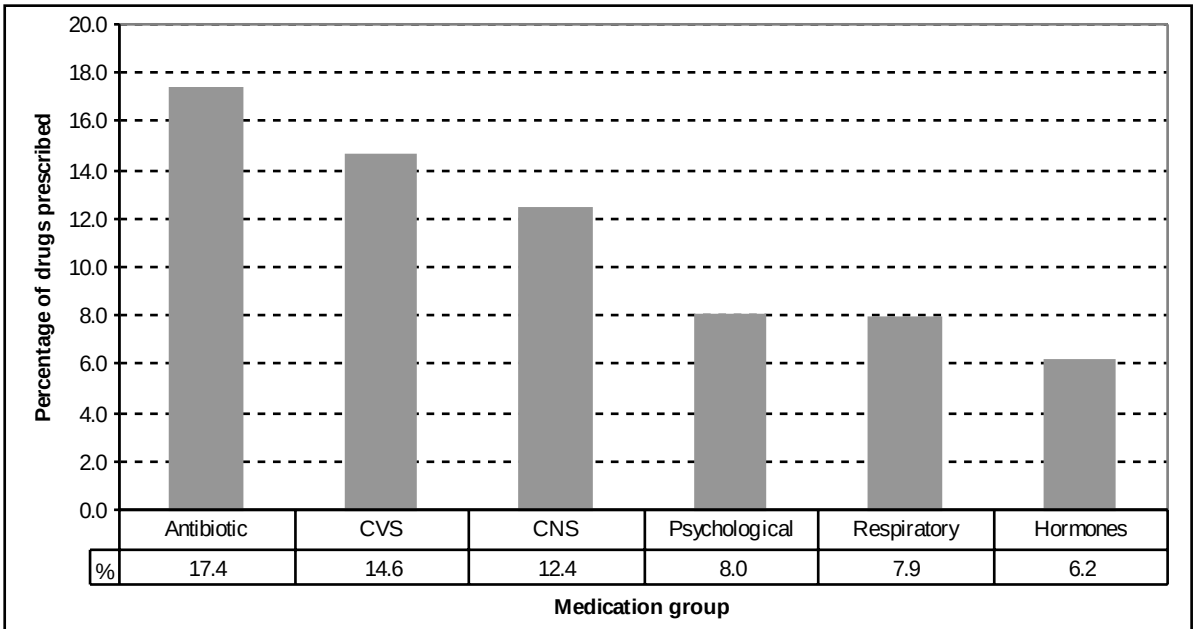


Figure 9.8: Age–sex-specific prescription rates per 100 encounters



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Male	61	67	62	58	60	66	72	69
Female	69	69	63	57	54	65	73	70

Figure 9.9: Age–sex-specific prescription rates per 100 problems



	Antibiotic	CVS	CNS	Psychological	Respiratory	Hormones
%	17.4	14.6	12.4	8.0	7.9	6.2

Figure 9.10: Distribution of prescribed medications by major groups

9.3.3 Types of medications prescribed

Medications prescribed by major groups

The distribution of prescribed medications by major groups is presented graphically in Figure 9.10. Antibiotics were the most commonly prescribed group, representing 17.4% of all prescriptions. These were followed by cardiovascular medications (14.6%), central nervous system (12.4%), psychological (7.5%), respiratory medications (7.9%) and hormones (6.2%). Table 9.1 shows the distribution of medications commonly prescribed by group, subgroup and generic name in order of medication group frequency.

In the antibiotic group, broad spectrum penicillins were prescribed at a rate of 4.7 per 100 encounters. Amoxycillin and the amoxycillin/potassium clavulanate were the most frequently prescribed in that group**.** Cephalosporins were prescribed almost as frequently at a rate of 4.0 per 100 encounters.

Within cardiovascular medications, antihypertensives contributed more than half the prescriptions (7.1 per 100 encounters). Other cardiovascular medications, principally lipid-lowering agents, contributed 2.4 prescriptions per 100 encounters. Beta-blockers were also frequently recorded.

Prescribed central nervous system medications were mainly analgesics (9.3 per 100 encounters) and anti-emetics (1.6). Compound analgesics containing codeine continue to be a frequent choice.

Psychological medications most frequently prescribed were antidepressants, in particular, sertraline, while bronchodilators (3.8) and asthma preventives (2.5) made up the majority of respiratory medications prescribed.

In other groups, vaccines were prescribed at a rate of 4.6, NSAIDS/anti-rheumatoids at a rate of 4.6, topical steroids at a rate of 2.8 and anti-ulcerants at a rate of 2.2 per 100 encounters.

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

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

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Antibiotics			**17,141**	**17.4**	**16.3**	**15.8**	**16.9**
	Penicillins		1,580	1.6	1.5	1.3	1.7
		Penicillin V/VK	626	0.6	0.6	0.4	0.8
	Broad-spectrum penicillins		4,963	5.0	4.7	4.4	5.1
		Amoxycillin	3,266	3.3	3.1	2.8	3.4
		Amoxycillin/clavulanate	1,690	1.7	1.6	1.4	1.8
	Tetracycline		1,203	1.2	1.1	1.0	1.3
		Doxycycline	971	1.0	0.9	0.7	1.1
	Sulphonamides		498	0.5	0.5	0.2	0.7
		Cotrimoxazole	498	0.5	0.5	0.2	0.7
	Other antibiotics		3,611	3.7	3.4	3.2	3.7
		Roxithromycin	1,886	1.9	1.8	1.6	2.0
		Erythromycin	774	0.8	0.7	0.5	0.9
	Antiviral agents		823	0.8	0.8	0.4	1.2
	Cephalosporins		4,239	4.3	4.0	3.7	4.4
		Cephalexin	2,154	2.2	2.1	1.8	2.3
		Cefaclor monohydrate	1,725	1.8	1.6	1.3	2.0
Cardiovascular			**14,378**	**14.6**	**13.7**	**12.9**	**14.5**
	Antihypertensives		7,460	7.6	7.1	6.7	7.6
		Amlodipine	820	0.8	0.8	0.6	0.9
		Perindopril	738	0.7	0.7	0.5	0.9
		Enalapril mal	714	0.7	0.7	0.5	0.9
		Irbesartan	711	0.7	0.7	0.5	0.9
		Indapamide	617	0.6	0.6	0.4	0.8
		Felodipine	541	0.6	0.5	0.3	0.7
	Antiangina		1,380	1.4	1.3	1.1	1.5
	Betablockers		1,896	1.9	1.8	1.6	2.0
		Atenolol	1,085	1.1	1.0	0.8	1.2
		Metoprolol	498	0.5	0.5	0.3	0.7
	Other CVS medications		2,535	2.6	2.4	2.2	2.6
		Simvastatin	951	1.0	0.9	0.7	1.1
		Atorvastatin	820	0.8	0.8	0.6	0.9

(continued)

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

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Central nervous system			**12,159**	**12.4**	**11.6**	**11.0**	**12.2**
	Simple analgesics		5,213	5.3	5.0	4.6	5.4
		Paracetamol	4,248	4.3	4.1	3.7	4.4
		Aspirin	891	0.9	0.8	0.6	1.1
	Narcotic analgesics		1,411	1.4	1.3	0.9	1.8
	Compound analgesics		3,126	3.2	3.0	2.8	3.2
		Paracetamol/codeine	2,529	2.6	2.4	2.2	2.6
	Anticonvulsants		522	0.5	0.5	0.3	0.7
	Anti-emetic/antinausea		1,673	1.7	1.6	1.5	1.7
		Prochlorperazine	805	0.8	0.8	0.6	0.9
		Metoclopramide	793	0.8	0.8	0.6	0.9
Psychological			**7,912**	**8.0**	**7.5**	**7.1**	**8.0**
	Sedative hypnotics		2,009	2.0	1.9	1.7	2.1
		Temazepam	1,504	1.5	1.4	1.3	1.6
	Anti-anxiety		2,202	2.2	2.1	1.9	2.3
		Diazepam	1,120	1.1	1.1	0.9	1.3
		Oxazepam	883	0.9	0.8	0.6	1.1
		Phenothiazine	625	0.6	0.6	0.4	0.8
	Antidepressants		3,076	3.1	2.9	2.8	3.1
		Sertraline	734	0.7	0.7	0.5	0.9
Respiratory			**7,790**	**7.9**	**7.4**	**6.9**	**7.9**
	Expectorants		575	0.6	0.5	0.2	0.9
	Bronchodilators		3,946	4.0	3.8	3.5	4.1
		Salbutamol	2,499	2.5	2.4	2.2	2.6
		Terbutaline	725	0.7	0.7	0.5	0.9
		Ipratropium inhaled	716	0.7	0.7	0.5	0.9
	Asthma preventives		2,660	2.7	2.5	2.3	2.8
		Budesonide	777	0.8	0.7	0.6	0.9
		Beclomethasone	635	0.6	0.6	0.4	0.8
		Fluticasone propionate	533	0.5	0.5	0.3	0.7

(continued)

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

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Hormones			**6,136**	**6.2**	**5.9**	**5.5**	**6.2**
	Sex hormones		2,164	2.2	2.1	1.9	2.2
		Medroxyprogesterone	547	0.6	0.5	0.4	0.7
	Corticosteroids		1,484	1.5	1.4	1.2	1.6
		Prednisone	530	0.5	0.5	0.2	0.8
		Prednisolone	515	0.5	0.5	0.3	0.7
	Hypoglycaemics		1,901	1.9	1.8	1.5	2.1
		Metformin	740	0.8	0.7	0.5	0.9
	Other hormones		584	0.6	0.6	0.4	0.7
Musculoskeletal			**5,977**	**6.1**	**5.7**	**5.4**	**6.0**
	NSAID/anti-rheumatoid		4,807	4.9	4.6	4.3	4.8
		Diclofenac systemic	1,321	1.3	1.3	1.1	1.5
		Naproxen	790	0.8	0.8	0.5	1.0
		Piroxicam oral	606	0.6	0.6	0.3	0.8
		Ibuprofen	591	0.6	0.6	0.3	0.8
Allergy, immune system			**5,461**	**5.6**	**5.2**	**4.8**	**5.6**
	Antihistamines		729	0.7	0.7	0.5	0.9
	Vaccines		4,572	4.6	4.4	3.9	4.8
		Influenza virus vaccine	1,575	1.6	1.5	0.9	2.1
Skin			**4,833**	**4.9**	**4.6**	**4.4**	**4.8**
	Anti-infection skin		1,040	1.1	1.0	0.8	1.1
	Topical steroid		2,965	3.0	2.8	2.7	3.0
		Betamethasone topical	904	0.9	0.9	0.7	1.0
		Monetasone	672	0.7	0.6	0.5	0.8
		Hydrocortisone topical	543	0.6	0.5	0.4	0.7
	Other skin		804	0.8	0.8	0.6	0.9
Digestive			**4,490**	**4.6**	**4.3**	**4.1**	**4.5**
	Anti-ulcerants		2,299	2.3	2.2	2.0	2.4
		Ranitidine	1,029	1.0	1.0	0.8	1.1
	Antidiarrhoeals		560	0.6	0.5	0.4	0.7
Ear, nose topical			**2,594**	**2.6**	**2.5**	**2.3**	**2.6**
	Topical otic		1,008	1.0	1.0	0.8	1.1
		Dexamethasone/ Framycetin	524	0.5	0.5	0.3	0.7
	Topical nose		1,584	1.6	1.5	1.3	1.7
		Budesonide topical nasal	958	1.0	0.9	0.8	1.1

(continued)

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

Group	Subgroup	Generic	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Urogenital			**2,123**	**2.2**	**2.0**	**1.8**	**2.2**
	Diuretics		1,561	1.6	1.5	1.3	1.7
		Frusemide (Furosemide)	851	0.9	0.8	0.6	1.0
Contraceptives			**1,822**	**1.9**	**1.7**	**1.6**	**1.9**
	Oral contraception		1,818	1.8	1.7	1.6	1.9
		Levonorgestrel/ Ethinyloestradiol	1,333	1.4	1.3	1.1	1.4
Eye medications			**1,794**	**1.8**	**1.7**	**1.6**	**1.8**
	Anti-infectives, eye		1,133	1.2	1.1	1.0	1.2
		Chloramphenicol eye	950	1.0	0.9	0.8	1.0
Blood			**1,668**	**1.7**	**1.6**	**1.4**	**1.7**
	Haemopoietic		874	0.9	0.8	0.7	1.0
	Other blood		795	0.8	0.8	0.6	0.9
		Warfarin sodium	728	0.7	0.7	0.5	0.9
Nutrition, metabolism			**1,185**	**1.2**	**1.1**	**0.9**	**1.3**
	Minerals/tonics		601	0.6	0.6	0.4	0.7
Miscellaneous			**373**	**0.4**	**0.4**	**0.0**	**0.8**
Antineoplastics			**348**	**0.4**	**0.3**	**0.1**	**0.5**
Surgical preparations			**110**	**0.1**	**0.1**	**0.0**	**0.7**
Diagnostic agents			**78**	**0.1**	**0.1**	**0.0**	**0.4**

Note: Scripts–prescriptions, encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

Most frequently prescribed generic medications

The most frequently prescribed individual generic medications are listed in Table 9.2. Antibiotics were well represented in BEACH, with five of the top ten medications being from that group. Simple analgesics were very frequently prescribed, probably reflecting their prescription for health care card holders for whom prescription is a cheaper option than over-the-counter purchase. Influenza vaccine represented 1.6% of all prescriptions, presumably reflecting a patient and GP response to public health campaigns to increase immunisation levels in at-risk groups.

Table 9.2: Most frequently prescribed medications

Generic medication	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Paracetamol	4,248	4.3	4.1	3.7	4.4
Amoxycillin	3,266	3.3	3.1	2.8	3.4
Paracetamol/codeine	2,529	2.6	2.4	2.2	2.6
Salbutamol	2,499	2.5	2.4	2.2	2.6
Cephalexin	2,154	2.2	2.1	1.8	2.3
Roxithromycin	1,886	1.9	1.8	1.6	2.0
Cefaclor monohydrate	1,725	1.8	1.6	1.3	2.0
Amoxycillin/potassium clavulanate	1,690	1.7	1.6	1.4	1.8
Influenza virus vaccine	1,575	1.6	1.5	0.9	2.1
Temazepam	1,504	1.5	1.4	1.3	1.6
Levonorgestrel/ethinyloestradiol	1,333	1.4	1.3	1.1	1.4
Diclofenac sodium systemic	1,321	1.3	1.3	1.1	1.5
Diazepam	1,120	1.1	1.1	0.9	1.3
Atenolol	1,085	1.1	1.0	0.8	1.2
Ranitidine	1,029	1.0	1.0	0.8	1.1
Doxycycline hcl	971	1.0	0.9	0.7	1.1
Budesonide topical nasal	958	1.0	0.9	0.8	1.1
Simvastatin	951	1.0	0.9	0.7	1.1
Chloramphenicol eye	950	1.0	0.9	0.8	1.0
Betamethasone topical	904	0.9	0.9	0.7	1.0
Aspirin	891	0.9	0.8	0.6	1.1
Oxazepam	883	0.9	0.8	0.6	1.1
Frusemide (Furosemide)	851	0.9	0.8	0.6	1.0
Amlodipine	820	0.8	0.8	0.6	0.9
Atorvastatin	820	0.8	0.8	0.6	0.9
Prochlorperazine	805	0.8	0.8	0.6	0.9
Metoclopramide	793	0.8	0.8	0.6	0.9
Naproxen	790	0.8	0.8	0.5	1.0
Budesonide	777	0.8	0.7	0.6	0.9
Erythromycin	774	0.8	0.7	0.5	0.9
Subtotal	*41,902*	*42.5*	. .	. .	. .
Total prescribed medications	**98,371**	**100.0**	**93.8**	**91.5**	**96.2**

Note: Scripts–prescriptions, encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

Distribution of medications prescribed by ATC medication group

Table 9.3 shows the distribution of prescribed medications using the WHO ATC classification (WHO 1997) as an alternative method of grouping. This allows comparison with other data classified in ATC such as those produced by the HIC.

With this classification analgesics were the most frequently prescribed group, followed by penicillins and NSAIDs. Other beta-lactam antibacterials, principally cephalosporins, were fourth, followed by inhaled adrenergics and ACE inhibitors.

Table 9.3: Distribution of medications prescribed by ATC medication group

ATC medication group	Number	Per cent of scripts	Rate per 100 encs	95% LCI	95% UCI
Other analgesics & antipyretics	7,904	8.0	7.5	7.1	8.0
Beta-lactam antibacterials: penicillins	6,492	6.6	6.2	5.8	6.6
Anti-inflammatory/antirheumatic products, non-steroids	4,753	4.8	4.5	4.3	4.8
Other beta-lactam antibacterials	4,239	4.3	4.0	3.7	4.4
Adrenergics inhalants	3,474	3.5	3.3	3.1	3.6
ACE inhibitors plain	3,454	3.5	3.3	3.1	3.5
Other anti-asthmatics inhalants	3,176	3.2	3.0	2.8	3.3
Antidepressants	3,076	3.1	2.9	2.8	3.1
Macrolides & lincosamides	2,949	3.0	2.8	2.6	3.0
Viral vaccines	2,728	2.8	2.6	2.2	3.0
Corticosteroids plain	2,372	2.4	2.3	2.1	2.4
Cholesterol & triglyceride reducers	2,302	2.3	2.2	2.0	2.4
Medications for treatment of peptic ulcer	2,299	2.3	2.2	2.0	2.4
Anxiolytics	2,205	2.2	2.1	1.9	2.3
Hypnotics & sedatives	1,998	2.0	1.9	1.7	2.1
Beta-blocking agents plain	1,983	2.0	1.9	1.7	2.1
Hormonal contraceptives for systemic use	1,946	2.0	1.9	1.7	2.0
Opioids	1,819	1.8	1.7	1.3	2.1
Selective calcium channel blockers with mainly vascular effects	1,713	1.7	1.6	1.4	1.8
Decongestants & other nasal preparations for topical use	1,530	1.6	1.5	1.3	1.6
Oral blood glucose lowering medications	1,523	1.5	1.5	1.2	1.7
Corticosteroids for systemic use plain	1,472	1.5	1.4	1.2	1.6
Antipsychotics	1,430	1.5	1.4	1.2	1.5
Anti-infectives	1,277	1.3	1.2	1.1	1.3
Tetracyclines	1,203	1.2	1.1	1.0	1.3
Propulsives	1,065	1.1	1.0	0.9	1.2
Estrogens	1,033	1.1	1.0	0.9	1.1
Antihistamines for systemic use	966	1.0	0.9	0.7	1.2
Vasodilators used in cardiac disease	941	1.0	0.9	0.7	1.1
Sulfonamides & trimethoprim	910	0.9	0.9	0.7	1.0
Subtotal	*74,232*	*75.5*	. .	. .	. .
Total medications prescribed	**98,372**	**100.0**	**93.8**	**91.5**	**96.2**

Note: Encs–encounters, Scripts–prescriptions, UCI–upper confidence interval, LCI–lower confidence interval.

9.4 Medications advised for over-the-counter purchase

The total number of medications recorded as recommended by the GP for over-the-counter purchase was 9,842, at a rate of 9.4 per 100 encounters and 6.4 per 100 problems managed. At least one medication was recorded as advised at 8.3% of encounters and for 5.8% of problems.

9.4.1 Types of medications advised

Medications advised by major groups

Central nervous system medications predominated in those advised to patients, with almost a third of the advised medications being in this group. They were followed by respiratory medications and those in the skin and digestive medication groups (Figure 9.11).

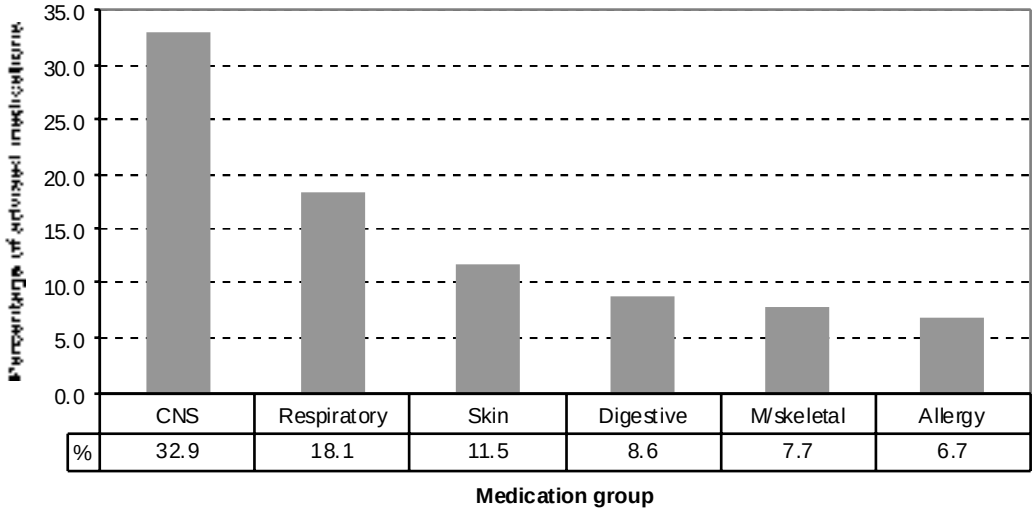


Figure 9.11: Advised medications by major groups

The distribution of the most frequently advised medications by generic name shows that paracetamol was the most common (26.4% of all advised over-the-counter medications), and together with the paracetamol/codeine combination accounted for 29.9% of all medications advised (Table 9.4). While other medications were advised in relatively small numbers, the range of medications was wide. Most frequent of these included analgesics, cold relief and antihistamines.

