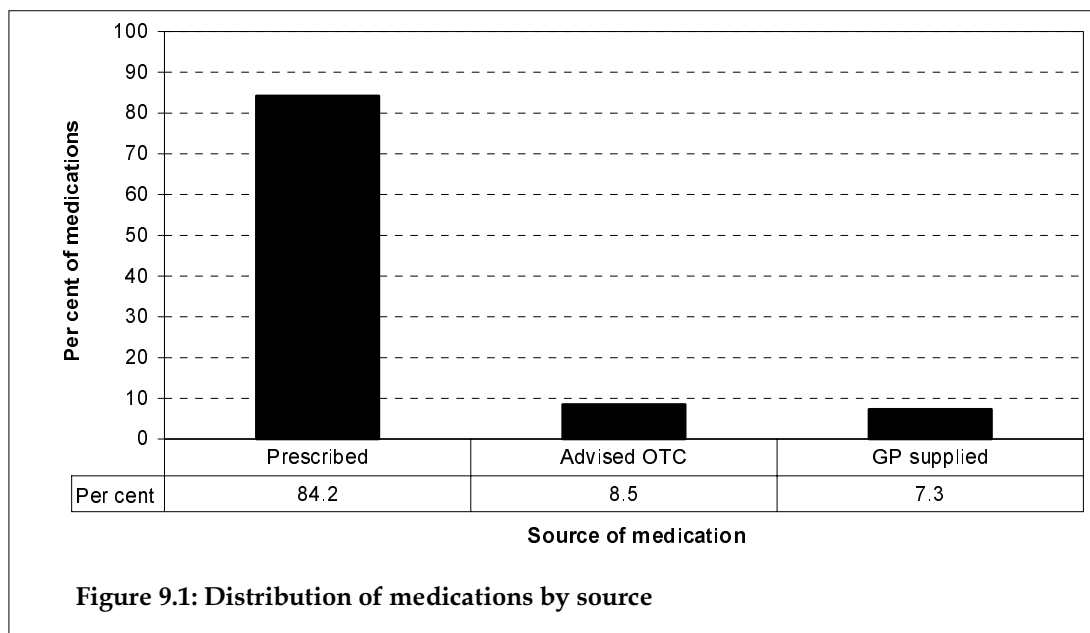# 9 Medications

## 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,[14] (see Chapter 2—Methods). Although analysis can be conducted at brand name level, results in this chapter are reported only at the generic level.

| | Prescribed | Advised OTC | GP supplied |
|---|---|---|---|
| Per cent | 84.2 | 8.5 | 7.3 |

Source of medication

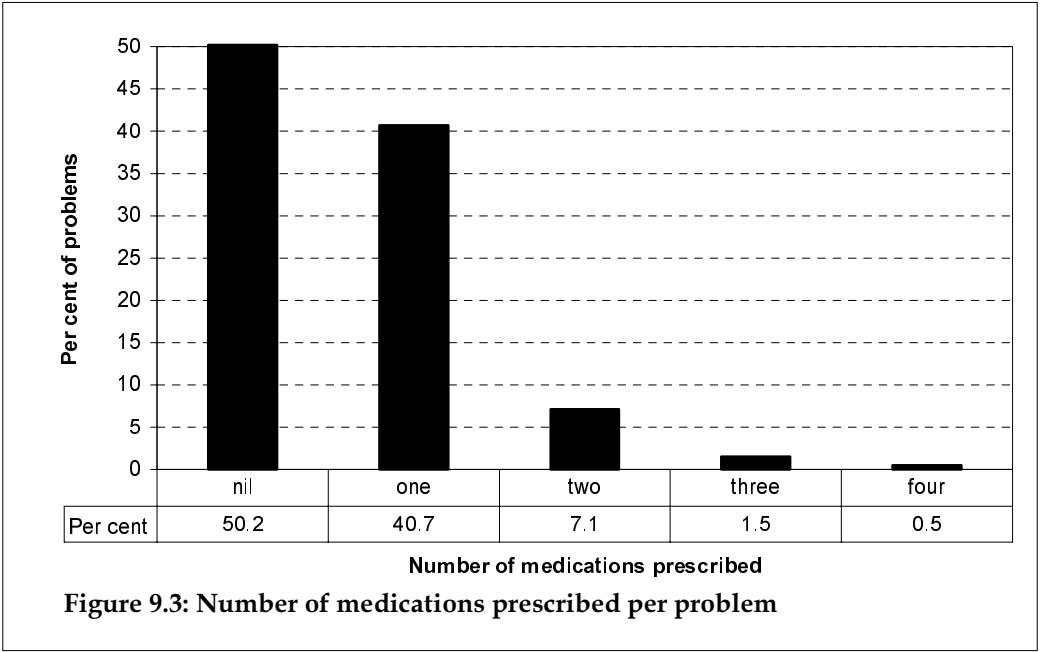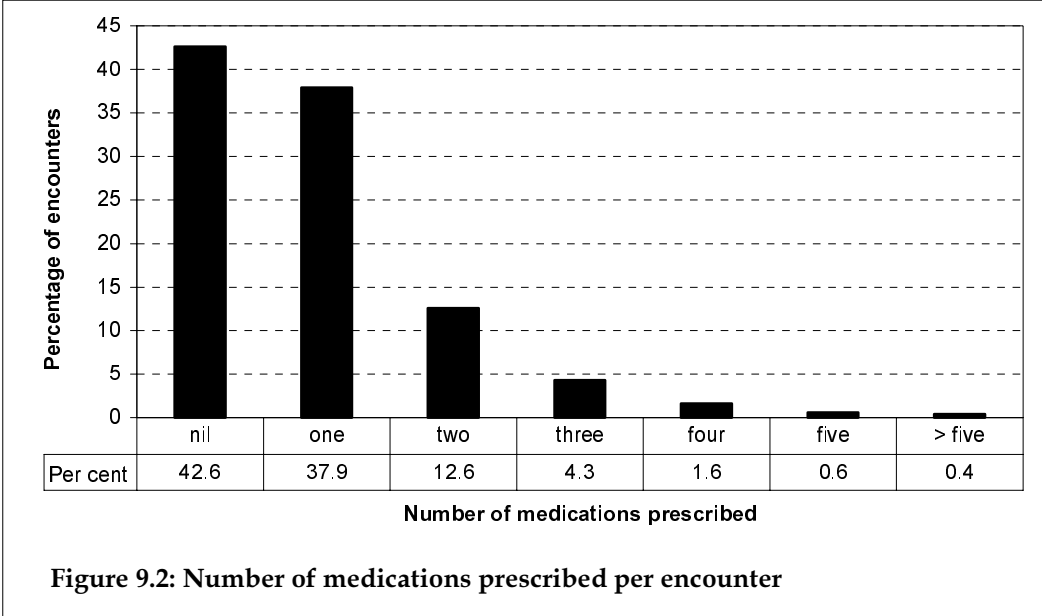**Figure 9.1: Distribution of medications by source**

Overall, GPs recorded 85.0% of medications by brand name and 15.0% by their generic (non-proprietary) name. There were 86.3% of prescribed medications, 80.6% of GP supplied and 76.1% of over-the-counter medications recorded by their brand names.

A total of 101,350 medications were recorded during this year of the BEACH survey, at a rate of 105 per 100 encounters and 73 per 100 problems managed. Most medications (84.2%) were prescribed. However, 8.5% of medications were recommended by the GP for purchase over-the-counter and 7.3% were supplied to the patient by the GP (Figure 9.1). Extrapolated to the whole general practice population, GPs recommended 8.9 million medications to their patients for purchase over-the-counter at 8.5 million encounters per annum. GPs also supplied 7.6 million medications directly to the patient at 5.8 million encounters.

# 9.2 Prescribed medications

There were 85,332 prescriptions recorded, at a rate of 88.0 per 100 encounters and 61.4 per 100 problems managed. At least one prescription was recorded at 57.4% of encounters and for half (49.8%) of the problems managed.



| Number of medications prescribed | nil | one | two | three | four | five | > five |
|---|---|---|---|---|---|---|---|
| Per cent | 42.6 | 37.9 | 12.6 | 4.3 | 1.6 | 0.6 | 0.4 |

**Figure 9.2: Number of medications prescribed per encounter**



| Number of medications prescribed | nil | one | two | three | four |
|---|---|---|---|---|---|
| Per cent | 50.2 | 40.7 | 7.1 | 1.5 | 0.5 |

**Figure 9.3: Number of medications prescribed per problem**

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

No medications were prescribed at 42.6% of encounters, one medication at 37.9% of encounters, two at 12.6% and three at 4.3%. Four or more medications were prescribed at

only 2.6% of encounters (Figure 9.2). No prescription was given for half (50.2%) of all problems managed, one for 40.7%, two for 7.1% and three or more for 2.0% (Figure 9.3).