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

Generic medication	Number	Per cent of OTCs	Rate per 100 encs	95% LCI	95% UCI
Paracetamol	2,601	26.4	2.5	2.0	3.0
Paracetamol/codeine	344	3.5	0.3	0.0	0.8
Ibuprofen	313	3.2	0.3	0.0	0.7
Pseudoephedrine/paracetemol	287	2.9	0.3	0.0	1.1
Chlorpheniramine/phenylephrine	266	2.7	0.3	0.0	0.7
Loratadine	265	2.7	0.3	0.0	0.6
Diclofenac diethyl topical	231	2.3	0.2	0.0	0.5
Clotrimazole topical	220	2.2	0.2	0.0	0.4
Aspirin	172	1.8	0.2	0.0	0.6
Brompheniramine/pseudoephedrine	172	1.8	0.2	0.0	0.6
Pseudoephedrine	170	1.7	0.2	0.0	0.6
Sodium/potassium/citric/glucose	147	1.5	0.1	0.0	0.5
Pholcodine	142	1.4	0.1	0.0	0.5
Fexofenadine	132	1.3	0.1	0.0	0.9
Clotrimazole vaginal	121	1.2	0.1	0.0	0.4
Chlorpheniramine/pseudoephedrine	101	1.0	0.1	0.0	0.7
Povidone—iodine topical	96	1.0	0.1	0.0	0.4
Subtotal	*5,780*	*58.7*	. .	. .	. .
Total medications advised	**9,842**	**100.0**	**9.4**	**8.6**	**10.2**

Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

9.5 Medications supplied by general practitioners

General practitioners supplied their patients with a total of 7,218 medications in this study, at a rate of 6.9 medications per 100 encounters and 4.7 per 100 problems. At least one medication was supplied at 5.1% of encounters and for 3.7% of problems.

9.5.1 Types of medications supplied by GPs

Medications supplied by GPs by major groups

The distribution of supplied medications by medication group showed that allergy / immune medications constituted almost 42% of all medications supplied. This result probably reflects the direct GP supply of childhood vaccines in most parts of Australia. Cardiovascular and central nervous system medications made up 8.8% and 7.2% of GP-supplied medications (Figure 9.12).

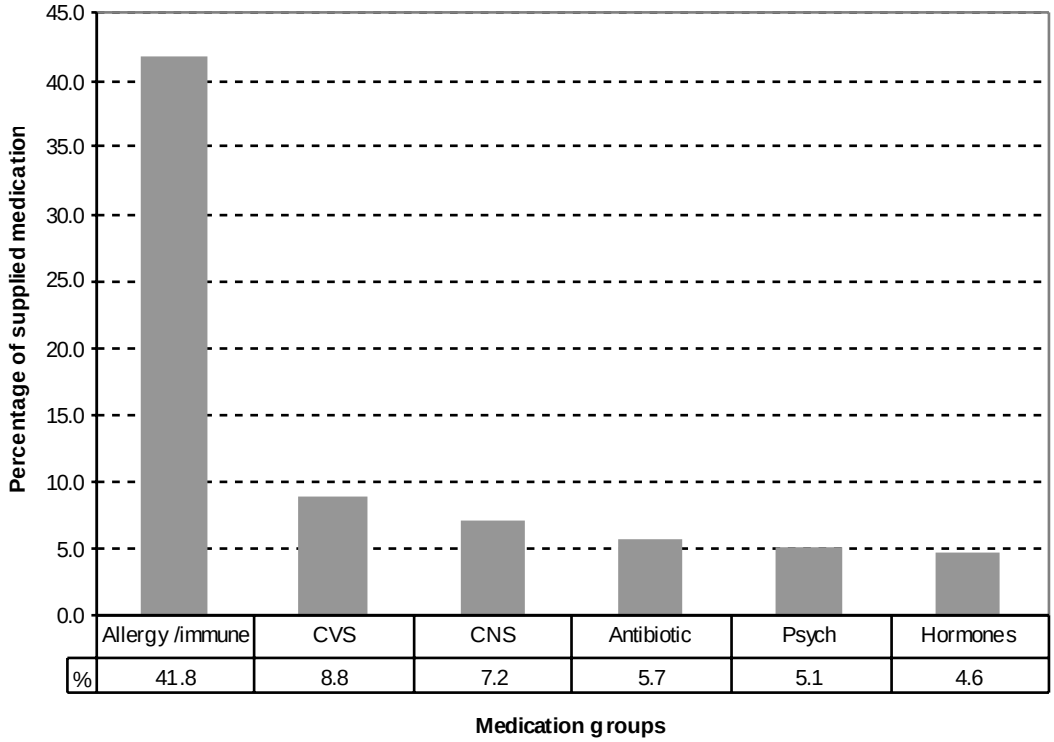


Figure 9.12: GP-supplied medications by major groups

Of the top ten most common medications supplied by the GP eight were vaccines, principally influenza virus vaccine which accounted for over 10% of GP-supplied medications (Table 9.5). There was a wide spread of other medications supplied, mostly prescription medications, presumably from manufacturers' sample packs. They reflect a range of medications which may be needed acutely in a situation (such as out of pharmacy hours) where prescription medications cannot be obtained from other sources or where cost is an issue. Some of the most commonly supplied of these were the anti-emetic, metoclopramide, the antidepressant, sertraline and the asthma medication, salbutamol.

Table 9.5: Medications most frequently supplied by GPs

Generic medication	Number	Per cent of GP-supplied	Rate per 100 encs	95% LCI	95% UCI
Influenza virus vaccine	751	10.4	0.7	0.0	1.7
Polio Sabin oral vaccine	407	5.6	0.4	0.1	0.7
Triple antigen (Diphtheria/Pertussis/Tetanus vaccine)	366	5.1	0.3	0.1	0.6
Haemophilus influenzae type b vaccine	338	4.7	0.3	0.1	0.6
ADT/CDT (Diphtheria/Tetanus) vaccine	290	4.0	0.3	0.0	0.5
Hepatitis B vaccine	182	2.5	0.2	0.0	0.6
Mumps/measles/rubella vaccine	177	2.5	0.2	0.0	0.5
Metoclopramide	112	1.5	0.1	0.0	0.4
Tetanus toxoid vaccine	94	1.3	0.1	0.0	0.5
Sertraline	90	1.2	0.1	0.0	0.4
Salbutamol	86	1.2	0.1	0.0	0.7
Levonorgestrel/ethinyloestradiol	80	1.1	0.1	0.0	0.5
Prochlorperazine	77	1.1	0.1	0.0	0.5
Piroxicam oral	75	1.0	0.1	0.0	0.7
Pneumococcal vaccine	74	1.0	0.1	0.0	1.4
Paracetamol	71	1.0	0.1	0.0	0.8
Amoxycillin	66	0.9	0.1	0.0	1.7
Pethidine hcl inject/tab	64	0.9	0.1	0.0	0.4
Hepatitis A and B vaccine	62	0.9	0.1	0.0	0.7
Paracetamol/codeine	61	0.9	0.1	0.0	0.8
Hepatitis A vaccine	60	0.8	0.1	0.0	0.8
Celecoxib	57	0.8	0.1	0.0	0.7
Irbesartan	56	0.8	0.1	0.0	0.5
Roxithromycin	55	0.8	0.1	0.0	0.9
Monetasone	55	0.8	0.1	0.0	0.4
Vitamin B12 (cyanocobalamin)	54	0.7	0.1	0.0	0.6
Methylprednisolone	51	0.7	0.0	0.0	0.4
Paroxetine	47	0.7	0.0	0.0	0.8
Betamethasone	47	0.6	0.0	0.0	0.5
Diclofenac sodium systemic	45	0.6	0.0	0.0	1.0
Subtotal	*4050*	*55.1*	. .	. .	. .
Total medications supplied	**7,024**	**100.0**	**6.9**	**5.8**	**7.9**

Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

10 Non-pharmacological management

For each problem managed, GPs could record up to two non-pharmacological treatments provided at the encounter. These were divided into two categories: clinical treatments, the majority of which were advice and counselling, and procedural treatments, which encompassed all procedures carried out by general practitioners (e.g. removal of sutures, application/removal of plaster). Observations of the patient such as measurements of blood pressure, regarded as routine clinical measurements, were not included in the data collection program.

At least one non-pharmacological treatment was provided at over one-third of all encounters. Overall 48,194 non-pharmacological treatments were recorded, a rate of 46 per 100 encounters, and 31 per 100 problems managed. These results are similar to those reported in the annual report for general practice activity, 1998–1999 (Britt et al. 1999c). Clinical treatments (22.8 per 100 problems, 95% CI: 21.7–23.9) were provided by GPs significantly more often than procedural treatments (8.5 per 100 problems, 95% CI: 8.1–8.9) (Table 10.1).

Table 10.1: Non-pharmacological treatments—summary table

	Number	Rate per 100 encs[(a)]	95% LCI	95% UCI	Rate per 100 problems[(a)]	95% LCI	95% UCI
At least one non-pharmacological treatment	37,957	36.2	35	37.4	24.7	23.9	25.5
Non-pharmacological treatments	48,194	46.0	44.1	47.8	31.3	30.1	32.5
Clinical treatments	35,102	33.5	31.8	35.2	22.8	21.7	23.9
Procedural treatments	13,092	12.5	11.9	13.0	8.5	8.1	8.9

(a) Figures do not total 100.0 as more than one treatment can be described at each encounter and for each problem.

Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

10.1 Clinical treatments

10.1.1 Number of clinical treatments at encounter

There were 35,102 clinical treatments provided, at a rate of 33.5 per 100 encounters (Table 10.1). Types of clinical treatments include general and specific advice, counselling or education, family planning and administrative processes related to problem management. Appendix 4 lists all treatments classified as 'clinical'.

10.1.2 Most frequent clinical treatments

Advice or education pertaining to the management of the patient's problem was the most frequent clinical treatment provided by GPs, accounting for 13.4% of all non-pharmacological treatments, and occurring at a rate of 6.2 per 100 encounters.

General/unspecified advice/education and advice about weight and nutrition were both provided at 4.2 per 100 encounters, counselling about the problem being managed (3.4 per 100 encounters) and advice/education concerning medication (2.9 per 100 encounters) were also provided frequently. Table 10.2 lists a range of clinical treatments provided in order of decreasing frequency. These treatments relate to various aspects of health such as medication and alcohol use, smoking, exercise, lifestyle, occupational and relationship issues.

Table 10.2: Most frequent clinical treatments

Treatment*	Number	Per cent of non-pharmacological treatments	Rate per 100 encs[(a)] (N=104,856)	95% LCI	95% UCI
Advice/education–treatment*	6,460	13.4	6.2	5.5	6.8
Advice/education*	4,440	9.2	4.2	3.6	4.9
Counsel/advice–nutrition/weight*	4,423	9.2	4.2	3.8	4.6
Counselling–problem*	3,607	7.5	3.4	2.8	4.1
Advice/education–medication*	2,995	6.2	2.9	2.5	3.2
Counselling–psychological*	2,716	5.6	2.6	2.3	2.9
Counsel/advice–exercise*	1,714	3.6	1.6	1.3	2.0
Reassurance, support	1,654	3.4	1.6	1.2	2.0
Other admin/documentation*	1,087	2.3	1.0	0.8	1.2
Counsel/advice–smoking*	764	1.6	0.7	0.4	1.0
Sickness certificate	647	1.3	0.6	0.3	0.9
Counsel/advice–health/body*	615	1.3	0.6	0.0	1.2
Observe/wait*	586	1.2	0.6	0.2	0.9
Counsel/advice–relationship*	401	0.8	0.4	0.2	0.6
Counsel/advice–drug abuse*	391	0.8	0.4	0.0	2.2
Counsel/advice–alcohol*	380	0.8	0.4	0.1	0.6
Counsel/advice–prevention*	353	0.7	0.3	0.0	0.8
Counsel/advice–relaxation*	340	0.7	0.3	0.1	0.6
Family planning*	332	0.7	0.3	0.1	0.5
Counsel/advice–lifestyle*	322	0.7	0.3	0.0	0.7
Subtotal: most frequent clinical treatments	*34,227*	*71.0*	*. .*	*. .*	*. .*
Total clinical treatments	***35,102***	***72.8***	***33.5***	***31.8***	***35.2***
Total non-pharmacological treatments	**48,194**	**100.0**	**46.0**	**44.1**	**47.8**

(a) Figures do not total 100.0 as more than one treatment can be recorded at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 4).
Note: Encs–encounters; UCI–upper confidence interval, LCI–lower confidence interval.

10.1.3 Problems managed with clinical treatments

A total of 31,885 problems included a clinical treatment as part of their management. The ten most common accounted for over one-quarter (28.5%) of all problems for which a clinical treatment was provided. The problem most often managed with a clinical treatment was depression (5.3% of problems managed with a clinical treatment), followed by URTI (4.6%), hypertension (3.5%), diabetes and anxiety (2.6%) (Table 10.3).

Table 10.3: The ten most common problems managed with a clinical treatment

Problem managed	Number	% probs managed with a clinical treatment	Rate per 100 encs[(a)] (N=104,856)	95% LCI	95% UCI
Depression*	1,693	5.3	1.6	1.4	1.8
Upper respiratory infection, acute	1,460	4.6	1.4	1.1	1.7
Hypertension*	1,120	3.5	1.1	0.8	1.3
Diabetes (all)*	834	2.6	0.8	0.6	1.0
Anxiety*	827	2.6	0.8	0.6	1.0
Lipid disorder	811	2.5	0.8	0.6	1.0
Back complaint*	636	2.0	0.6	0.4	0.8
Asthma	625	2.0	0.6	0.3	0.8
Sprain/strain*	549	1.7	0.5	0.3	0.7
Gastroenteritis, presumed infection	546	1.7	0.5	0.3	0.8
Subtotal: top ten probs managed with clinical treatment	*9,102*	*28.5*	*. .*	*. .*	*. .*
Total problems managed with a clinical treatment	**31,885**	**100.0**	**30.4**	**28.9**	**31.9**

* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 3).
Note: Probs–problems, Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

10.1.4 The inter-relationship of a clinical treatment with other variables. Example: counselling and advice for smoking

A clinical treatment of counselling / advice for smoking was assigned when the GP recorded counselling, advice or education about smoking. This group was the tenth most frequent clinical treatment provided, accounting for 1.6% of all clinical treatments (Table 10.2) and was recorded at 756 encounters. This treatment was given for 764 problems managed at these encounters. About half the patients were female (51.1%), and this advice was most often given to patients aged 25–44 years (40.3%) or 45–64 years (31.2%) (Figure 10.1) .

Rates for RFEs are presented as a rate per 100 encounters where counselling / advice for smoking occurred, while problems managed, prescriptions, other treatments, pathology and imaging, and referrals are presented as rates per 100 problems managed.

Reasons for encounter

A total of 1,298 reasons for encounter were described at a rate of 172.0 per 100 encounters by patients who received smoking advice or education. This is notably higher than that of the total dataset (148.5).

The most commonly reported RFE was a cough (19.7 per 100 encounters where counsel / advice for smoking was given), a need for a prescription (8.8), cardiac check-up

(7.0) and tobacco abuse (7.0). That is, at only 7 per 100 encounters at which counselling / advice about smoking was provided by the GP, the smoking habit was one of the patient's reasons for consulting the GP.

Problems managed

Based on the assumption that the majority of patients who received advice or counselling for smoking were current smokers, the most frequent problems managed for these patients appear to reflect a range of health implications that are commonly associated with smoking, particularly problems related to the respiratory and cardiovascular systems (Figure 10.1).

Almost one in five of the problems for which counselling / advice for smoking was given were labelled as tobacco abuse by the GP (19.2 per 100 problems). The following four most frequent problems were respiratory related: acute bronchitis / bronchiolitis (13.9 per 100 problems), chronic obstructive pulmonary disease (6.5 per 100 problems), asthma (6.0) and URTI (5.3). Oral contraception was also a common problem (grouped label see Appendix 3) for which smoking counselling or advice was provided. This is not surprising given that one of the contraindications to oral contraceptive use is smoking.

Prescriptions

Pharmacological treatments given together with smoking counselling / advice were varied, reflecting the range of problems under management. Overall, prescribing rates for problems concurrently managed with smoking counselling / advice were greater (88.6) than for all problems managed (75.0). Salbutamol was most frequently prescribed (7.2 per 100 problems managed), followed by roxithromycin (4.8), levonorgestrel / ethinyloestradiol (4.8) and nicotine (4.6). Respiratory medications ipratropium inhalant (3.3), terbutaline (3.0) and budesonide (2.6) also appeared in the most frequent medications, reflecting the number of respiratory problems under management.

Other treatments

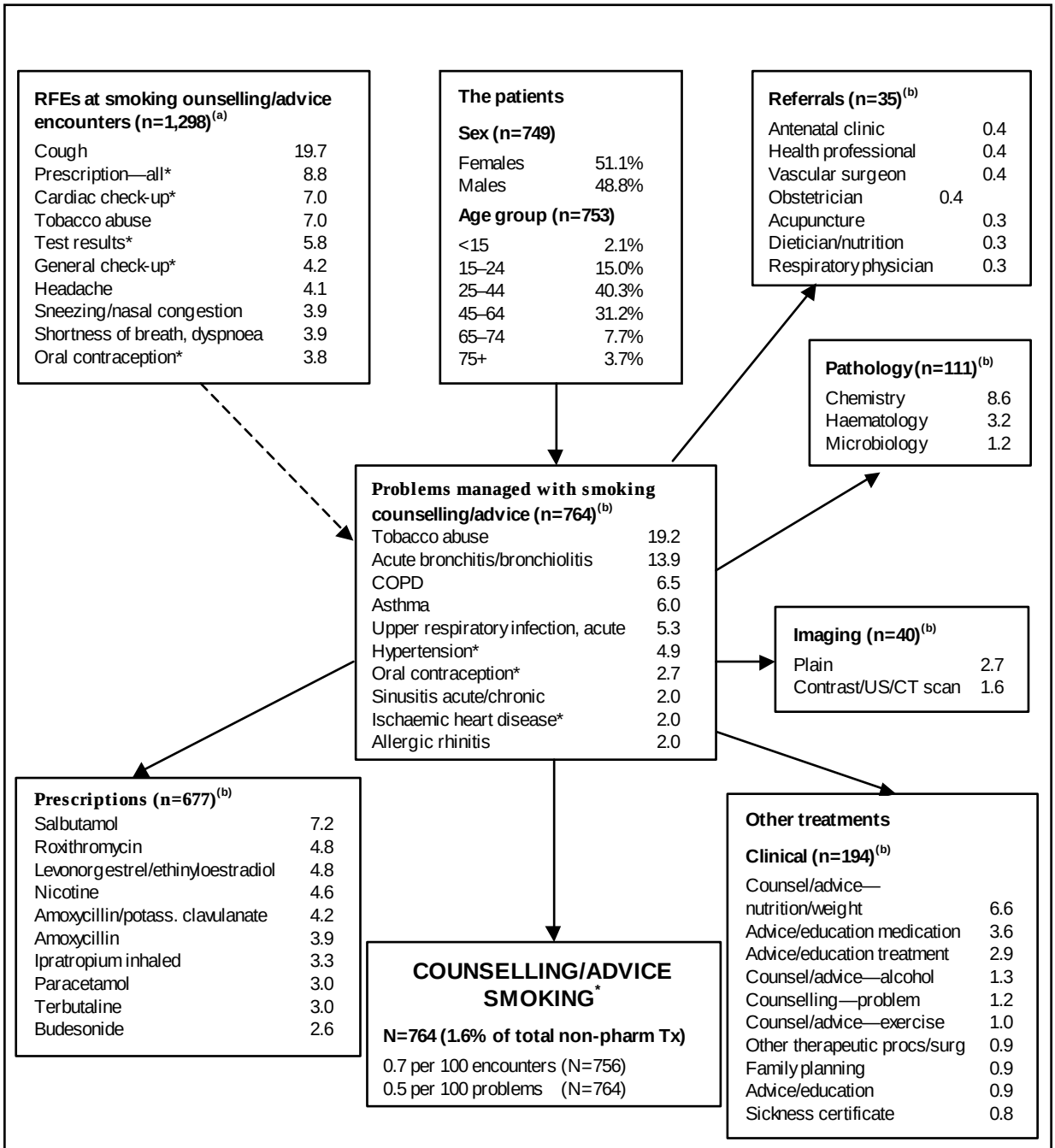
In addition to the provision of advice and counselling to patients regarding smoking, some patients at these encounters were advised / counselled about their weight / diet (6.6 per 100 encounters), medication (3.6 per 100 encounters), and the treatment of their problem (2.9).

Referrals, tests and investigations

Referrals for patients receiving advice / counselling for smoking (4.6 per 100 problems) were less frequent than the average for the total dataset (11.2 per 100 problems). The referrals recorded were to a variety of health specialists and professionals. The relatively low referral rates do not indicate a strong association between smoking advice / counselling and a particular type of referral but rather reflect the range of problems managed.

Pathology was ordered at a rate of 14.5 per 100 problems managed with smoking advice / counselling. This was higher than the pathology rate for the total dataset (10.4 per 100 problems). The most frequent type of pathology ordered was chemistry (8.6 per 100 problems at which smoking / advice counselling was provided), followed by haematology (3.2 per 100 problems).

Imaging was ordered at a rate of 5.2 per 100 problems managed with smoking advice/counselling. This rate was slightly higher than in the total dataset (4.7 per 100 problems). The most common imaging test ordered was a plain x-ray (2.7 per 100).



(a) Expressed as rates per 100 encounters at which counselling and advice for smoking was given (N=756).
(b) Expressed as rates per 100 problems at which counselling and advice for smoking was given (N=764).
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Encs—encounters, non-pharm Tx—non-pharmacological treatments, COPD–chronic obstructive pulmonary disease, US–ultrasound, CT–computerised tomography.

Figure 10.1: Inter-relationship of counselling with other variables. Example: counselling and advice for smoking

10.2 Procedural treatments

10.2.1 Number of procedures at encounter

Procedural treatments included therapeutic actions and diagnostic procedures undertaken by the GP. ICPC–2 level codes were grouped across chapters for this analysis due to small numbers within each chapter. There were 13,092 procedural treatments recorded, at a rate of 12.5 per 100 encounters (Table 10.1). The procedural codes and groupings are listed in Appendix 5.

10.2.2 Most frequent procedures

The most common procedure was the excision or removal of tissue (including destruction, debridement or cauterisation). It accounted for 6.4% of all non-pharmacological treatments and occurred at a rate of 3.0 per 100 encounters (see Table 10.4). This was followed by procedures of dressing, compressing or applying pressure (2.2 per 100 encounters). Physical medicine or rehabilitation (including physiotherapy, massage and therapeutic exercises) occurred at a rate of 1.7 per 100 encounters, and accounted for 3.6% of all non-pharmacological treatments. Other therapeutic procedures included the draining of fluids (1.1 per 100 encounters) and applying, removing and repairing casts or prosthetic devices (1.0 per 100 encounters).

Diagnostic procedures included taking Pap smears, electrical tracings, physical function tests such as peak flow readings, and pregnancy tests. (Note that the majority of diagnostic tests were ordered, and are therefore described in Chapter 12 Investigations.)

10.2.3 Problems managed with a procedural treatment

A total of 12,373 problems involved a procedure in their management. The top 10 problems accounted for 41.7% of all problems for which a procedure was used. These problems were commonly associated with skin complaints, injuries of various types, musculoskeletal problems and female genital check-ups.

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

Table 10.4: Most frequent procedural treatments

Treatment	Number	% of non-pharm treatments	Rate per 100 encs[(a)] (N=104,856)	95% LCI	95% UCI
Excision/removal tissue/biopsy/destruction/ debridement/cauterisation*	3,100	6.4	3.0	2.7	3.2
Dressing/pressure/compression/tamponade*	2,253	4.7	2.2	1.9	2.4
Physical medicine/rehabilitation	1,743	3.6	1.7	1.4	2.0
Other therapeutic procedures/surgery NEC*	1,129	2.3	1.1	0.2	1.9
Incise/drain/flush/aspirate/remove body fluid*	1,117	2.3	1.1	0.9	1.2
Repair/fixation—suture/cast/prosthetic device (apply/remove)*	1,076	2.2	1.0	0.9	1.2
Pap smear	816	1.7	0.8	0.5	1.1
Electrical tracings	419	0.9	0.4	0.2	0.6
Physical function test*	340	0.7	0.3	0.0	0.7
Pregnancy test	285	0.6	0.3	0.0	0.5
Test, glucose*	245	0.5	0.2	0.0	0.7
Local injection/infiltration*	221	0.5	0.2	0.0	0.6
Subtotal: most frequent procedural treatments	*12,743*	*26.4*	*. .*	*. .*	*. .*
Total procedural treatments	***13,092***	***27.2***	***12.5***	***11.9***	***13.0***
Total non-pharmacological treatments	**48,194**	**100.0**	**46.0**	**44.1**	**47.8**

(a) Figures do not total 100.0 as more than one treatment can be described for each problem and only per cents >=0.5% included.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 5).
Note: Non-pharm–non-pharmacological, Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval, NEC–Not elsewhere classified.

Table 10.5: The ten most common problems managed with a procedural treatment

Problem managed	Number	% of probs managed bya procedure	Rate per 100 encs[(a)] (N=104,856)	95% LCI	95% UCI
Solar keratosis/sunburn	798	6.5	0.8	0.6	1.0
Laceration/cut	700	5.7	0.7	0.5	0.8
Warts	572	4.6	0.5	0.4	0.7
Excessive ear wax	516	4.2	0.5	0.3	0.6
Female genital check-up*	515	4.2	0.5	0.1	0.8
Sprain/strain*	496	4.0	0.5	0.2	0.8
Chronic ulcer skin (incl. varicose ulcer)	489	4.0	0.5	0.2	0.7
Malignant neoplasm skin	421	3.4	0.4	0.2	0.6
Back complaint*	398	3.2	0.4	0.1	0.7
Fracture*	249	2.0	0.2	0.0	0.4
Subtotal: top ten problems with procedural treatments	*5,154*	*41.7*	*. .*	*. .*	*. .*
Total problems managed with a procedural treatment	**12,373**	**100.0**	**11.8**	**11.3**	**12.3**

(a) Figures do not total 100.0 as more than one problem can be described at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Probs–problems, Encs–encounters,UCI–Upper confidence interval, LCI–lower confidence interval.

11 Referrals and admissions

A referral is defined as the process by which the responsibility for part or all of the care of a patient is temporarily transferred to another health care provider. Only new referrals arising at the encounter were included (i.e. continuations were not recorded). For each problem managed, GPs could record up to two referrals. These included referrals to specialists, to allied health professionals, to hospitals for admission or to the accident and emergency department. Referrals to hospital outpatient clinics were classified as specialist referrals. Referrals for certain clinical assessments such as endoscopies and ECGs without nomination of the provider, were also included in this section. (Note that orders for imaging and pathology are described in Section 12 Investigations.)

11.1 Number of referrals and admissions

The patient was given at least one referral at 10.4% of all encounters for 7.1% of all problems managed. There were 11,760 referrals made at a rate of 11.2 per 100 encounters. The most frequent were referrals to a medical specialist (7.3 per 100 encounters), followed by referrals to allied health services (3.1). Very few patients were referred to hospital for admission (0.7 per 100 encounters) or to the emergency department of a hospital (0.1 per 100). For every 100 problems managed, a referral to a specialist was made for 5.0, while a referral to an allied health professional was given for 2.1 (Table 11.1). A very small number of encounters (0.8%) resulted in two referrals.

Table 11.1: Referrals and admissions—summary table

	Number	Rate per 100 encs[(a)]	95% LCI	95% UCI	Rate per 100 problems[(a)]	95% LCI	95% UCI
At least one referral	10,922	10.4	10.0	10.8	7.1	6.8	7.3
Referrals	11,760	11.2	10.8	11.7	7.6	7.4	7.9
Specialist	7,639	7.3	7.0	7.6	5.0	4.8	5.2
Allied health service	3,290	3.1	2.9	3.4	2.1	2.0	2.3
Hospital	745	0.7	0.5	0.9	0.5	0.4	0.6
Emergency department	87	0.1	0.0	0.4	0.1	0.0	0.4

(a) Figures do not total 100.0 as more than one treatment can be described at each encounter and for each problem.
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

11.2 Most frequent referrals

Of the 11,760 referrals, 93% (n=10,929) were referrals to specialists or allied health services. The top ten provider types in each category accounted for 67.1% of all referrals to medical specialists and 61.5% of those to allied health services respectively (Table 11.2.)

Table 11.2: The most frequent referrals to specialists and allied health professionals

Professional to whom patient referred	Number	% of all referrals	% of referral group	Rate per 100 encs [(a)] (N=104,856)	95% LCI	95% UCI
Medical specialist	**7,639**	**69.9**	**100.0**	**7.3**	**7.0**	**7.6**
Surgeon	808	6.9	10.6	0.8	0.6	0.9
Orthopaedic surgeon	699	6.0	9.2	0.7	0.5	0.8
Ophthalmologist	689	5.9	9.0	0.7	0.5	0.8
Dermatologist	599	5.1	7.8	0.6	0.4	0.7
Gynaecologist	566	4.8	7.4	0.5	0.4	0.7
Ear, nose and throat specialist	503	4.3	6.6	0.5	0.3	0.6
Cardiologist	410	3.5	5.4	0.4	0.2	0.6
Gastroenterologist	350	3.0	4.6	0.3	0.1	0.5
Urologist	249	2.1	3.3	0.2	0.1	0.4
Psychiatrist	249	2.1	3.3	0.2	0.1	0.4
Subtotal: top ten specialist referrals	*5,122*	*43.6*	*67.1*	. .	. .	. .
Allied health professionals	**3,290**	**30.1**	**100.0**	**3.1**	**2.9**	**3.4**
Physiotherapy	1,097	9.3	33.3	1.1	0.8	1.3
Dentist	176	1.5	5.3	0.2	0.0	0.4
Psychologist	156	1.3	4.7	0.2	0.0	0.4
Podiatrist/chiropodist	140	1.2	4.3	0.1	0.0	0.3
Dietitian/nutrition	129	1.1	3.9	0.1	0.0	0.5
Acoustic testing	100	0.9	3.0	0.1	0.0	0.4
Optometrist	73	0.6	2.2	0.1	0.0	0.4
Drug & alcohol	65	0.6	2.0	0.1	0.0	0.7
Counsellor	51	0.4	1.6	0.1	0.0	0.4
Chiropractor	38	0.3	1.2	0.0	0.0	0.6
Subtotal: top ten allied health services	*2,025*	*17.2*	*61.5*	. .	. .	. .
Total specialist & allied health referrals	**10,929**	**100.0**	. .	**10.4**	. .	. .

(a) Figures do not total 100.0 as more than one referral can be described at each encounter.
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

The most frequent referrals made to specialist medical practitioners were to surgeons (10.6% of all referrals to medical specialists), orthopaedic surgeons (9.2%), ophthalmologists (9.0%) and dermatologists (7.8%).

The majority of referrals to allied health services were to physiotherapists, and these accounted for 33.3% of all referrals of this type, and 9.3% of all referrals. Referrals to dentists (1.5% of all referrals), psychologists (1.3%), podiatrists and chiropodists (1.2%) followed (Table 11.2).

11.3 Problems that were referred

A referral to a specialist was provided for a total of 7,639 problems managed. The ten problems most commonly associated with a referral to a specialist accounted for 17.0% of all problems associated with specialist referrals. The problems most often referred to a specialist were malignant neoplasms of the skin (2.4% of referred problems), osteoarthritis (1.9%), ischaemic heart disease (1.8%), depression (1.8%) and back complaints (1.8%) (Table 11.3).

Referrals to allied health services were fewer in number (3,290), possibly because formal referrals to such services are not always required. There were 3,201 problems referred to an allied health professional or service. Table 11.4 shows the ten most common of these. They accounted for one-third (33.7%) of all problems referred to allied health services.

Back complaint was the problem type most frequently referred to allied health services (8.4% of problems referred), followed by sprains and strains (6.0%). These problems are those that would be likely to be referred to physiotherapists. Depression (3.1%), teeth/gum disease (2.9%) and osteoarthritis (2.7%) also featured in the top ten problems referred to allied health services. Note that depression, ischaemic heart disease, back complaints, osteoarthritis and diabetes were referred relatively frequently to both allied health professionals and to medical specialists.

Of the 745 referrals for hospital admission, the problems under management were often acute in nature. While the numbers involved are very small it is interesting to note the types of problems for which hospital admission was sought. These included fractures (6.0% of problems referred for admission), appendicitis (3.2%) and pneumonia (2.2%). Cardiovascular problems such as heart failure, ischaemic heart disease and acute myocardial infarctions were also referred to hospital. Referrals to psychiatric units/hospitals were also included in this category and these would appear to be associated with depression (1.9%) (Table 11.5).

Table 11.3: The ten most common problems referred to a specialist

Problem managed	Number	% of problems referred	Rate per 100 encs [(a)] (N=104,856)	95% LCI	95% UCI
Malignant neoplasm skin	182	2.4	0.2	0.0	0.4
Osteoarthritis*	145	1.9	0.1	0.0	0.4
Ischaemic heart disease*	141	1.8	0.1	0.0	0.4
Depression*	138	1.8	0.1	0.0	0.4
Back complaint*	138	1.8	0.1	0.0	0.4
Diabetes (all)*	128	1.7	0.1	0.0	0.4
Pregnancy*	124	1.6	0.1	0.0	0.4
Oesophageal disease	115	1.5	0.1	0.0	0.3
Acute internal knee damage	94	1.2	0.1	0.0	0.3
Menstrual problems*	94	1.2	0.1	0.0	0.3
Subtotal: top ten problems referred to a specialist	*1,299*	*17.0*	*. .*	*. .*	*. .*
Total problems	**7,639**	**100.0**	**7.2**	**6.9**	**7.5**

(a) Figures do not total 100.0 as more than one RFE can be described at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval.

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

Problem managed	Number	% of problems referred	Rate per 100 encs [(a)] (N=104,856)	95% LCI	95% UCI
Back complaint*	269	8.4	0.2	0.1	0.5
Sprain/strain*	193	6.0	0.2	0.0	0.4
Depression*	99	3.1	0.1	0.0	0.4
Teeth/gum disease	93	2.9	0.1	0.0	0.4
Osteoarthritis*	87	2.7	0.1	0.0	0.4
Neck syndrome (incl. osteoarthritis)	79	2.5	0.1	0.0	0.4
Injury musculoskeletal NOS	73	2.3	0.1	0.0	0.4
Ischaemic heart disease*	67	2.1	0.1	0.0	0.4
Diabetes (all)*	62	2.0	0.1	0.0	0.5
Shoulder syndrome (incl. arthritis)	56	1.8	0.1	0.0	0.4
Subtotal: top ten problems referred to an allied health professional	*1,078*	*33.7*	*. .*	*. .*	*. .*
Total problems	**3,201**	**100.0**	**3.1**	**2.8**	**3.3**

(a) Figures do not total 100.0 as more than one RFE can be described at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval, NOS–not otherwise specified

Table 11.5: The ten most common problems referred to hospital

Problem managed	Number	% of problems managed	Rate per 100 encs [(a)] (N=104,856)	95% LCI	95% UCI
Fracture*	45	6.0	0.04	0.0	0.4
Heart failure*	26	3.5	0.03	0.0	0.6
Ischaemic heart disease*	24	3.2	0.02	0.0	0.6
Appendicitis	24	3.2	0.02	0.0	0.5
Pneumonia	17	2.2	0.02	0.0	0.6
Asthma	14	1.9	0.01	0.0	0.6
Chronic obstructive pulmonary disease	14	1.9	0.01	0.0	0.6
Depression*	14	1.9	0.01	0.0	0.8
Pre-postnatal check-up*	13	1.7	0.01	0.0	0.8
Acute myocardial infarction	12	1.7	0.01	0.0	0.7
Subtotal: top ten problems referred to a hospital	*203*	*27.2*	*. .*	*. .*	*. .*
Total problems	**745**	**100.0**	**0.71**	**0.6**	**0.9**

(a) Figures do not total 100.0 as more than one RFE can be described at each encounter.
* Includes multiple ICPC–2 or ICPC–2 PLUS codes (see Appendix 3).
Note: Encs–encounters, UCI–U=upper confidence interval, LCI–lower confidence interval.

11.4 The inter-relationship of referrals with other variables. Example: referrals to a surgeon

Referrals can be directly linked (solid lines in Figure 11.1) to all other encounter variables apart from RFEs (shown as dotted lines). There were 808 problems referred to surgeons and these accounted for 10.6% of referrals to medical specialists.

Age and sex distribution of patients

Over half the patients referred to a surgeon were female (51.9%) but this proportion was somewhat less than in the total dataset (57.3% female). Patients aged 25–44 years were over-represented in this subgroup (31.4% compared with approximately 25% in the total dataset), and those aged less than 25 years were under-represented (12.6%).

Reasons for encounter

Patients who were referred to a surgeon presented to the GP with a range of RFEs including a request for test results (9.5 per 100 encounters at which there was a surgeon referral), swelling (9.3) and abdominal pain (9.2). A request for a prescription was made at a rate of 6.0 per 100 encounters.

Problems managed

Of the most common problems referred to a surgeon there were a number of digestive problems managed, the most common being inguinal hernias (6.8 per 100 problems referred to a surgeon), together with other abdominal hernias (6.2), and cholecystitis / cholelithiasis (4.7). Other problems managed included malignant skin neoplasms (6.5) and haemorrhoids (4.6 per 100).

Prescriptions and other treatments

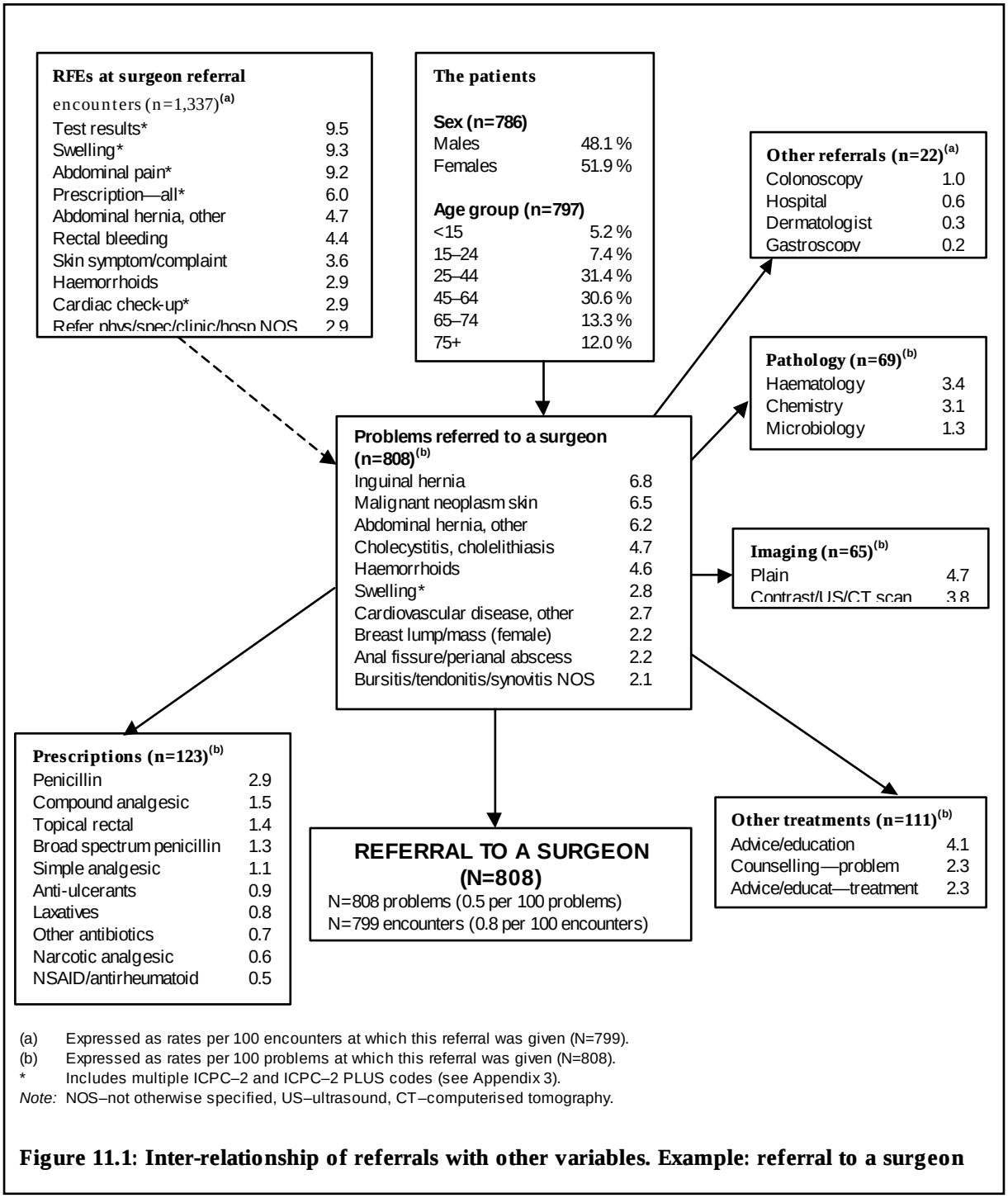
The prescription rate for these problems was notably less (15.2 per 100 problems) than the average for all problems (75.0). This suggests that GPs are less likely to prescribe pharmacological treatment for patients they are referring to a surgeon.

The majority of medications prescribed for problems referred to a surgeon were analgesics and anti-infectives. The most common prescription was for penicillin (2.9 per 100 problems) followed by compound analgesics (1.5) and topical rectal medication (1.4).

The rate of non-pharmacological treatments was also less (13.7 per 100 problems) than in the total dataset (31.3). The most common of these were general advice / education (4.1 per 100 problems referred to a surgeon), counselling about the problem being referred (2.3) and advice / education about treatment of the problem (2.3).

Other referrals, tests and investigations

There were few other referrals (22) made for the problems referred to a surgeon and ordering rates for pathology and imaging were also relatively low. Haematology (3.4 per 100 problems) and chemistry (3.1) were the most frequent pathology test types ordered for problems where a referral to a surgeon was made.