## Number of repeats

GPs were also asked to record the number of repeat prescriptions ordered for each prescribed medication. In previous BEACH years, there was a very high level of missing data in this field (up to 50.0%). However, with an improved instruction sheet which asked participating GPs to indicate with a zero or dash if there were no repeats, the missing rate dropped to just over one-third. For the 55,591 prescriptions for which data were available, the distribution of the specified number of repeats (from specified zero to 6+) is provided in Figure 9.4. For 38.3% of these prescriptions the GP specified that no repeats had been prescribed and for 26.4% 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. The ordering of one or two repeats (17.6% and 13.1%) was also not unusual.
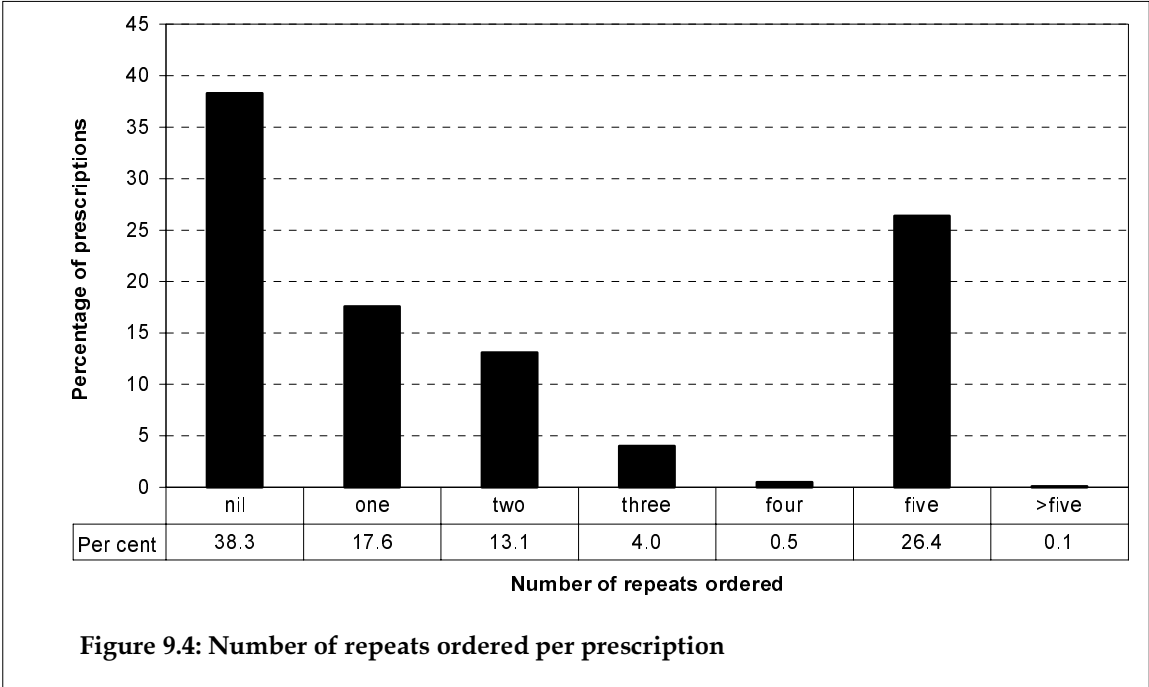


| | nil | one | two | three | four | five | >five |
|---|---|---|---|---|---|---|---|
| Per cent | 38.3 | 17.6 | 13.1 | 4.0 | 0.5 | 26.4 | 0.1 |

Number of repeats ordered

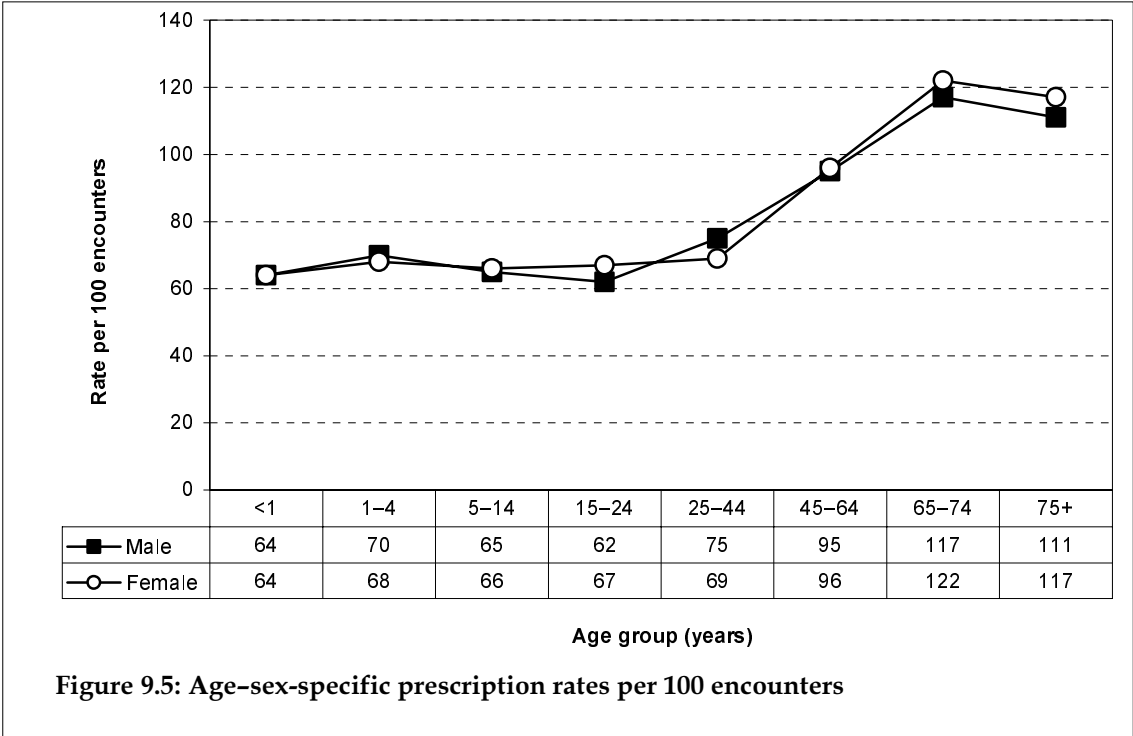**Figure 9.4: Number of repeats ordered per prescription**