(a) Expressed as rates per 100 encounters at which this referral was given (N=799).
(b) Expressed as rates per 100 problems at which this referral was given (N=808).
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: NOS–not otherwise specified, US–ultrasound, CT–computerised tomography.

Figure 11.1: Inter-relationship of referrals with other variables. Example: referral to a surgeon

12 Investigations

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

A pathology test order may be for a single test (e.g. Pap smear, HbA1c) or for a battery of tests (e.g. lipids, FBC). Where a battery of tests was ordered the battery name was recorded rather than each individual test. GPs also recorded the body site for any imaging ordered (e.g. x-ray chest, CT head).

There were no tests recorded at the vast majority (81.1%) of encounters. At least one pathology order was recorded at 13.8% of encounters (for 10.4% of problems managed) and at least one imaging test was ordered at 6.7% of encounters (for 4.7% of problems managed) (Table 12.1).

Table 12.1: Number of encounters and problems generating an order for a pathology or imaging test

	Number of encs	% of encs	95% LCI	95% UCI	Number of probs	% of probs	95% LCI	95% UCI
Pathology and imaging ordered	1,591	1.5	1.4	1.7	1,213	0.8	0.7	0.9
Pathology only ordered	12,835	12.2	11.8	12.7	14,727	9.6	9.2	9.9
Imaging only ordered	5,428	5.2	4.9	5.4	6,029	3.9	3.7	4.1
No tests ordered	85,002	81.1	80.5	81.7	131,889	85.7	85.3	86.2
Total (N)	**104,856**	**100.0**	**..**	**..**	**153,857**	**100.0**	**..**	**..**
At least one pathology ordered	14,426	13.8	13.3	14.3	15,940	10.4	10.0	10.7
At least one imaging ordered	7,019	6.7	6.4	7.0	7,242	4.7	4.5	4.9

Note: Abbreviations: Encs–encounters, Probs–problems, UCI–Upper confidence interval, LCI–Lower confidence interval.

12.1 Pathology ordering

A comprehensive report on pathology ordering by general practitioners in Australia in 1998 written by the GP Statistics and Classification Unit using BEACH data were published on the Internet by the Diagnostics and Technology Branch of the DHAC during 2000 (Britt et al. 1999a). Readers wishing a more detailed study of pathology ordering should consult that publication and may wish to compare those results with the information presented below.

12.1.1 Number of pathology orders at encounter

There were 27,613 orders for a pathology test (or battery of tests) and these were made at a rate of 26.3 per 100 encounters (Table 12.2).

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

Pathology test ordered	Number	% of all pathology orders	Per cent of group	Rate per 100 encs (N=104,700)	95% LCI	95% UCI
Chemistry	**12,711**	**46.0**	**100.0**	**12.1**	**11.4**	**12.8**
Lipids	2,413	8.7	19.0	2.3	2.1	2.5
EUC	1,656	6.0	13.0	1.6	1.3	1.9
Liver function	1,607	5.8	12.6	1.5	1.3	1.8
Glucose/tolerance	1,434	5.2	11.3	1.4	1.2	1.6
Thyroid function	1,283	4.6	10.1	1.2	1.1	1.4
Multibiochemical analysis	1,159	4.2	9.1	1.1	0.7	1.5
Hormone assay	581	2.1	4.6	0.6	0.3	0.8
Ferritin	534	1.9	4.2	0.5	0.3	0.7
HbA1c	483	1.8	3.8	0.5	0.3	0.7
Prostate-specific antigen	410	1.5	3.2	0.4	0.2	0.6
Haematology	**5,342**	**19.4**	**100.0**	**5.1**	**4.8**	**5.4**
Full blood count	3,525	12.8	66.0	3.4	3.1	3.6
ESR	836	3.0	15.7	0.8	0.6	1.0
Coagulation	737	2.7	13.8	0.7	0.5	0.9
Microbiology	**4,795**	**17.4**	**100.0**	**4.6**	**4.3**	**4.9**
Urine MC&S	1,674	6.1	34.9	1.6	1.5	1.7
Hepatitis serology	546	2.0	11.4	0.5	0.2	0.8
Vaginal swab and C&S	373	1.4	7.8	0.4	0.1	0.6
Microbiology, other	286	1.0	6.0	0.3	0.1	0.5
HIV	272	1.0	5.7	0.3	0.0	0.5
Faeces MC&S	221	0.8	4.6	0.2	0.0	0.4
Monospot	220	0.8	4.6	0.2	0.0	0.5
Cytology	**1,594**	**5.8**	**100.0**	**1.5**	**1.3**	**1.8**
Pap smear	1,546	5.6	97.0	1.5	1.2	1.7
Other NEC	**1,657**	**6.0**	**100.0**	**1.6**	**1.2**	**2.0**
Other NEC, other	956	3.5	57.7	0.9	0.4	1.4
Other NEC, blood test	369	1.3	22.3	0.4	0.0	0.8
Infertility/pregnancy	**412**	**1.5**	**100.0**	**0.4**	**0.2**	**0.6**
Histopathology	**524**	**1.9**	**100.0**	**0.5**	**0.3**	**0.7**
Histology, skin	422	1.5	80.5	0.4	0.2	0.6
Immunology	**538**	**2.0**	**100.0**	**0.5**	**0.2**	**0.8**
Immunology, other	269	1.0	50.0	0.3	0.0	0.7
Simple test, other	**39**	**0.1**	**100.0**	**0.0**	**0.0**	**0.7**
Total pathology tests	**27,613**	**100.0**	**100.0**	**26.3**	**25.2**	**27.5**

Note: Encs–encounters, UCI–upper confidence interval, LCI–lower confidence interval

12.1.2 Nature of the pathology orders

Table 12.2 provides a summary of the different types of pathology tests that were ordered by the participating GPs.

The pathology tests recorded were grouped according to the categories set out in Appendix 7. The ten main pathology groups reflect those used in previous analyses of pathology tests recorded by the HIC.

The top four pathology test groups were Chemistry, Haematology, Microbiology and Cytology and together these accounted for almost 90% of all pathology test orders. The fifth largest group was Other NEC (other pathology test orders that could not be classified elsewhere), which made up 6.0% of all pathology test orders. The relatively large size of this group is in part due to the non-specificity of the pathology orders sometimes recorded by some GPs (e.g. blood test) and in part to a lack of specificity available in ICPC–2 PLUS for the classification of some pathology items.

The largest of the groups, Chemistry, accounted for 46.0% of all tests and was recorded at a rate of 12.1 per 100 encounters. Within this group the most frequently ordered test was lipids (19.0%) followed by EUC (13.0%). Full blood count (66.0%) was the largest group within Haematology and urine MC&S (34.9%) was the largest in Microbiology.

The most frequently ordered test types were full blood count, lipids, urine MC&S, EUC, liver function and Pap smear tests. Full blood counts accounted for 12.8% of tests and were ordered at a rate of 3.4 per 100 encounters. Pap smears, accounting for 6.6% of all tests, made up the greater proportion of the Cytology group (97.0%). Lipid tests were ordered at a rate of 2.3 per 100 encounters (Table 12.2).

12.1.3 Problems associated with pathology tests

Table 12.3 describes, in decreasing order of frequency, the most common problems under management when pathology was ordered. They are presented in decreasing order of frequency.

There were 15,940 problems to which pathology tests were linked (Table 12.1). The three problems accounting for the highest number of pathology tests ordered were lipid disorder (5.3% of problems managed with a pathology order), hypertension (4.9%), female genital check-up / Pap smear (4.5%) and diabetes (4.4%). This is not surprising given the distribution of pathology tests described in the previous table. However, the last two columns of the table provide some interesting contrasts. The second last column shows the per cent of contacts (with the selected problem) that resulted in an order for pathology. The last column shows the number of test orders placed when contact with the selected problem resulted in pathology tests.

Hypertension was the most common problem managed in general practice and there were 8,821 hypertension problems recorded in the dataset (5.7% of problems). Female genital check-ups (1.1% of problems) occurred far less frequently. However, female genital check-ups accounted for almost as many pathology tests as did hypertension. There were 1,285 tests orders (4.5%) associated with female genital check-up and 1,391 test orders (4.9%) associated with hypertension. This is explained by the fact that 71.6% of female genital check-ups resulted in a pathology test compared with 7.5% of contacts with hypertension.

Weakness / tiredness was not a problem label that ranked in the top thirty problems managed in general practice, yet it ranked fifth highest in the problems associated with pathology ordering. This is because the decision to order a pathology test for

weakness / tiredness was relatively frequent (50.5% of contacts generating an order) and where such a decision was made, multiple pathology tests were likely (averaging 318 test orders per 100 problems). The problem label of female genital check-up / Pap smear, and the associated pathology test Pap smear, provide a useful contrast as multiple tests were rarely ordered.

Table 12.3: The ten most common problems for which a pathology test ordered

Problem managed	Number of problems	Number of prob/path combinations[(a)]	% of prob/path combinations	Per cent of problems with test[(b)]	Rate of path orders per 100 problems with path[(c)]
Lipid disorder	2,765	1,512	5.3	31.1	175.7
Hypertension*	8,821	1,391	4.9	7.5	211.6
Female genital check-up/Pap smear*	1,628	1,285	4.5	71.6	110.3
Diabetes (all)*	2,808	1,236	4.4	23.1	190.9
Weakness/tiredness general	704	1,130	4.0	50.5	318.0
UTI*	1,843	1,029	3.6	50.9	109.6
General check-up*	1,845	875	3.1	21.2	224.3
Pre-postnatal check-up*	1,189	555	2.0	24.6	190.1
Pregnancy*	777	410	1.5	32.3	163.3
Viral disease, other/NOS	1,608	398	1.4	10.0	248.6
Subtotal	*23,988*	*9,822*	*34.6*	*. .*	*. .*
Total	**153,857**	**28,356**	**100.0**	**. .**	**. .**

(a) A test was counted more than once if it was ordered for the management of more than one problem at an encounter. There were 27,613 pathology test orders and 28,356 problem/pathology combinations.
(b) The per cent of contacts with the problem which generated at least one order for pathology.
(c) The rate of pathology orders placed per 100 contacts with that problem generating at least one order for pathology.
* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix 3).
Note: Path—pathology order, prob—problem managed.

12.1.4 The inter-relationship between pathology ordered and other variables. Example: thyroid function test

Thyroid function test was the eighth most common pathology test ordered in general practice, accounting for 4.6% of all pathology orders. Overall 1,283 thyroid function tests were ordered at a rate of 1.2 per 100 encounters (Table 12.2).

Figure 12.1 illustrates the relationship between the ordering of a thyroid function test and other variables that are collected at the general practice encounter. An order for pathology is directly linked to one or more problems under management. Through these managed problems, the pathology order can be linked to the other variables collected at the encounter such as medications supplied and imaging ordered.

Age and sex distribution of patients

Eighty per cent of patients for whom a thyroid function test was ordered were female, and this is much higher than the proportion for the dataset as a whole. There were relatively few patients aged under 25 who had a thyroid function test compared with the dataset patient population.

Reasons for encounter

There were 2,360 reasons for encounter recorded at the 1,283 encounters at which a thyroid function test was ordered. The most common reasons for encounter for patients with a thyroid function test were weakness / tiredness (24.4 per 100 encounters), a request for a prescription (8.8), general check-up (5.6) and cardiac check-up (5.5).

Problems managed

There were 1,322 problems associated with an order for a thyroid function test. Weakness / tiredness was the most common of these problems followed by hypothyroidism and hyperthyroidism.

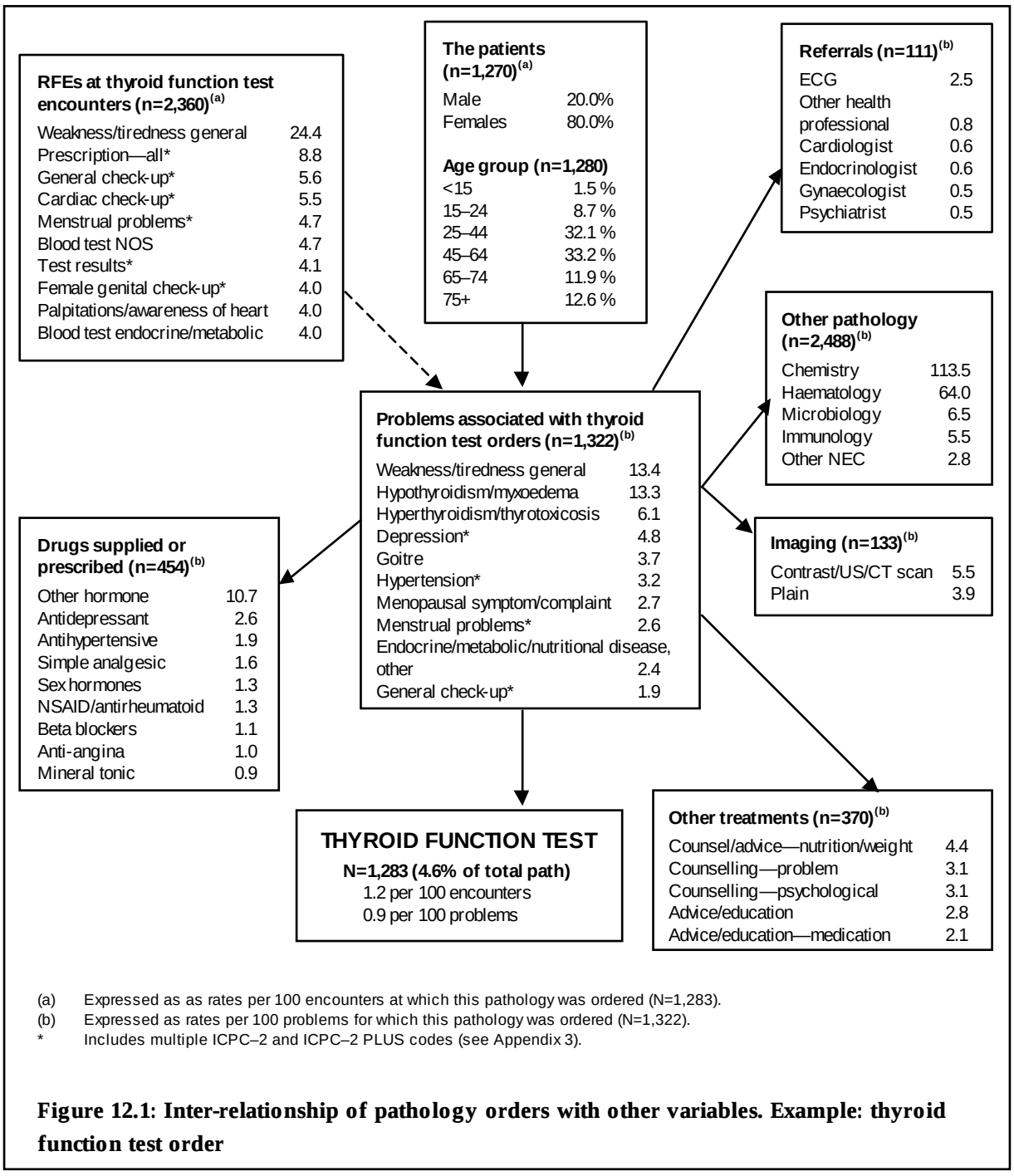
Prescriptions and other treatments

Medications supplied or prescribed for problems managed with an order for a thyroid function test numbered 454. The most common medication groups were 'other hormones' (which includes thyroxine) (10.7 per 100 problems managed) and antidepressants (2.6).

Other treatments were carried out for problems managed with a thyroid function test at a rate of 28.0 per 100 problems. The majority of these other treatments were in the form of advice or counselling.

Referrals, tests and investigations

A referral for an ECG was the most common referral for problems associated with a thyroid function test. An order for imaging was recorded at 10.0 of every 100 problems managed by a thyroid function test. The contrast / ultrasound / CT group of x-rays were the most common type of imaging ordered. Almost 200 other pathology tests were ordered for every 100 problems managed with an order for a thyroid function test. Pathology tests categorised as Chemistry made up over 60% of these tests.



(a) Expressed as as rates per 100 encounters at which this pathology was ordered (N=1,283).
(b) Expressed as rates per 100 problems for which this pathology was ordered (N=1,322).
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).

Figure 12.1: Inter-relationship of pathology orders with other variables. Example: thyroid function test order

12.2 Imaging ordering

12.2.1 Number of imaging orders at encounter

There were 7,841 orders for imaging and these were made at a rate of 7.5 per 100 encounters (Table 12.4). At least one imaging was ordered at 6.7% of encounters and for 4.7% of problems managed (Table 12.1).

12.2.2 Nature of imaging orders

The imaging tests recorded were grouped into one of three categories–Plain, Contrast / US / CT and Other imaging (see Appendix 7). Plain x-rays made up almost two-thirds (59.1%) of all imaging tests, Contrast / US / CT accounted for 34.7% and Other imaging only 6.2% (Table 12.4).

Chest x-rays were by far the most common plain x-ray (23.0%) while x-ray of the knee (8.6%) and x-ray of spine (8.0%) followed. Contrast x-rays were usually of the abdomen (16.0%), the pelvis (13.3%) or spine (7.7%). Bone scans (32.2%), doppler tests (21.7%) and unspecified imaging (21.2%) were the most common in the other group (Table 12.4).

Overall the most frequently ordered imaging test was a chest x-ray which accounted for 13.6% of all imaging and was ordered at a rate of 1.0 per 100 encounters. All other imaging tests were ordered at a rate of less than 1 per 100 encounters. Contrast x-rays of the abdomen, the second most frequently ordered, accounted for 5.5% of all imaging tests and were ordered at a rate of 0.4 per 100 encounters.

12.2.3 Problems associated with orders for imaging

Table 12.5 describes the problems most commonly under management when imaging was ordered. They are presented in decreasing order of frequency.

There were 7,918 problem / imaging combinations. Six (including the top four) of the ten most common problems were related to the musculoskeletal system. The remaining problems were related to abdominal, breast, skin and respiratory problems.

Back complaint, the most common problem for which imaging was ordered, accounted for 6.4% of all imaging. Only 15.3% of contacts with this problem resulted in an order for imaging. Fracture accounted for almost the same proportion of imaging orders but over one-third (37.9%) of contacts with a fracture resulted in an imaging order.

The ordering of multiple imaging for a single problem was much less common than the ordering of multiple pathology. Breast lump / mass (female) had the highest rate of multiple test orders in the top ten problems, 137.2 tests being ordered for every 100 problems.

Table 12.4: Most frequent imaging tests ordered

Imaging test ordered	Number	Per cent of tests	Per cent of group	Rate per 100 encs	95% LCI	95% UCI
Plain	**4,634**	**59.1**	**100.0**	**4.4**	**4.2**	**4.7**
X-ray;chest	1,063	13.6	23.0	1.0	0.9	1.1
X-ray;knee	397	5.1	8.6	0.4	0.2	0.5
X-ray;spinal	371	4.7	8.0	0.4	0.2	0.5
Mammography;F	360	4.6	7.8	0.3	0.2	0.5
X-ray;foot/feet	276	3.5	6.0	0.3	0.1	0.4
X-ray;lumbosacral	272	3.5	5.9	0.3	0.0	0.5
X-ray;hand	238	3.0	5.1	0.2	0.1	0.4
X-ray;shoulder	225	2.9	4.9	0.2	0.0	0.4
X-ray;ankle	215	2.7	4.6	0.2	0.0	0.4
X-ray;hip	170	2.2	3.7	0.2	0.0	0.4
X-ray;wrist	163	2.1	3.5	0.2	0.0	0.3
X-ray;abdomen	106	1.4	2.3	0.1	0.0	0.4
X-ray;cervical	102	1.3	2.2	0.1	0.0	0.4
X-ray;neck	90	1.2	2.0	0.1	0.0	0.5
X-ray;elbow	79	1.0	1.7	0.1	0.0	0.3
Contrast / US / CT	**2,718**	**34.7**	**100.0**	**2.6**	**2.4**	**2.8**
Test;US/CT/contrast;abdomen	434	5.5	16.0	0.4	0.3	0.6
Test;US/CT/contrast;pelvis	362	4.6	13.3	0.4	0.2	0.5
Test;US/CT/contrast;spine	209	2.7	7.7	0.2	0.0	0.4
Test;US/CT/contrast;obstetric	184	2.3	6.8	0.2	0.0	0.5
Test;US/CT/contrast;breast;F	172	2.2	6.3	0.2	0.0	0.4
Test;US/CT/contrast;shoulder	158	2.0	5.8	0.2	0.0	0.4
Test;US/CT/contrast;brain	134	1.7	5.0	0.1	0.0	0.4
Test;US/CT/contrast;urin tract	131	1.7	4.8	0.1	0.0	0.4
Test;US/CT/contrast	130	1.7	4.8	0.1	0.0	0.4
Test;US/CT/contrast;head	102	1.3	3.7	0.1	0.0	0.4
Test;US/CT/contrast;neck	77	1.0	2.9	0.1	0.0	0.4
Other	**488**	**6.2**	**100.0**	**0.5**	**0.2**	**0.7**
Scan;bone(s)	157	2.0	32.2	0.2	0.0	0.5
Test;Doppler	106	1.4	21.7	0.1	0.0	0.4
Imaging other	103	1.3	21.2	0.1	0.0	1.4
Total imaging tests	**7,841**	**100.0**	**100.0**	**7.5**	**7.1**	**7.8**

Note: Abbreviations: Encs–encounters, UCI–Upper confidence interval, LCI–Lower confidence interval.

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

Problem managed	Number of problems	Number of prob/imaging combinations[a]	Per cent of prob/imaging combinations	Per cent of problems with test[b]	Rate of image orders per 100 problems with imaging[c]
Back complaint*	2,880	506	6.4	15.3	114.8
Fracture*	1,032	423	5.3	37.9	108.1
Osteoarthritis*	2,346	325	4.1	12.6	109.6
Sprain/Strain*	1,878	318	4.0	16.0	105.8
Injury musculoskeletal NOS	745	200	2.5	24.5	109.4
Abdominal pain*	620	191	2.4	27.7	111.1
Shoulder syndrome (incl arthritis)	504	160	2.0	25.1	126.6
Injury skin, other	629	157	2.0	23.5	106.1
Breast lump/mass (female)	178	154	1.9	62.8	137.2
Acute bronchitis/bronchiolitis	3,319	146	1.8	4.4	100.5
Subtotal	*14,131*	*2,579*	*32.6*	*. .*	*. .*
Total	**153,857**	**7,918**	**100.0**	**. .**	**. .**

(a) A test was counted more than once if it was ordered for the management of more than one problem at an encounter. There were 7,841 imaging test orders and 7,918 problem/imaging combinations.
(b) The per centage of contacts with the problem which generated at least one order for imaging.
(c) The rate of imaging orders placed per 100 contacts with that problem generating at least one order for imaging.
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: Prob—problem, image—imaging

12.2.4 The inter-relationship between imaging ordered and other variables. Example: plain spinal x-ray

Figure 12.2 illustrates the relationship between the ordering of a plain spinal x-ray and other variables that are collected at the general practice encounter. The 775 orders accounted for 4.7% of all imaging and occurred at a rate of 0.4 per 100 encounters. An order for imaging is directly linked to one or more problems under management. Through these problems managed, the imaging can be linked to other variables such as referrals and treatments carried out.

Age and sex distribution of patients

Just under half of the patients who had a spinal x-ray were male, and this is slightly higher than the overall per centage of males seen in general practice. Patients aged 45–64 were also over-represented.

Reasons for encounter

There were 1,274 reasons for encounter recorded at encounters where a spinal x-ray was ordered. Back and neck complaints were the most common RFEs recorded.

Problems managed

Back complaint was the most common problem managed of the 775 problems managed with a spinal x-ray accounting for almost 40% of tests.

Prescriptions and other treatments

There were 558 medications prescribed or supplied for problems with a spinal x-ray. The most common were NSAIDs (31.7) followed by compound analgesics (16.0) and simple analgesics (13.9).

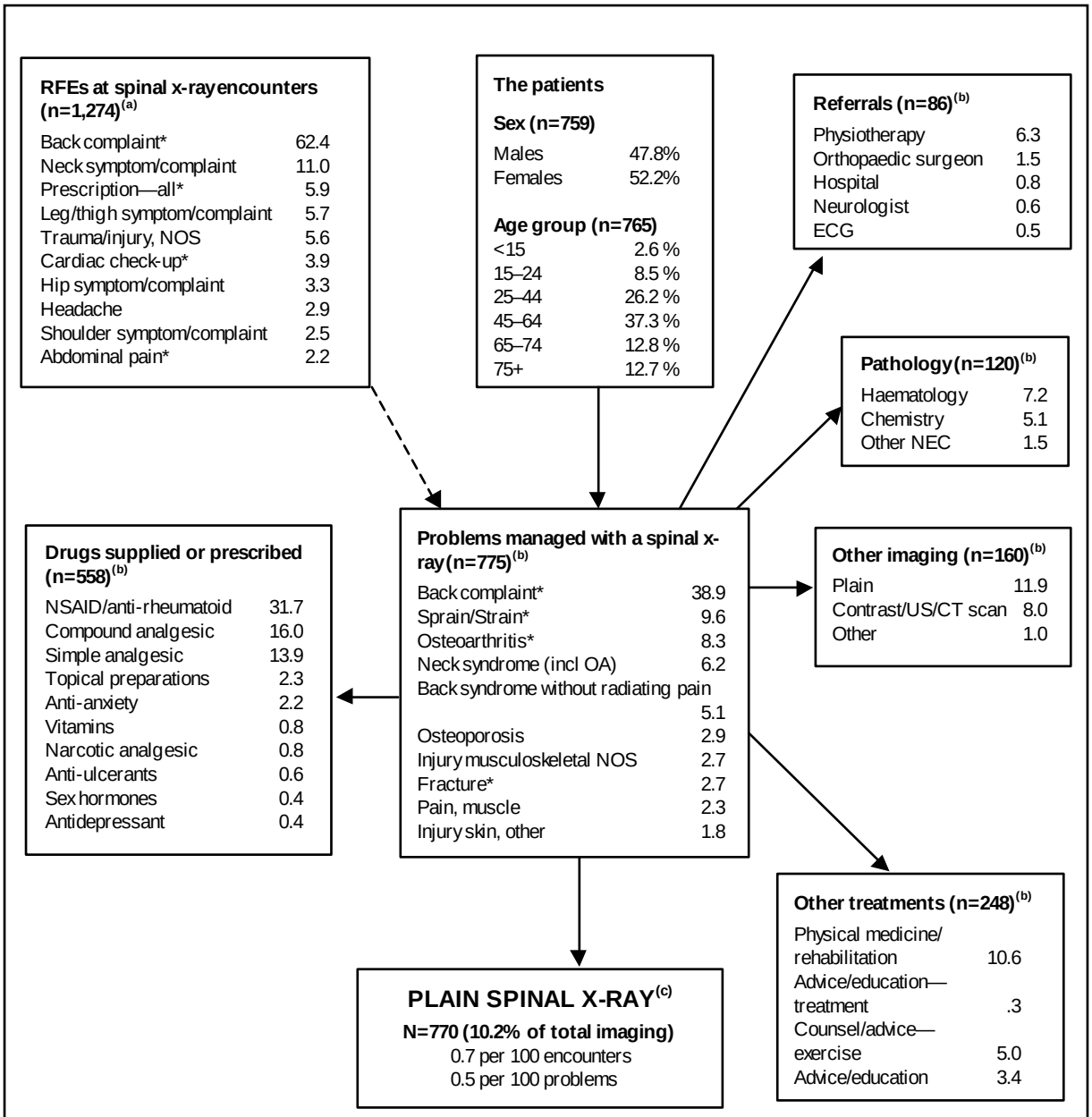
Other treatments were carried out at a rate of 32.0 per 100 problem. Physical medicine/rehabilitation was the most common other treatment carried out for these problems.

Referrals, tests and investigations

Referrals were recorded for 86 problems managed with a spinal x-ray. A referral for physiotherapy was recorded for 6.3% of problem contacts and an orthopaedic referral for 1.5%.

Pathology tests were ordered at a rate of only 15.5 per 100 problem contacts. The majority of these tests were either haematology or chemistry tests.

Only 160 other imaging tests were ordered for the same problem contact as those with a spinal x-ray. Only 20% of problems had another imaging test ordered concurrently with a spinal x-ray.



(a) Expressed as rates per 100 encounters at which a spinal x-ray was ordered (N=770).
(b) Expressed as rates per 100 problems for which a spinal x-ray was ordered (N=775).
(c) Includes multiple ICPC-2 PLUS codes: L41021–plain x-ray lumbosacral; L41022– plain x-ray cervical; L41023– plain x-ray thoracic; L41024– plain x-ray spine;
* Includes multiple ICPC–2 and ICPC–2 PLUS codes (see Appendix 3).
Note: NOS–not otherwise specified, NEC–not elsewhere classified, US–ultrasound, CT–compumterised tomography, incl OA–including osteoarthritis, ECG–electrocardiogram.

Figure 12.2: Inter-relationship of imaging orders with other variables.
Example: plain spinal x-ray

13 Patient wellbeing and risk factors

13.1 Background

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

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

13.2 Methods

The second annual BEACH data collection period was broken down into 10 blocks of recording, each block comprising five weeks. Each block should include data from 100 GPs, 20 GPs recording per week. Each GP's recording pad of 10 forms was made up of three components (40 A forms, 40 S forms and 20 L forms). Each component covered a different SAND topic, and involved a line of questioning that was asked of the patient or the GP in addition to the encounter-based information.

The order of SAND components in the GPs recording pack is randomised, so that 40 A forms may appear first, second or third in the pad. Randomised ordering of the components ensures that there is no order effect on the quality of the information collected.

Two parts of SAND remain constant for the year across the 10 blocks of the BEACH program. All GPs have 40 A forms in their recording pads and these investigate height and weight (for calculation of body mass index, BMI), patient assessed wellbeing and alcohol use. A single smoking status item is included on all 40 S forms. Questions in the remaining space vary from block to block, and address other aspects of patient health and health care delivery in general practice, effectively subsampling the overall sample.

The population risk factor questions for patient wellbeing, alcohol consumption, BMI and smoking status are constant throughout the year and will remain so in future years. While in the first BEACH year these SAND questions were reported in a separate report together with all other SAND questions, the constancy of their inclusion in the program led the research team to add them to the standard report rather than report them separately each year. The results of other topics covered in SAND will be reported in other publications.

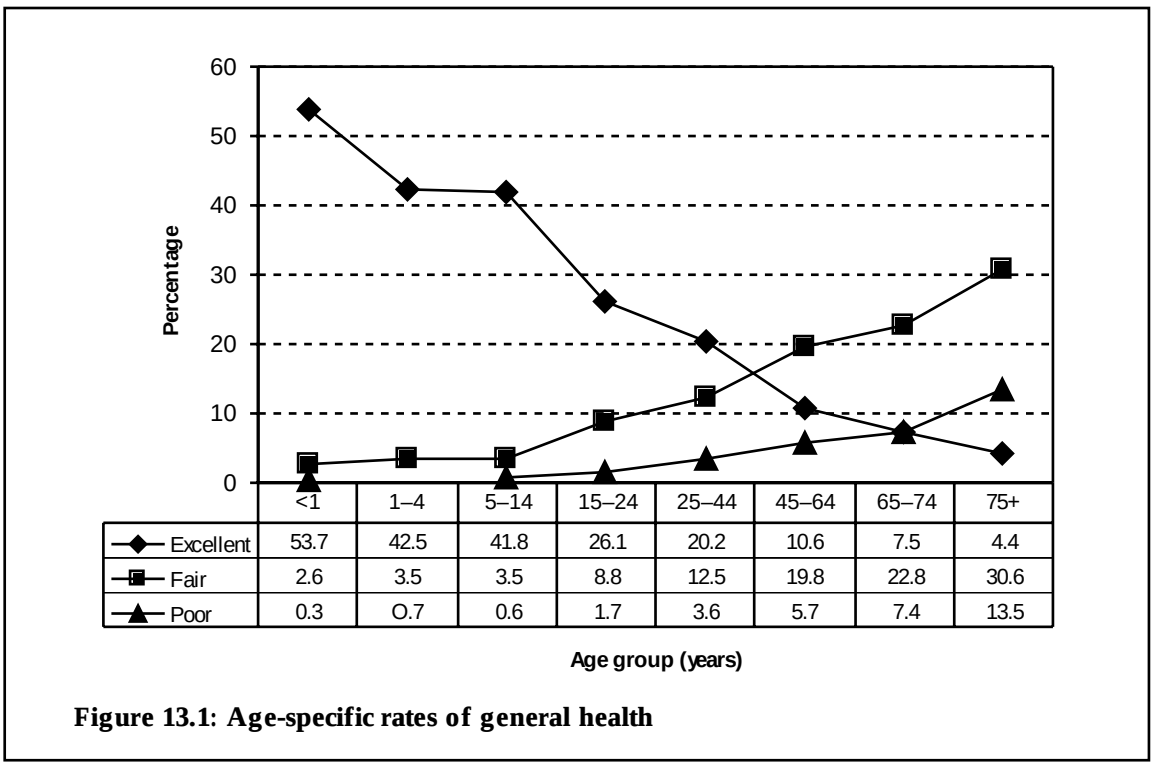
13.3 Wellbeing

Measurement of patient self-assessed wellbeing relied on the single overall health evaluation item question from the SF-36 (Medical Outcomes Study questionnaire) which was designed as a generic indicator of health status (Ware & Sherbourne 1992). This item provides a summary indicator and captures the general impact of health problems on the individual's functional status (McDowell & Newell 1996).

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

- In general would you say your health is: Excellent?
  Very good?
  Good?
  Fair?
  Poor?

Responses to this question were recorded at 37,444 patient encounters from 1,047 GPs. Overall, 17.7% (95% CI: 16.9–18.6) of respondents rated their general health as excellent, while 16.3% (95% CI: 15.8–16.9) rated it as fair and 5.2% (95% CI: 4.8–5.7) rated it as poor. The proportion of encounters with patients rating their health as excellent decreased steadily with age while the proportion rating it as poor increased with age. The distributions of self-rated general health for males and females were comparable. In adult patients aged 18 years and over (N=31,722) 13.7% (95% CI: 12.9–14.4) of respondents rated their health as excellent, while 18.4% (95% CI: 17.8–19.0) rated it fair and 6.0% (95% CI: 5.5–6.5) rated it as poor (Figure 13.1).



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
Excellent	53.7	42.5	41.8	26.1	20.2	10.6	7.5	4.4
Fair	2.6	3.5	3.5	8.8	12.5	19.8	22.8	30.6
Poor	0.3	O.7	0.6	1.7	3.6	5.7	7.4	13.5

Figure 13.1: Age-specific rates of general health

13.4 Body mass

Body mass is commonly assessed through the body mass idex (BMI). A person's BMI is assessed by dividing weight (kilograms) by height (metres) squared. A BMI that is less than 20 is considered underweight, 20–24 is normal, 25–29 is overweight and more than 30 is considered to be obese.

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

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

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

Responses were received at 38,660 patient encounters from 1047 GPs. Overall, 17.2% of these encounters were with patients considered obese, and a further 29.5% were with those graded as overweight. A further 16.0% were with underweight patients and 37.3% were with patients whose BMI was in the normal range.

To allow comparison of these results with data from that of the 1995 National Nutrition Survey,analysis was undertaken for adults (aged 18 years or over) by age group and sex. There were 33,069 patient encounters with adults in this sample. Overall, 19.4% (95% CI: 18.8–20.0) of adult patient encounters were with people considered obese, and 33.1% (95% CI: 32.5–33.8) were with those considered overweight. A higher proportion of males were overweight or obese (59.0%) than females (48.1%). While the proportion of patients considered overweight or obese increased with age, the trend reversed at 75 years and over in both sexes (Figure 13.2). These results do not differ markedly from those of 1995 which estimated that 64% of adult males and 49% of women were overweight or obese at that time (AIHW 2000 p 164)**.**

The patient was considered underweight at 8.5% (95% CI: 8.0–8.9) of encounters. However, in the 18–24 years age group, 22.9% of women and 12.4% of men were considered to be underweight (Figure 13.3). These estimates are almost four times those made from the general population in 1995 (underweight measured in that case as BMI<18.5) when only 3% of women and 1% of men were considered underweight and the prevalence in the 18–24 age group for females was about 6%. The use of different underweight cut-off points between the two studies may account for this large difference. However, it is notable that in accepted clinical practice, GPs use a cut-off of BMI<20 rather than <18.5. It is also possible that young women attending general practice are more likely to be underweight than those in the general population. The issue is worthy of further investigation.

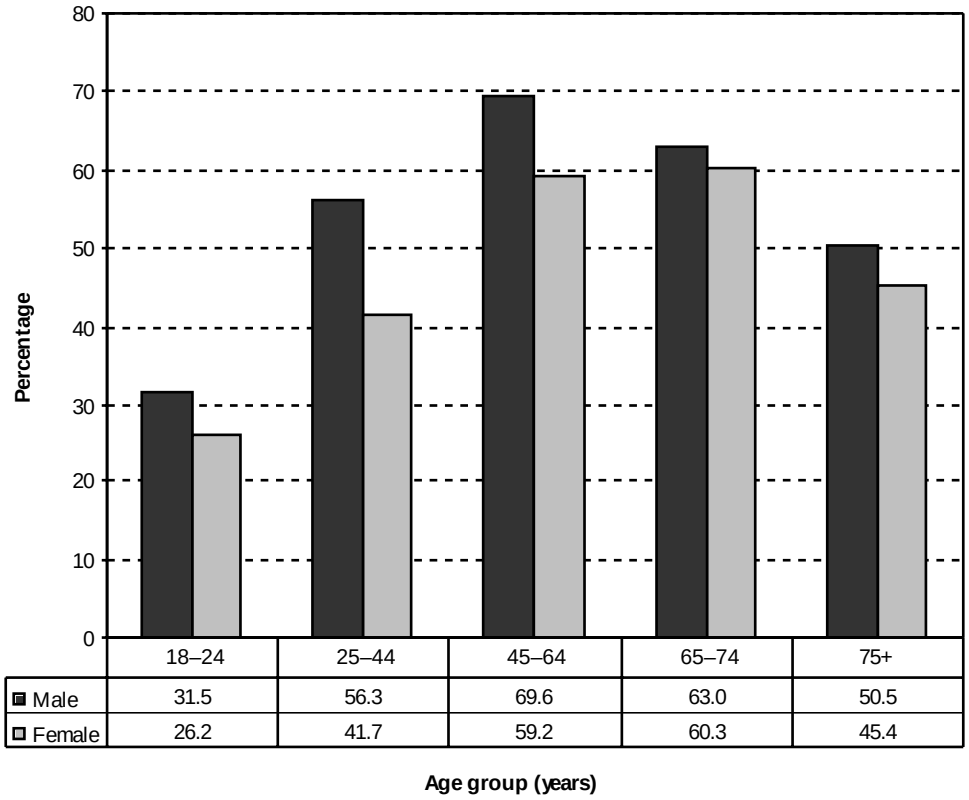


Figure 13.2: Age–sex-specific rates of overweight and obese

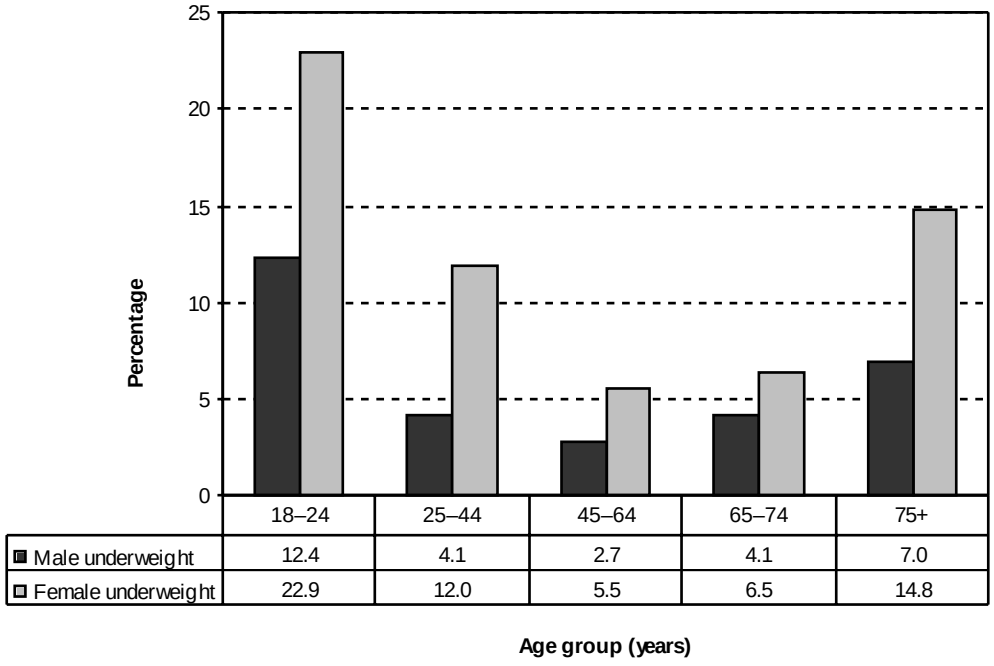
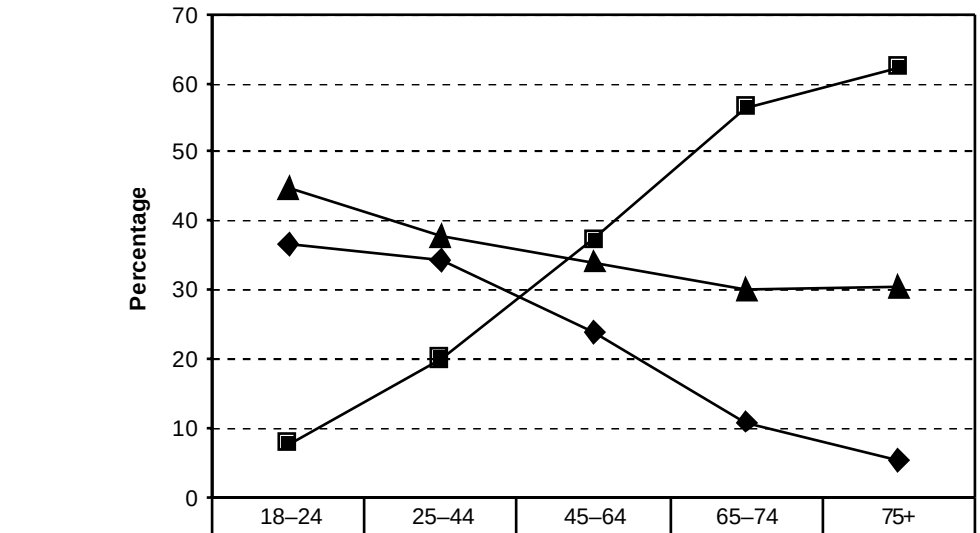


Figure 13.3: Age–sex-specific rate of underweight



	18–24	25–44	45–64	65–74	75+
Male daily	36.7	34.4	23.9	10.9	5.3
Male previous	7.8	20.0	37.3	56.5	62.3
Male never	44.8	37.8	34.1	30.0	30.4

Age group (years)

Figure 13.4: Male age-specific rates—smoking status

3.5 Smoking

It has been estimated that 27% of Australian men and 23% of Australian women are smokers (Hill et al. 1998).

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

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

Responses were received at 32,483 patient encounters with adult patients from 1,044 GPs. Overall, 18.9% (95% CI: 18.2–19.6) of patient encounters were with adults who were daily smokers, 5.2% (95% CI: 4.8–5.7) were with occasional smokers and 27.1% (95% CI: 26.4–27.8) with previous smokers. A greater proportion of males (23.4%) than females (16.2%) were daily smokers. The proportion of smokers decreased with age, with only 5% of male and 4% of female patients aged 75 years and over being daily smokers (Figures 13.4 and 13.5). However, almost 60% of males (and 25% of females) aged 65 years or more were previous smokers. These data suggest a somewhat lower smoking rate in this population at this time when compared with the results from the general population in the 1995 National Health Survey. In that study it was estimated that 27% of men and 20% of women were smokers and 32% of men and 23% of women were ex-smokers (AIHW 2000 p 149).

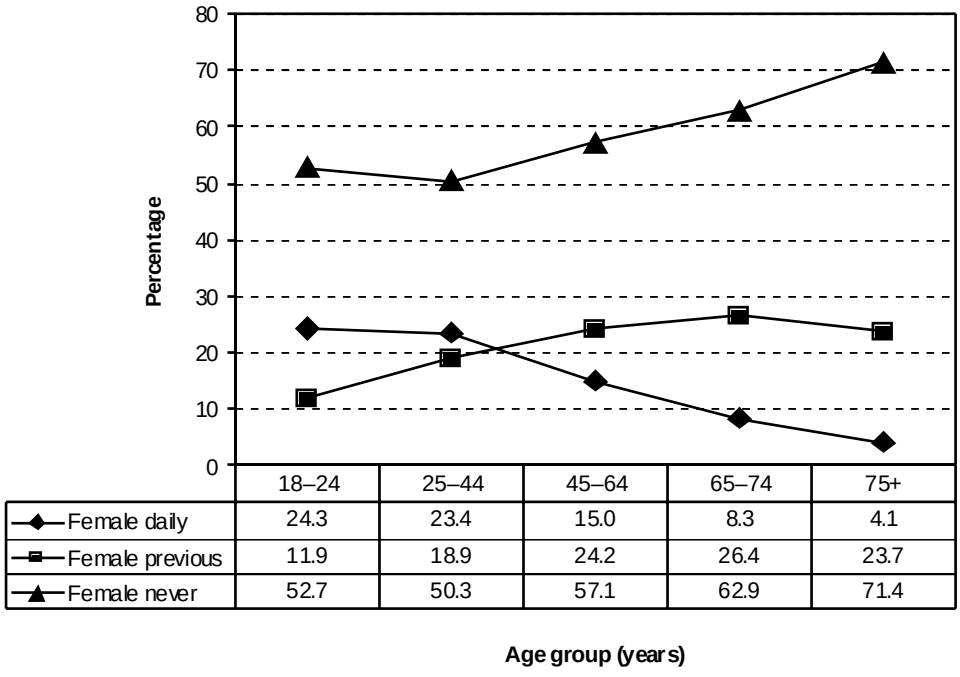


Figure 13.5: Female age-specific rates—smoking status

13.6 Alcohol use

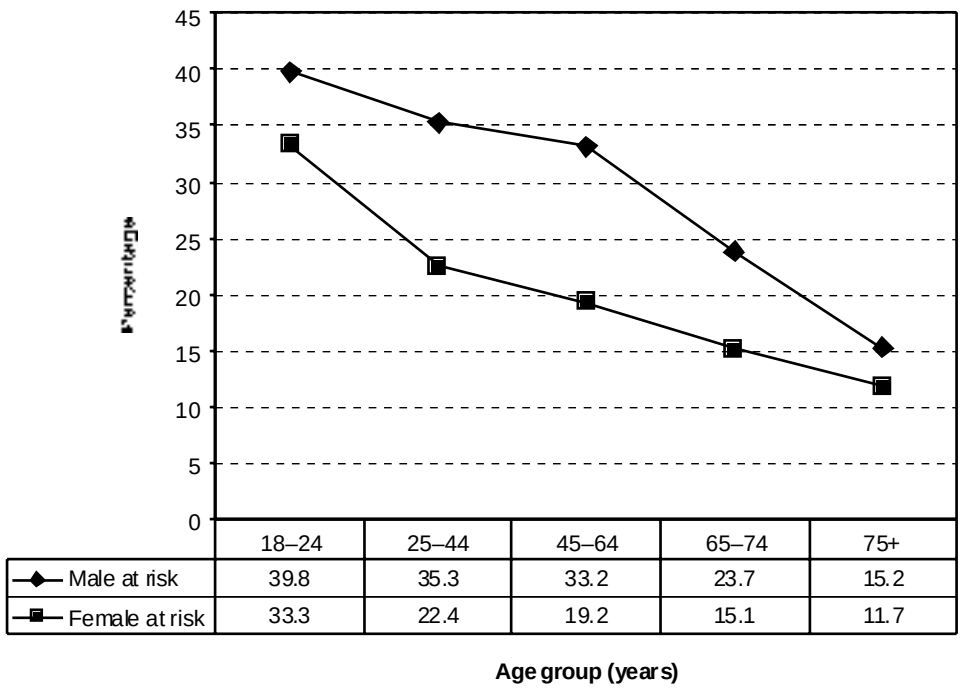
There have been some public health gains in reducing alcohol consumption in recent years. However, alcohol use is the second leading cause of drug-related death in Australia after tobacco(AIHW 2000). It is estimated that 44% of male drinkers and 30% of female drinkers drink regularly to excessive levels (Mattick & Jarvis 1993). National Health Priority Areas also recognises alcohol as an important modifiable cause of premature death and disability in Australia (AIHW 2000 p. 147).

To measure alcohol consumption BEACH uses three items based on from Section A of the WHO Alcohol Use Disorders Identification Test (international version) (Saunders et al. 1993) and the Australian version (Centre for Drug and Alcohol Studies 1993). Together these three questions assess 'at risk' alcohol use. The scores for each question range from 0–4. A score of 5+ for males or 4+ for females suggest that the person's drinking level is placing them at risk.

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

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

A standard drinks chart was provided to each GP to assist the patient in identifying the number of standard drinks consumed.



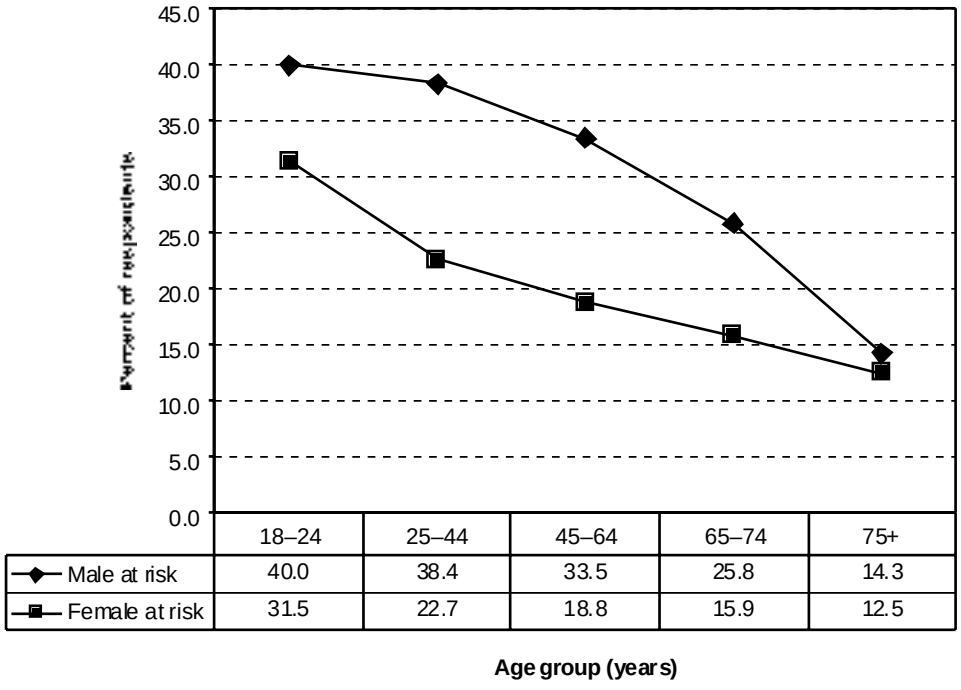
	18–24	25–44	45–64	65–74	75+
Male at risk	39.8	35.3	33.2	23.7	15.2
Female at risk	33.3	22.4	19.2	15.1	11.7

Figure 13.6: Age–sex-specific rate for at risk alcohol use: BEACH 1999–2000

Responses to these questions were recorded at 32,908 patient encounters (18+years) from 1,045 GPs.

Overall, 24.2% (95% CI: 23.4—24.9) of patient encounters were with adults who reported drinking 'at risk' levels of alcohol. Male patients had a higher rate of at risk drinkers (30.3%; 95% CI: 29.2—31.4) than women (20.1; 95% CI: 19.2—21.0). The proportion of patients of both sexs who were at risk drinkers decreased with age. (Figure 13.6) The proportion of adult male drinkers who were drinking at risk levels of alcohol was estimated as being 38.7%. The corresponding figure for women was 32.0%. These estimates are similar to those of Mattick in 1993, though a little lower for males and a little higher for females (Mattick & Jarvis 1993).

There is considerable variance in the methods of calculation used to measure at risk alcohol consumption between different studies. The method of calculation of at risk levels of alcohol consumption reported here for BEACH 1999–2000 used a slightly different process from that applied to the 1998–99 BEACH data. (Sayer et al. 2000). For comparative purposes the new methods of calculation have been applied to the 1998–99 BEACH data and the results are presented in Figure 13.7.



	18–24	25–44	45–64	65–74	75+
Male at risk	40.0	38.4	33.5	25.8	14.3
Female at risk	31.5	22.7	18.8	15.9	12.5

Figure 13.7: Age–sex-specific rate for at risk alcohol use: BEACH 1998–1999

14 Discussion

In this report the results have in general been presented as summaries of the most frequent events that occur in general practice. These summaries serve to direct our attention to those events that, due to their high relative frequency, form a large part of the GP's workload. However, the fact that the top thirty patient reasons for encounter accounted for only 55% of all patient RFEs demonstrates the wide variety of issues that the population presents to GPs, ranging from physical symptoms to psychological and social problems. The top thirty problems managed accounted for less than half of all the problems managed by GPs during the BEACH program and this reflects the breadth of morbidity treated in this primary care environment. For prescribed medications, the thirty most commonly prescribed generic medications represented only 43% of all prescribed medications and this also reflects the wide range of morbidity dealt with in general practice. The relative high rate of provision of clinical services such as advice, health instruction and counselling demonstrates that GPs use a range of non-pharmacological management techniques in their practice and these include regular use of therapeutic procedures.

The number of patients admitted to hospital, referred to the emergency department or to specialists was relatively few (about 8%), indicating the extent to which patients are cared for by GPs in the community without the involvement of the secondary or tertiary sector. Any assessment of the health of the community must therefore consider the contribution of general practice to the provision of acute care and ongoing chronic care to a large proportion of the population.

14.1 Methodological issues

The second year of the BEACH study included some changes to the layout of the forms, based on the experience gained in the first year of the program. The results here reported raise some methodological issues regarding the effect of these changes on GP completion rates for some variables. Issues surrounding the sampling method and the HIC GP characteristic data are also discussed.

14.1.1 The GP sample selection process

The sampling methods developed by the DHAC to select the BEACH sample were well designed and worked well in the first two years of the program (see Section 2.3). However, as the number of projects requiring GP samples has increased, the sample frame has 'rolled over' (particularly in some States) very quickly in recent times. While the speed of the 'roll-over' does not affect samples for one-off projects it does affect large ongoing studies such as BEACH. Fast 'roll-over' can mean that a GP randomly selected in the first quarter of the year can be selected again in the third quarter. These GPs are rejected and not re-approached by the research team. Since the speed of 'roll-over' does not affect all States equally this can influence the State distribution of the GPs who can be approached in any one quarter. In turn this can influence final participation rates in each State. The GP Branch of the DHAC has now overcome this problem by creating a separate database for the BEACH program so that the national sample is not influenced by the extent of research undertaken in each State by other bodies.

14.1.2 Cluster sampling

Section 2.5 described the statistical techniques applied in BEACH. It recognises that the sampling is based on GPs and that for each GP there is a cluster of encounters. It also suggests that each cluster may have its own characteristics, being influenced by the characteristics of the GP. While ideally the sample should be a random sample of GP–patient encounters, such a sampling method is impractical in the Australian health care system. The reader should however be aware that the larger the GP sample and the smaller the cluster the better. The research teams theoretical preference would be for a sample of five or six encounters from every recognised practising GP in the country, distributed evenly through the year. However, there is currently no system in place that could provide a cost-effective means of collecting such a sample of encounters. The sample size of 100,000 encounters from a random sample of 1,000 GPs has been demonstrated to be the most suitable balance between cost and statistical power and validity (Meza et al. 1995).

14.1.3 Response rates

The response rate of GPs to BEACH was 39.1% of those with whom contact was established and this was similar to the response rate for the first year of BEACH (38.4%) (Britt et al. 1999c). Ten per cent of the GPs in the sample provided by the DHAC from the HIC records could not be contacted. A large proportion of these were not practising at the time of recruitment, having retired, died, gone overseas or taken maternity leave since their selection from the HIC records. As the aim is to represent active, practising GPs the exclusion of these GPs from the sample is a valid and necessary action. However, there were also some GPs who had left the practice and could not be traced. In many of these cases the practice informed recruiting staff that the GP selected had not been at the practice for some years. This suggests that the HIC system of practice address registration is not error free.

GPs aged less than 35 years were under-represented in the final GP sample and this could be due to the fact that general practice registrars are not required to undertake QA activities during training and during the QA triennium of completion of training. Some incentives need to be introduced to encourage participation of these younger GPs in BEACH. A similar problem will arise with recruitment of the increasing number of unrecognised GPs now allowed to practice in needy rural areas, who by special arrangement can claim A1 Medicare items of service but who are not required to undertake QA activities. Incentives are also required to encourage the participation of these GPs to ensure sufficient representation of general practice in these areas.

14.1.4 Disagreement between self-reported GP characteristics data and those from the HIC

In Section 3 the characteristics of the BEACH GPs were described on the basis of the data provided by the participants themselves (see Table 3.2 and the GP questionnaire in Appendix 2). In contrast, Table 3.3 relies on the HIC GP characteristic data (to allow for the comparison of participants with non-participants). Note that while the sex distribution in the two data sets is in agreement, there is slight disagreement in the number purported to have graduated in Australia. More importantly, the age distribution of the participants according to HIC records differs markedly from that of the data provided by the GPs themselves. While this has no significant impact on the BEACH study it is worthy of note for other researchers relying on GP characteristic data drawn from the HIC records.

14.1.5 GP response levels for patient characteristics and to the number of repeats

In Section 6 the significantly lesser proportion (compared with the 1998–99 BEACH year) of patients marked on the form as being health care card holders and the lesser proportion marked as being from a non-English-speaking background was noted. As earlier suggested (see Section 6), this could well be due to the revised format of the form in the second year. GPs were no longer asked to tick 'yes' or 'no' next to each of the patient characteristics, but asked only to tick the box against each characteristic applying to the patient. The research team believes that this led to a significant under-reporting compared with the previous year. The format of the questions is being reconsidered in an attempt to improve the response level.

14.1.6 The count of Indigenous patients

The proportion of patients recorded as being Aboriginal people or Torres Strait Islanders was also less in 1999–2000 than in the previous year. Due to the small sample size the difference was not statistically significant but this is also likely to be a result of the layout change described above. However, even the estimates of the number of encounters with Indigenous people from the 1999–2000 data (1.2%) may be an underestimate as it is dependent on self-identification in response to GP inquiry.

14.1.7 Count of repeat prescriptions

As discussed in Section 9.3.1,there was a very high level of missing data in the 'number of repeats' fields. This makes it difficult to reliably extrapolate to the total number of intended prescriptions (i.e. original plus repeats). The extrapolations can be based on two possible assumptions: that for all missing repeat data the GP intended that no repeats be given or that missing data are random and distributed across all medication types in a similar manner to those for which repeat status was recorded. Neither of these two assumptions proved acceptable and the extrapolated estimate of the total number of prescriptions (original + repeats) intended by GPs across Australia in one year had to be provided as being within the range of 190 million and 300 million per year. While this is a very broad estimate it does not negate the importance of the huge difference between even the lowest possible estimate (190 million) and the PBS data which counts only those prescriptions that are paid by the PBS. However, the research team is reviewing the layout of the form for the coming BEACH year in an effort to improve the completion rate of the number of repeats for each prescription.

14.2 Data collection from electronic health records

14.2.1 Future national data collection for electronic health records?

The BEACH program is currently a paper-based data collection program. Many people have recently suggested that with the increased GP uptake of electronic prescribing systems or full clinical systems (electronic health records, EHRs) national data could soon be drawn passively directly from the GPs computers. Although an attractive proposition, there are many barriers to its implementation:

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

The research team believes that for the reasons outlined above it will be many years before data collection programs aiming to honestly describe national general practice activity will be able to rely on passive data collection directly from EHRs. However we believe there could be a middle step: *active* collection of data from electronic clinical systems. Active collection requires specifically designed software to interface with the clinical system in use. The software would draw all available data directly from the medical record into the minimum data set. At the end of the consultation the GP could be asked to complete any elements of the data set that have not been filled automatically, or to specify that the encounter included no activity in that field to record.

However, before the rollout of such an option for BEACH participants, it will be important to test the extent to which data collected in this manner reflects that collected on structured paper encounter forms. A controlled trial comparing the two data collection methods is therefore planned.

14.2.2 National data collection from the Better Medication Management System?

Others have suggested that the introduction of the Better Medication Management System (BMMS) planned for 1 July 2001 will provide a reliable source of data regarding patient management. The BMMS allows the GP to electronically transmit the prescription to an electronic database and allows the optional inclusion of comments by the prescribing GP, which may include reasons for the prescription (DHAC 2000b).

Unfortunately this will not provide a reliable national data source for pharmaco-epidemiological research for the following reasons:

- The BMMS will operate on an 'opt-in' basis for the GP, the patient and the pharmacy. Both patient and GP must participate in the system if the prescription is to be transmitted electronically.
- The GP and the patient will have the choice as to whether or not to record comments on the prescription.
- The BMMS will not have a record of any problem contacts that do not result in a prescription. This means that even if all GPs, patients and pharmacists participate and if a diagnosis / problem label was recorded in the comments at all times, no estimate of the relative rate of prescribing for a specific problem could be calculated. For example: in measuring change in the relative rate of GP prescribing of antibiotics for URTI a measured decrease in the number of prescriptions electronically transmitted for antibiotics for URTI could not be assumed to mean a relative decrease in overall prescribing rate. There is no base measure of the number of encounters at which URTI was managed, nor a measure of the number of patients presenting at least once for URTI.

14.3 Comparing BEACH data with those from other sources

Users of the data reported in this publication might wish to compare the results with those from other sources, such as the HIC (HIC 1999). While integration of data from multiple sources can provide a more comprehensive picture of the health of the Australian community, the user must keep in mind the limitations of each data set and the differences between them. Some examples are presented below:

14.3.1 The Pharmaceutical Benefits Scheme

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

- Each prescription recorded in the BEACH program reflects the GPs intent that the patient receives the prescribed medication and the specified number of repeats. The prescription, irrespective of the number of repeats ordered, is counted only once.
- Prescriptions are counted in BEACH irrespective of whether or not the medication is covered by the PBS at all, or for all patients, or for those holding a health care card or who have reached the safety net threshold.

- The BEACH data does not inform us of the number of prescriptions not filled by the patient (and neither does the PBS).

In contrast, the PBS data:

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

These differences will influence not only the numbers of prescriptions counted but also their distribution. For example, the majority of hormone replacement therapies (HRTs) fall under the PBS minimum subsidy level and would not be counted in the PBS data unless the patient receives it under the PBS scheme because they are a health care card holder or have reached the annual safety net threshold. The PBS would therefore grossly underestimate the number of HRT prescriptions filled and the proportion of total medications accounted for by HRTs.

14.3.2 The Medicare Benefits Schedule items

If comparing the BEACH data with Medicare data it must be remembered that:

- The BEACH participants have the opportunity to only record a single Medicare item number on each encounter form. They are instructed to select the more general item number where two item numbers apply to the consultation because additional services attracting their own item number (e.g. 30026–repair of wound) are counted as actions in other parts of the form. This results in a lesser number of 'other' Medicare items than would be counted in the Medicare data.
- The BEACH database includes data about all clinical activities, not only those billed to the MBS. Both direct (patient seen) and indirect (patient not seen but a clinical activity undertaken) consultations are recorded. Some of these are paid by other funding sources (such as State health departments, private insurance companies, workers compensation etc.) and some are provided free of charge by the GP (see Section 5). In contrast, the MBS data includes only those GP services that have been billed to Medicare.

These two factors must affect the age and sex distribution of the patients encountered in BEACH when compared with that of encounters billed to Medicare. This issue is discussed in Section 4.

14.3.3 Pathology data from the MBS

The BEACH database includes details of pathology tests ordered by the participating GPs. When comparing these data to those in the MBS it must be remembered that:

- BEACH reflects the GPs intent that the patient present for the pathology test(s) ordered and information as to the extent to which patients do not have the test done is not available.
- Each pathology company can respond differently to a specific test order label recorded by the GP. Further, the pathology companies can only charge MBS for the three most expensive tests undertaken even where more were actually undertaken. This is called 'coning' and is part of the DHAC pathology payment system.

- Pathology MBS items contain pathology tests grouped on the basis of cost. An item may therefore not give a clear picture of the precise tests performed.

The effect of these factors is that the MBS pathology data includes only those tests billed to the MBS after interpretation of the order by the pathologist and after selection of the three most expensive tests. This effect will not be random. For example, an order for four tests to review the status of a patient with diabetes it is likely that the HbA1c will be the least expensive and will 'drop' off the billing process due to coning. This would result in an underestimate of the number of HbA1cs being ordered by GPs.

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

Those interested in GP pathology ordering will find more detailed information from the BEACH program in 'Pathology ordering by general practitioners in Australia 1998' (Britt et al. 1999a).

14.3.4 Imaging data from the MBS

Some of the issues discussed regarding pathology data also apply to imaging data. While coning is not an issue for imaging, radiologists are free to decide whether or not the test ordered by the GP is the most suitable and whether to undertake other tests of their choosing. The MBS data therefore reflects the tests that are actually undertaken by the radiologist while the BEACH data reflects those ordered by the GP.

15 Conclusion

This report has provided an overview of general practice activity in Australia in 1999–2000. BEACH provides the profession of general practice, researchers and those in policy development and health plannin, with a rich data source, a database that enumerates the clinical activities of general practitioners. Further, the report describes the normative behaviour of over one thousand general practitioners who together have more than 10,000 years of clinical experience in this role. Such studies of normative data may well contribute to the development of guidelines of care in the future.

The summary inter-relationship diagrams included in this report may provide the reader with an indication of current practice in the selected areas. Analyses such as these (with greater specificity than reported in the summaries in this report) can be undertaken on innumerable topics associated with the morbidity of the patient population of general practice, its management, the health of specific groups or the practice styles of GPs selected on the basis of geography, sex or another GP characteristic.

This year's BEACH data will act as the second measurement point in future trend analyses of changes in general practice clinical activity—changes that may occur in response to changes in the structure and the payment system of general practice, educational interventions, public education campaigns, or changes in the wider health care system. The continuing nature of the program will facilitate tracking of these changes over time. Trend analyses will begin when there are three measurement points, after the third year of the program.

There is still a need for longitudinal de-identified data that would allow assessment of medium and long-term outcomes of care. While BEACH will evolve with the changing data needs of those organisations supporting the program and with the increased adoption of computer technology in general practice (as earlier discussed in Section 14), it will be some time before the standards required for reliable collection of data via computer will be in place. The General Practice Statistics and Classification Unit continues to work on the development of the analytical techniques to ensure that the program will move forward with technology as the problems (earlier discussed) are overcome.

A number of other publications in the General Practice series are planned for the future. These will include a comparative study of the practice patterns of GPs in rural and metropolitan areas who participated in the first two years of the BEACH program. Brief summaries of results of the other SAND topics covered in the second year of the program will soon be available on the web (ee Accessing BEACH data, Section 15.1). Some of these topics will be reported more fully in specific subject publications related to the National Health Priority Areas and to patient population subgroups.

A wide range of people from government, industry and research organisations is currently using BEACH data. The uses to which they have already been put in the area of policy development have been summarised elsewhere (Britt & Miller 2000). The potential of this rich database is immense for those interested in health services research, population health, health economics or quality of health care. The numbers of research questions that can be applied to the database are innumerable. The examples of analyses of the relational database pertaining to specific areas of interest may help others better understand the ways in which the data could be utilised. The ongoing nature of BEACH will ensure an ever-increasing sample size so that the reliability of the data in describing even relatively rare events will constantly improve.

15.1 Current status of BEACH

The BEACH program is now in its third year. The database for the first 2.5 years includes data pertaining to approximately 254,000 GP–patient encounters from more than 2,500 GPs. While this report concentrates on the more common events occurring in general practice over one year, the full database allows investigation of far less frequent events. For example, those interested in encounters at which the patient is referred to the emergency department of a hospital would find that while such referrals only occur at a rate of 1 per 1000 encounters, there would be approximately 250 cases in the current database. This would be sufficient to provide an overview of the types of patients and the pattern of problems referred to an emergency department. The same concept applies to those morbidities that are relatively rare and to medications prescribed on an infrequent basis.

15.2 Access to the BEACH data

15.2.1 Public domain

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

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

Abstract No.	Subject	No. encounters	No. GPs
1	Allergic rhinitis	4,077	102
2	Anxiety-stress, consultation time, level of education	3,684	100
3	Asthma	4,285	213
4	Cardiovascular disease:	2,119	106
5	Depression	8,333	309
6	Employment status and workers' compensation claims	8,833	221
7	Health services utilisation, lifestyle status and chronicity	2,124	106
8	Hormone replacement therapy	2,063	100
9	Influenza and absenteeism	4,228	106
10	Length of consultation; after hours arrangements; co-oribidity	6,328	210
11	Patient employment status and occupation	4,385	110
12	Smoking and passive smoking	3,944	100

15.2.2 Participating organisations

Organisations providing funding for the BEACH program receive quarterly summary reports of the encounter data and standard reports about their subjects of interest. Analysis of the data is a complex task. The General Practice Statistics and Classification Unit has therefore designed standard report formats that cover most aspects of the subject under investigation.

Standard reports have multiple possible entry points. For example:

- population-based (e.g. the elderly; non-English-speaking background patients);
- encounter type (e.g. long consultations);
- GP type (e.g. rural practitioners);
- test ordering (e.g. pathology of any sort; a specific pathology test)
- referral (e.g. those patients and problems for which a referral to a surgeon was made);
- medication-based analyses for individual medications (brand or generic), medication subgroups or medication groups; and
- diagnostically based analyses for individual ICPC–2 PLUS codes (e.g. uncomplicated hypertension), ICPC individual code (e.g. hypertension; nephropathy), ICPC grouper (e.g. all hypertension), ICPC chapter-component level (e.g. digestive symptoms), or ICPC chapters (e.g. all cardiovascular problems).

Individual data analyses are conducted where the specific research question is not adequately answered through standard reports.

15.2.3 External purchasers of standard reports

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

Appendix 1 Example of a recording form

Appendix 2 GP characteristics questionnaire

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

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

(continued)

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

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

(continued)

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

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

(continued)

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

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

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

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

(continued)

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

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

(continued)

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

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

(continued)

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

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

(continued)

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

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

Note: –(code) signifies that the concept includes all of the specified code across all chapters of ICPC–2.

Appendix 5 Procedural treatment code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Assist at operation	A69006	Assist at operation
	B69002	Assist at operation;blood
	D69002	Assist at operation;digestive
	F69002	Assist at operation;eye
	H69002	Assist at operation;ear
	L69002	Assist at operation;musculoske
	N69002	Assist at operation;neurological
	P69002	Assist at operation;psycho
	R69002	Assist at operation;respiratory
	S69002	Assist at operation;skin
	T69002	Assist at operation;endo/metab
	U69002	Assist at operation;urological
	W69002	Assist at operation;reproduct
	X69002	Assist at operation;genital;female
	Y69002	Assist at operation;genital;male
	Z69003	Assist at operation;social
Contraceptive device fit/supply/remove	W12003	Contraception;IUD
	W12004	Insertion;IUCD
	W12005	Removal;IUCD
	W14010	Contraception;diaphragm
	W14012	Fitting (of);diaphragm
	W14013	Supply;diaphragm
	W14014	Removal;diaphragm

(continued)

Appendix 5 (continued): Procedural treatment code groups from ICPC–2 PLUS

Treatment group	ICPC–2 PLUS code	ICPC–2 PLUS label
Diagnostic endoscopy	–40	
Dressing/pressure/compression/ tamponade	–56	
Excision/removal tissue/biopsy/ destruction/debridement/ cauterisation	–52	
Incise/drainage/flushing/aspiration/removal body fluid	–51	
Instrumentation/catheterisation/ intubation/dilution	–53	
Local injection/infiltration	–55	
Other diagnostic procedures	–43	
Other preventive procedures/high risk medication/condition	–49	
Other therapeutic procedures/minor surgery NEC	–59	
Pap smear	X37001	Pap smear
Physical function test	–39	
Pregnancy test	W33001	Test;urine;pregnancy
	W33002	Test;pregnancy
Repair/fixation–suture/cast/prosthetic device (apply/remove)	–54	
Sensitivity test	–32	
Test;glucose	T34005	Test;glucose
Urine test	–35	

Note: –(code) signifies that the concept includes all of the specified code across all chapters of ICPC–2.

Appendix 6 Referrals—code groups from ICPC–2 and ICPC–2 PLUS

Referral group	ICPC–2 PLUS code	ICPC–2 PLUS label
Allied health services	–66	Referral to other provider/nurse/therapist/social worker
	–68 excluding A68009	Other referrals NEC
	Z67002	Referral;respite care
Specialist	–67 excluding A67011; A67010; P67005 and Z67002	Referral to physician/specialist/clinic/hospital
	A68009	Referral;oncologist
Emergency department	A67011	Referral;A&E
Hospital	A67010	Referral;hospital
	P67005	Referral;hospital;psychiatrist

Note: –(code) signifies that the concept includes all of the specified code across all chapters of ICPC–2.

Appendix 7 Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
Chemistry	Amylase	D34004	Test;amylase
	B12	B34015	Test;B12
		D34009	Test;Schillings
	C reactive protein	A34005	Test;C reactive protein
	Calcium/phosphate	A34006	Test;calcium
		A34013	Test;phosphate
	Cardiac enzymes	D34005	Test;asparate aminotransferase
		K34003	Test;cardiac enzymes
		K34004	Test;creatine kinase
	Chemistry;other	A33023	Test;alpha fetoprotein
		A33026	Test;cancer antigen 125
		A33027	Test;cancer antigen 15.3
		A33028	Test;cancer antigen 19.9
		A33029	Test;carcinoembryonic antigen
		A34015	Test;protein
		A34018	Vitamin assay
		A34019	Test;lead
		A34020	Test;blood gas analysis
		A35004	Test;urine sodium
		B34023	Test;transferrin
		D34002	Test;alanine aminotransferase
		K34001	Test;blood;digitalis
		N34001	Test;blood;phenylhydantoin
		P34003	Test;methadone
		T34021	Test;C peptide
	Digoxin	A34002	Drug assay
		K34005	Test;digoxin
		N34003	Test;phenytoin
		P34002	Test;lithium
	Drug screen	A35003	Drug screen
	EUC	A34007	Test;chloride
		A34008	Test;electrolytes
		A34010	Test;EUC
		A34014	Test;potassium
		A34017	Test;sodium

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		U34002	Test;creatinine
		U34003	Test;urea
	Ferritin	B34016	Test;ferritin
		B34019	Tests;iron studies
	Folic acid	B34017	Test;folic acid
		B34024	Test;folate (red cell)
	Glucose tolerance	T34005	Test;glucose
		T34009	Test;glucose tolerance
		T34023	Test;glucose (fasting/random)
	HbA1c	T34010	Test;HbA1c
		T34017	Test;fructusamine
		T34022	Test;HBA1
	Hormone assay	A34003	Hormone assay
		D33015	Test;Anti gliadin antibody
		T34007	Test;cortisol
		T34018	Test;androgens
		T34019	Test;insulin
		W34005	Test;HCG
		W34006	Test;BHCG level (titre/quant)
		X34002	Test;LH
		X34003	Test;progesterone
		X34004	Test;oestradiol
		X34005	Test;FSH
	Lipids	T34001	Check-up;cholesterol
		T34004	Test;lipids profile
		T34006	Test;cholesterol
		T34011	Test;cholesterol HDL
		T34013	Test;cholesterol LDL
		T34016	Test;triglycerides
		T34020	Test;chol/trig
		T34024	Test;free fatty acids
	Liver function	A34004	Test;albumin
		D34003	Test;alkaline phosphatase
		D34006	Test;bilirubin
		D34007	Test;gGT
		D34008	Test;liver function
		T34012	Test;LDH

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
	Multibiochemical analysis	A34012	Test;mult biochemical analysis
		A34021	Test;E & LFT
	Prostate specific antigen	Y34002	Test;acid phosphatase
		Y34003	Test;prostate specific antigen
	Thyroid function	T34015	Test;thyroid function
	Urate/uric acid	U34004	Test;urate/uric acid
Cytopathology	Cytology;other	A37002	Test;cytology
		B37003	Test;cytology;blood
		D37002	Test;cytology;digestive
		F37002	Test;cytology;eye
		H37002	Test;cytology;ear
		K37002	Test;cytology;cardiovascular
		L37002	Test;cytology;musculoskeletal
		N37002	Test;cytology;neurological
		R37002	Test;cytology;respiratory
		R37003	Test;sputum cytology
		S37002	Test;cytology;skin
		T37002	Test;cytology;endocr/metabol
		U37002	Test;cytology;urology
		W37002	Test;cytology;reproduction
		Y37002	Test;cytology;genital;male
	Pap smear	X37001	Pap smear
		X37003	Test;cytology;genital;female
Haematology	Blood grouping & typing	B33001	Test;Coombs
		B33002	Test;blood grouping & typing
		B33009	Test;blood group
	Blood;other	B33003	RH;antibody titer
		B34005	Test;blood;platelets
		B34007	Test;blood;sickle cell
		B34021	Test;reticulocyte count
		B37001	Exam;bone marrow
	Coagulation	B34002	Test;blood;coagulation/bleed
		B34003	Test;blood;coagulation time
		B34006	Test;part thromboplastin time
		B34008	Test;bleeding/coagulation time
		B34009	Test;prothrombin time

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		B34014	Test;APTT
		B34022	Test;thrombin time
		B34025	Test;INR
		B34026	Test;fibrinogen
		B34028	Test;bleeding time
		B34029	Test;coagulation screen
	ESR	A34009	Test;ESR
	Full blood count	A34011	Test;full blood count
	Haemoglobin	B34018	Test;haemoglobin
Histopathology	Histology,other	A37001	Test;histology
		B37002	Test;histology,blood
		D37001	Test;histology,digestive
		F37001	Test;histology,eye
		H37001	Test;histology,ear
		K37001	Test;histology,cardiovascular
		L37001	Test;histology,musculoskeletal
		N37001	Test;histology,neurological
		R37001	Test;histology,respiratory
		T37001	Test;histology,endoc/metabol
		U37001	Test;histology,urology
		W37001	Test;histology,reproductive
		X37002	Test;histology,genital;female
		Y37001	Test;histology,genital;male
	Histology,skin	S37001	Test;histology,skin
Immunology	Anti nuclear antibodies	L33004	Test;anti nuclear antibodies
	Immunology,other	A32001	Test;sensitivity
		A33005	Test;immunology
		A33011	Test;HLA
		A33024	Test;bone marrow surface mark
		A33025	Test;serum electrophoresis
		B33005	Test;immunology,blood
		B33007	Test;immunoglobulins
		B33011	Test;IgE
		B34027	Test;FBC for surface markers
		D32001	Test;sensitivity,digestive
		D33004	Test;immunology,digestive
		D33014	Test;endomysial antibody

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		H33002	Test;immunology,ear
		K33002	Test;immunology,cardiovascular
		L33003	Test;immunology,musculoskeletal
		L34001	Test;lupus erythemat;cell prep
		N33002	Test;immunology,neurological
		R32004	Test;sensitivity,respiratory
		R33004	Test;immunology,respiratory
		S32001	Test;sensitivity,skin
		S33002	Test;immunology,skin
		S33004	Test;skin patch
		T33002	Test;immunology,endocrine/metabolic
		U33003	Test;immunology,urology
		W33007	Test;immunology,reproductive
		X33002	Test;immunology,genital;female
		Y33002	Test;immunology,genital;male
	RAST	A34016	Test;RAST
	Rheumatoid factor	L33001	Test;rheumatoid factor
Infertiliity/pregnancy test	Infertility/pregnancy	W33001	Test;urine;pregnancy
		W33002	Test;pregnancy
		W34002	Test;blood;pregnancy
		W34003	Test;antenatal
		Y38002	Test;sperm count
		Y38003	Test;semen examination
Microbiology	Antibody	A33003	Test;antibody
	Cervical swab	X33004	Test;cervical swab
	Chlamydia	A33006	Test;chlamydia
		A33034	Test;chlamydia direct immunofl
		X33006	Test;viral culture;genital;female
	Ear swab and C&S	H33003	Test;ear swab and C&S
	Faeces MC&S	D33002	Stool(s);culture
		D33008	Test;faeces MC&S
		D36001	Test;faeces;cyst/ova/parasite
	Fungal ID/sensitivity	A33008	Test;fungal ID/sensitivity
		A33030	Test;skin scraping fungal MCS
	H pylori	D33009	Test;H Pylori
		D33005	Test;hepatitis A serology

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		D33006	Test;hepatitis B serology
		D33007	Test;hepatitis C serology
		D33013	Test;hepatitis serology
	HIV	A33021	Test;cytomegalovirus serology
		B33006	Test;HIV
		B33008	Test;AIDS screen
	Microbiology,other	A33004	Test;microbiology
		A33007	Test;culture and sensitivity
		A33012	Yrdy;mycoplasma serology
		A33013	Test;parvovirus serology
		A33015	Test;Barmah forest virus
		A33016	Teste;Antistreptolysin O Titre
		A33017	Test;herpes simplex culture
		A33019	Test;herpes simplex serology
		A33020	Test;toxoplasmosis serology
		A33033	Test;swab MCS
		B33004	Test;microbiology,blood
		B33010	Test;serum immumnoglobulins
		D33003	Test;microbiology,digestive
		D33010	Test;hepatitis D serology
		D33011	Test;hepatitis E serology
		D33012	Test;rotavirus
		D33016	Test;hepatitis C antibody
		D33017	Test;hepatitis B surf antigen
		F33001	Test;microbiology,eye
		H33001	Test;microbiology,ear
		K33001	Test;microbiology,cardiovascular
		L33002	Test;microbiology,musculoskeletal
		N33001	Test;microbiology,neurological
		R33001	Culture;tuberculosis
		R33002	Culture;throat
		R33003	Test;microbiology,respiratory
		S33001	Test;microbiology,skin
		S33005	Test;varicella zoster serology
		S33006	Test;varicella zoster culture
		T33001	Test;microbiology,endoc/metabolic
		U33002	Test;microbiology,urology
		W33006	Test;microbiology,reproductive

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
		X33001	Test;microbiology;genital;female
		X33003	Culture;gonococcal;female
		Y33001	Test;microbiology;genital;male
		Y33003	Culture;gonococcal;male
		Y33004	Test;viral culture;genital;male
		Y33005	Test;urethral/penile swab
	Monospot	A33002	Test;monospot
		A33014	Test;Paul Bunnell
		A33031	Test;Epstein Barr virus serol
		A33032	Test;Epstein Barr virus
	Nose swab C&S	R33008	Test;nose swab C&S
	Pertussis	R33007	Test;pertussis
	Ross River fever	A33009	Test;Ross River fever
	Rubella	A33001	Test;rubella
	Skin swab C&S	S33003	Test;skin swab C&S
	Sputum C&S	R33005	Test;sputum MC&S
	Throat swab C&S	R33006	Test;throat swab C&S
	Urine MC&S	U33001	Test;culture;urine
		U33004	Test;urine MC&S
	Vaginal swab and C&S	X33005	Test;vaginal swab and C&S
	Venereal disease	A33010	Test;venereal disease
		A33022	Test;syphilis serology
Other NEC	Blood test	A34001	Test;blood
		B38001	Test;other lab;blood
		D34001	Test;blood;digestive
		F34001	Test;blood;eye
		H34001	Test;blood;ear
		K34002	Test;blood;cardiovascular
		L34003	Test;blood;musculoskeletal
		N34002	Test;blood;neurological
		P34001	Test;blood;psychological
		R34001	Test;blood;respiratory
		S34001	Test;blood;skin
		T34002	Test;blood;endocr/metabolic
		U34001	Test;blood;urology
		W34001	Test;blood;reproductive
		X34001	Test;blood;genital;female
		Y34001	Test;blood;genital;male

(continued)

Appendix 7 (continued): Pathology test orders—code groups from ICPC–2 and ICPC–2 PLUS

Main pathology group	Pathology subgroup	ICPC–2 PLUS code	ICPC–2 PLUS label
	Faeces test	A36001	Test;faeces
		D36002	Test;faeces;digestive
	Other test NEC	A38001	Test;other lab
		A38002	Pathology
		D38001	Test;other lab;digestive
		F38001	Test;other lab;eye
		H38001	Test;other lab;ear
		K38001	Test;other lab;cardiovascular
		L38001	Test;other lab;musculoskeletal
		N38001	Test;other lab;neurological
		P38001	Test;other lab;psychological
		R38001	Test;other lab;respiratory
		S38001	Test;other lab;skin
		T38001	Test;other lab;endocr/metabol
		U38001	Test;other lab;urology
		W38001	Test;other lab;reproductive
		X38001	Test;other lab;genital;female
		Y38001	Test;other lab;genital;male
		Z38001	Test;other lab;social
	Urinalysis	A35002	Urinalysis
	Urine test	A35001	Test;urine
		D35001	Test;urine;digestive
		P35001	Test;urine;psychological
		T35001	Test;urine;endocrine/metabolic
		U35002	Test;urine;urology
		W35001	Test;urine;reproductive
		X35001	Test;urine;genital;female
		Y35001	Test;urine;genital;male
	Simple test;other	B35001	Test;urine;blood
		D36003	Test;occult blood
		R32001	Test;Mantoux
		R32002	Test;tuberculin

Appendix 8 Imaging test orders—code groups from ICPC–2 and ICPC–2 PLUS

Imaging group	ICPC–2 PLUS code	ICPC–2 PLUS label
Plain	A41002	X-ray;chest
	A41006	X-ray;abdomen
	D41006	X-ray;oesophageal
	D41008	X-ray;digestive tract
	D41009	X-ray;mouth
	F41002	X-ray;eye
	H41002	X-ray;ear
	L41003	X-ray;bone(s)
	L41004	Plain X-ray;bone(s)
	L41013	X-ray;elbow
	L41014	X-ray;hand
	L41015	X-ray;wrist
	L41016	X-ray;knee
	L41017	X-ray;hip
	L41018	X-ray;neck
	L41019	X-ray;pelvis
	L41020	X-ray;shoulder
	L41021	X-ray;lumbosacral
	L41022	X-ray;cervical
	L41023	X-ray;thoracic
	L41024	X-ray;spinal
	L41025	X-ray;joint(s)
	L41026	X-ray;foot/feet
	L41027	X-ray;ankle
	L41028	X-ray;leg
	L41029	X-ray;ribs
	L41030	X-ray;face
	L41032	X-ray;arm
	N41004	X-ray;skull
	R41002	X-ray;sinus
	U41007	X-ray;urinary tract
	W41003	X-ray;uterus
	X41001	Mammography;female
	X41002	Mammography;request;female
	X41007	X-ray;breast;female

(continued)

Appendix 8 (continued): Imaging test orders—code groups from ICPC–2 and ICPC–2 PLUS

Imaging group	ICPC–2 PLUS code	ICPC–2 PLUS label
Contrast/ultrasound/CT scan	A41003	Test;US/CT/contrast
	A41004	Test;US/CT/contrast;abdomen
	A41005	Test;US/CT/contrast;chest
	A41008	MRI
	D41002	Test;US/CT/contrast;gallbladder
	D41004	Test;US/CT/contrast;oesophageal
	D41010	Test;US/CT/contrast;stomach/duodenum
	D41011	Test;US/CT/contrast;colon
	K41005	Angiography;coronary
	K41007	Angiography;cerebral
	K41008	Test;US/CT/contrast;vascular
	K41009	Test;US/CT/contrast;cardiac
	K41010	Test;US/CT/contrast;heart
	L41001	Arthrogram
	L41006	Test;US/CT/contrast;pelvis
	L41007	Test;US/CT/contrast;musculosk
	L41008	Test;US/CT/contrast;neck
	L41009	Test;US/CT/contrast;spine
	L41010	Test;US/CT/contrast;joint
	L41011	Test;US/CT/contrast;face
	L41012	Test;US/CT/contrast;extremity
	L41031	Test;US/CT/contrast;shoulder
	N41002	Test;US/CT/contrast;brain
	N41003	Test;US/CT/contrast;head
	T41002	Test;US/CT/contrast;endo/metab
	U41006	Test;US/CT/contrast;urin tract
	W41001	Test;US/CT/contrast;obstetric
	X41006	Test;US/CT/contrast;breast;female
	X41008	Test;US/CT/contrast;genital;female
	Y41002	Test;US/CT/contrast;prostate
	Y41003	Test;US/CT/contrast;scrotum
	Y41004	Test;US/CT/contrast;genital;male

(continued)

Appendix 8 (continued): Imaging test orders—code groups from ICPC–2 and ICPC–2 PLUS

Imaging group	ICPC–2 PLUS code	ICPC–2 PLUS label
Other	A41007	Imaging other
	A41009	Nuclear medicine
	A41010	Radiology
	A41011	Isotope scan
	K41001	Echocardiography
	K41003	Cardiogram
	K42002	Electrocardiogram
	K42005	Holter monitor
	K43003	Test;Doppler
	L40006	Arthroscopy;knee
	L41002	Scan;bone(s)
	L43003	Test;bone marrow density
	N41001	Radiology;diagnostic;neurolog
	U41001	Pyelogram;intravenous

Glossary

Aboriginal	The patient identifies himself or herself as an Aboriginal person.
Activity level	Number of general practice Medicare items claimed during the previous three or twelve months by a participating general practitioner.
Allied health professionals	Those who provide clinical and other specialised services in the management of patients, including physiotherapists, occupational therapists, dietitians and pharmacists.
Chapters	The main divisions within ICPC–2 PLUS: there are 17 chapters primarily representing the body systems.
Complaint	A symptom or disorder expressed by the patient when seeking care.
Component	In ICPC–PLUS there are seven components which act as a second axis across all chapters.
Consultation	See *Encounter*
Diagnosis / problem	A statement of the provider's understanding of a health problem presented by a patient, family or community. GPs are instructed to record at the most specific level possible from the information available at the time. It may be limited to the level of symptoms.
• new problem	The first presentation of a problem, including the first presentation of a recurrence of a previously resolved problem but excluding the presentation of a problem first assessed by another provider.
• old problem	A previously assessed problem which requires ongoing care. Includes follow-up for a problem or an initial presentation of a problem previously assessed by another provider.
Drug	See *Medication*
Encounter (enc)	Any professional interchange between a patient and a general practitioner.
• indirect	Encounter where there is no face-to-face meeting between the patient and the general practitioner but a service is provided (e.g.prescription, referral).
• direct	Encounter where there is a face-to-face meeting of the patient and the general practitioner. Direct encounters can be further divided into encounters covered by:

(continued)

– Medicare	
– surgery consultations	encounters identified by any one of MBS item numbers 3; 23; 36; 44
– home visits	encounters identified by any one of MBS item numbers 4; 24; 37; 47
– hospital encounter	encounters identified by any one of MBS item numbers 19; 33; 40; 50
– nursing home visits	encounters identified by any one of MBS item numbers 20; 35; 43; 51
– other institutional visits	encounters identified by any one of MBS item numbers 13; 25; 38; 40
– other MBS encounters	encounters identified by an MBS item number which does not identify place of encounter
– Workers compensation	encounters paid by workers' compensation insurance
– Other paid	encounters paid from another source (e.g. State).
General practitioner (GP)	A medical practitioner who provides primary comprehensive and continuing care to patients and their families within the community' (Royal Australian College of General Practitioners).
Grouper	Multiple ICPC–2 or ICPC–2 PLUS codes which are grouped together for purposes of analysis.
Medication	Medication which is prescribed, advised for over-the-counter purchase or provided by the GP at the encounter.
Medication status	
• new	The medication prescribed / advised / provided at the encounter is being used for the management of the problem for the first time.
• continuation	The medication prescribed / advised / provided at the encounter is a continuation or repeat of previous therapy for this problem.
MIMS	A widely distributed bi-monthly index of medications in medicine.
Morbidity	Any departure, subjective or objective, from a state of physiological wellbeing. In this sense, sickness, illness and morbid conditions are synonymous.
Patient status	
• new	The patient has not been seen before in the practice.
• old	The patient has attended the practice before.
Problem managed	See *Diagnosis/problem*

(continued)

Provider	A person to whom a patient has access when contacting the health care system.
Reasons for encounter (RFEs)	The subjective reasons given by the patient for seeing or contacting the general practitioner. These can be expressed in terms of symptoms, diagnoses or the need for a service.
Recognised GP	A medical practitioner who is: vocationally recognised under Section 3F of the Health Insurance Act, or a holder of the Fellowship of the Royal Australian College of General Practitioners who participates in, and meets the requirements for, quality assurance and continuing medical education as defined in the RACGP Quality Assurance and Continuing Medical Education Program, or undertaking an approved placement in general practice as part of a Training Program for general practice leading to the award of the Fellowship of the Royal Australian College of General Practitioners or undertaking an approved placement in general practice as part of some other Training Program recognised by the RACGP as being of equivalent standard. (Medicare Benefits Schedule book, 1 November 1998)
Referral	The process by which the responsibility for part or all of the care of a patient is temporarily transferred to another health care provider. Only new referrals to specialist, allied health professionals, and for hospital and nursing home admissions arising at a recorded encounter are included. Continuation referrals are not included. Multiple referrals can be recorded at any one encounter.
Rubric	An individual term attached to a code in ICPC–2
Torres Strait Islander	The patient identifies himself or herself as a Torres Strait Islander.
Veterans' Affairs Gold	A person who holds a Gold Card from the Department of Veterans' Affairs.
Veterans' Affairs White	A person who holds a White Card from the Department of Veterans' Affairs.
Work-related problem	Irrespective of the source of payment for the consultation, it is likely in the GP's view that the problem has resulted from work-related activity or workplace exposures or that a pre-existing condition has been significantly exacerbated by work activity or workplace exposure.

Abbreviations

AIHW	Australian Institute of Health and Welfare
ATC	Anatomical Therapeutic Chemical (classification)
AUDIT	Alcohol Use Disorders Identification Test
BEACH	Bettering the Evaluation and Care of Health
BMI	Body mass index
BMMS	Better Medication Management System
BP	Blood pressure
CAPS	Coding Atlas for Pharmaceutical Substances
CI	Confidence interval (in this report 95% CIs are used)
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
COURT	Computed tomography
CVS	Cardiovascular system
DHAC	Commonwealth Department of Health and Aged Care
ECG	Electrocardiogram
EHRs	Electronic health records
Enc	Encounter
ENT	Ear, nose and throat
ESR	Erythrocyte sedimentation rate
EUC	Electrolytes, urea, creatinine
FBC	Full blood count
FMRC	Family Medicine Research Centre, Department of General Practice, The University of Sydney
GP	General practitioner
GPSCU	General Practice Statistics and Classification Unit, University of Sydney, a collaborating unit of the Australian Institute of Health and Welfare
HbA1c	Glycohaemoglobin whole blood test
HIC	Health Insurance Commission
HRT	Hormone replacement therapy
ICPC	International Classification of Primary Care
ICPC–2	International Classification of Primary Care (Version 2)
ICPC–2 PLUS	An extended vocabulary of terms classified according to ICPC–2
IHD	Ischaemic heart disease
LCI	Lower confidence interval
MBS	Medicare Benefits Schedule

MC&S	Microscopy culture and sensitivity
NEC	Not elsewhere classified
NOS	Not otherwise specified
NESB	The patient reports coming from a non-English-speaking background, i.e. a language other than English is spoken at home.
NHMRC	National Health and Medical Research Council
NOS	Not otherwise specified
NSAID	Non-steroidal anti-inflammatory medications
OA	Osteoarthritis
OTCs	Medications advised for over-the-counter purchase
PBS	Pharmaceutical Benefits Scheme
PDD	Prescribed daily dose
QA	Quality assurance (in this case the Quality Assurance Program of the Royal Australian College of General Practitioners)
RACGP	Royal Australian College of General Practitioners
RFE(s)	Reason for encounter(s) (see Glossary)
RRMA	Rural, remote and metropolitan area classification
SAND	Supplementary analysis of nominated data
SRS	Simple random sample
UCI	Upper confidence interval
URTI	Upper respiratory tract infection
UTI	Urinary tract infection
WHO	World Health Organization
WONCA	World Organization of Family Doctors

Bibliography

Australian Bureau of Statistics 1996. National Health Survey users guide Australia 1995. Canberra: AGPS.

Australian Institute of Health and Welfare (AIHW) 2000. Australia's health 2000: the seventh biennial health report of the Australian Institute of Health and Welfare. AIHW Cat. No. 19. Canberra: AIHW.

Barsky AJ 1981. Hidden reasons why some patients visit doctors. Annals of Internal Medicine 94: 492 – 498.

Beardon PH, McGilchrist MM, McKendrick AD, McDevitt DG & MacDonald TM 1993. Primary non-compliance with prescribed medication in primary care [see comments]. British Medical Journal 307: 846 – 848.

Brage S, Haldorsen EM, Johannesen TS, Ursin H & Tellnes G 1995. Assessment of sickness certification and concepts of musculoskeletal disease and illness in the general population. Scandinavian Journal of Primary Health Care 13: 188 – 196.

Bridges-Webb C, Britt H, Miles DA, Neary S, Charles J & Traynor V 1992. Morbidity and treatment in general practice in Australia 1990 – 1991. Medical Journal of Australia 157: S1 – S56.

Bridges-Webb C & RACGP 1976. The Australian general practice morbidity and prescribing survey 1969 to 1974. Medical Journal of Australia 2 (Spec Suppl No. 1).

Britt H 1997a. A measure of the validity of the ICPC in the classification of reasons for encounter. Journal of Informatics in Primary Care, November, 8 – 12.

Britt H 1997b. A new coding tool for computerised clinical systems in primary care—ICPC plus [see comments]. Australian Family Physician 26 (Suppl 2): S79 – S82.

Britt H 1998. Reliability of central coding of patient reasons for encounter in general practice, using the International Classification of Primary Care. Journal of Informatics in Primary Care 3 – 7.

Britt H, Angelis M & Harris E 1998. The reliability and validity of doctor-recorded morbidity data in active data collection systems. Scandinavian Journal of Primary Health Care 16: 50 – 55.

Britt H, Bridges-Webb C, Sayer GP, Neary S, Traynor V & Charles J 1994. The diagnostic difficulties of abdominal pain. Australian Family Physician 23(3): 375 – 381.

Britt H, Harris M, Driver B, Bridges-Webb C, O'Toole B & Neary S 1992. Reasons for encounter and diagnosed health problems: convergence between doctors and patients. Family Practice 9: 191 – 194.

Britt H, Meza RA & Del Mar C 1996. Methodology of morbidity and treatment data collection in general practice in Australia: a comparison of two methods. Family Practice 13: 462 – 467.

Britt H, Miller GC, McGeechan K & Sayer GP 1999a [cited 30.10.2000]. Pathology ordering by general practitioners in Australia 1998. AIHW Cat. No. GEP 4. Canberra: Department of Health and Aged Care. Available from Internet: http://www.health.gov.au:80/haf/docs/pathorder.htm

Britt H, Sayer GP, Miller GC, Charles J, Scahill S, Horn F & Bhasale A 1999b. BEACH Bettering the Evaluation and Care of Health: A study of general practice activity, six-month interim report. AIHW Cat. No. GEP 1. General Practice Series no. 1. Canberra: Australian Institute of Health and Welfare.

Britt H, Sayer GP, Miller GC, Charles J, Scahill S, Horn F, Bhasale A & McGeechan K 1999c. General practice activity in Australia 1998-99. AIHW Cat. No. GEP 2. General Practice Series no. 2. Canberra: Australian Institute of Health and Welfare.

Britt HC & Miller GC 2000. The BEACH study of general practice. Editorial. Medical Journal of Australia 173: 63 – 64.

Calcino GF 1993. Sampling from the HIC data set. In: Proceedings of General Practice Evaluation Program: 1993 Work-In-Progress Conference. Canberra: Department of Health, Local Government and Community Services, 31 – 7.

Centre for Drug and Alcohol Studies 1993. The alcohol use disorders identification test. Phamphlet No. 1/93. Sydney: Royal Prince Alfred Hospital and the University of Sydney.

Classification Committee of the World Organization of Family Doctors (WICC) 1997. ICPC-2: International Classification of Primary Care. Oxford: Oxford University Press.

Commonwealth Department of Health and Aged Care (DHAC) 1996. General practice in Australia: 1996. Canberra: DHAC, 1–347.

Commonwealth Department of Health and Aged Care (DHAC) 2000a. General practice in Australia: 2000. Canberra: DHAC, 1–566.

Commonwealth Department of Health and Aged Care (DHAC) 2000b [cited 30.10.2000]. Better Medication Management System. Canberra: DHAC. Available from Internet: http://www.health.gov.au:80/pubs/olap/activ/betmed.htm

Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare (DHAC &AIHW) 1999. National Health Priority Areas report: cardiovascular health 1998. AIHW Cat. No. PHE 9. Canberra: DHAC and AIHW.

Cost B, Bruijnzeels MA, van der Schoot AT & Hoes AW 2000. Incidence and management of heart failure in general practice in the Netherlands. In: Proceedings of The 15th WONCA World Conference. Dublin: WONCA, 181.

Crombie DL 1990. The problem of variability in general practitioner activities. Yearbook of research and development London: Her Majesty's Stationary Office, 21-4.

Driver B, Britt H, O'Toole B, Harris M, Bridges-Webb C & Neary S 1991. How representative are patients in general practice morbidity surveys ? Family Practice 8: 261 – 268.

Gardner TL, Dovey SM, Tilyard MW & Gurr E 1996. Differences between prescribed and dispensed medications [see comments]. New Zealand Medical Journal 109: 69 – 72.

Gehlbach SH 1979. Comparing methods of data collection in an academic ambulatory practice. Journal of Medical Education 54: 730 – 732.

Health Insurance Commission (HIC) 1999. Health Insurance Commission annual report. Canberra: HIC.

Hill DJ, White VM & Scollo MM 1998. Smoking behaviours in Australian adults in 1995: trends and concerns. Medical Journal of Australia 168: 209 – 213.

Kish L 1965. Survey sampling. New York: John Wiley & Sons.

Lawrence M, Jones L, Lancaster T, Daly E & Banks E 1999. Hormone replacement therapy: patterns of use studied through British general practice computerized records. Family Practice 16: 335 – 342.

Mattick RP & Jarvis T 1993. An outline for the management of alcohol problems: quality assurance project. Canberra: AGPS.

McDowell I & Newell C 1996. Measuring health: A guide to rating scales and Questionnaires. New York: Oxford University Press.

McWhinney IR 1986. Are we on the brink of a major transformation of clinical method? Canadian Medical Association Journal 135: 873 – 878.

Meza RA, Angelis M, Britt H, Miles DA, Seneta E & Bridges-Webb C 1995. Development of sample size models for national general practice surveys. Australian Journal of Public Health 19: 34 – 40.

MIMS Australia 1999. MIMS bi-monthly. Sydney: MIMS 36(2).

National Morbidity Survey Sub-committee 1966. Report on a national morbidity survey 1962-63. Canberra: National Health and Medical Research Council.

Norton PG, Dunn EV & Soberman L 1994. Family practice in Ontario. How physician demographics affect practice patterns. Canadian Family Physician 40: 249 – 256.

SAS Institute Inc 1996. SAS Proprietary Software Release 6.12.

Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. 1993. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption—II. Addiction 88: 791 – 804.

Sayer GP 1999. Estimating and generalising with clustered sampling in general practice. Australian Family Physician 28: S32 – S34.

Sayer GP, Britt H, Horn F, Bhasale A, McGeechan K, Charles J, Miller GC, Hull B & Scahill S 2000. Measures of health and health care delivery in general practice in Australia. AIHW Cat. No. GEP3. General Practice Series no. 3. Canberra: Australian Institute of Health and Welfare.

Schappert SM 1998. Ambulatory care visits to physician's offices, hospital outpatient departments and emergency departments: United States 1996. Vital Health Statistics 13. Washington: National Center for Health Statistics, 134.

Schroll H, Houmand A & Kragstrup J 1998. Methodes for registration and analysis diagnose classified episodes of care in general practice. In: Proceedings of The 15th WONCA World Conference Dublin: WONCA, 127.

Stewart MA, McWhinney IR & Buck CW 1975. How illness presents: a study of patient behaviour. Family Practice 2: 411 – 414.

Tilyard MW, Dovey SM & Spears GF 1995. Biases in estimates from the RNZCGP computer research group. New Zealand Medical Journal 108: 118 – 121.

Ware JE & Sherbourne CD 1992. The MOS 36 items Short-Form Health Survey (SF-36) I. Conceptual framework and item selection. Medical Care 30: 473 – 483.

World Health Organization Collaborating Centre for Drug Statistics Methodology (WHO) 1997. Anatomical Therapeutic Chemical (ATC) classification index with Defined Daily Doses (DDDs). Oslo: WHO.

Yamada T et al. 1998. Elderly care in Japan—ICPC data analysis. In: Proceedings of The 15th WONCA World Conference Dublin: WONCA, 163.