The level of missing data has dropped considerably from previous years (due to improved instructions to the GPs) but it is still difficult to extrapolate reliably to the total number of intended prescriptions (i.e. original plus repeats). However, if it is assumed that the missing data are random and distributed across all medication types in a similar manner to those for which repeat status was recorded, this would suggest that the participating GPs intended a total 217,726 medications to be dispensed as a result of these prescriptions. This extrapolates to about 218 million orders by recognised GPs in Australia per year. However, in the 2001 calendar year 138,446,840 dispensed prescriptions from recognised GPs were recorded in the PBS data (personal communication John Dudley, DoHA from HIC data).
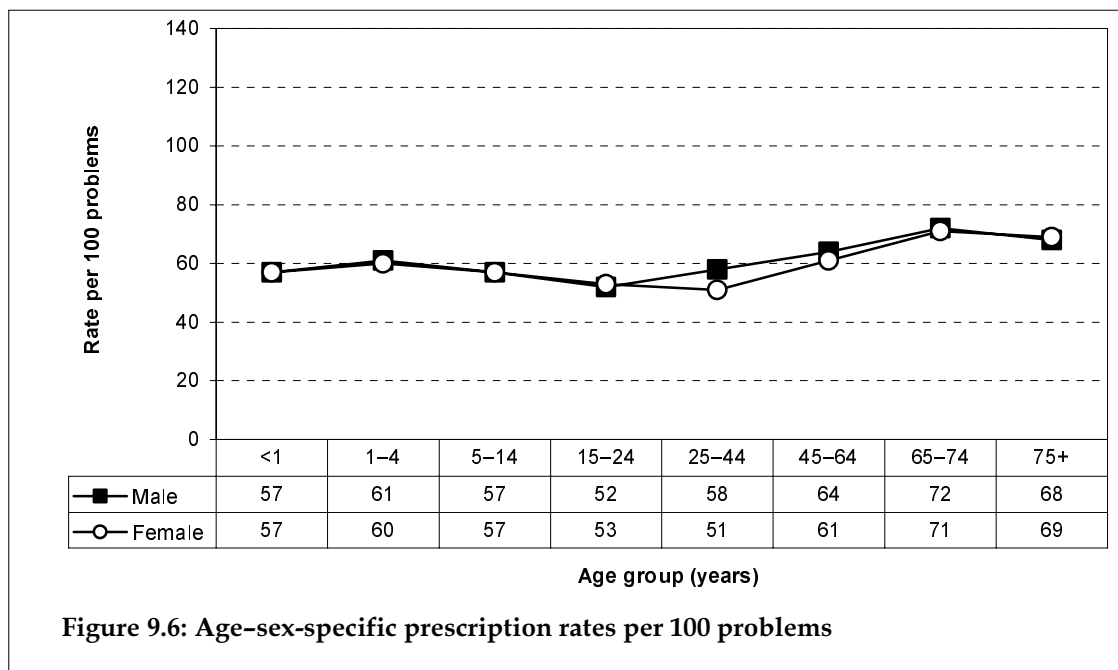
While it could be expected that some prescriptions are not presented for dispensing, the non-redemption rates for prescriptions in overseas studies have varied between 5.2% in the United Kingdom[27] and 13% in a more comparable health system in New Zealand.[28] These non-redemption rates would not be sufficient to explain the difference here. The main cause of this discrepancy appears to be the lack of recording in the Pharmaceutical Benefits Scheme (PBS) data of medications that fall below the subsidy threshold and the lack of data on private prescriptions. This suggests that PBS data should not be used alone to monitor significant areas of general practice medication management.

## Age–sex-specific rates of prescribed medications

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

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



| | <1 | 1–4 | 5–14 | 15–24 | 25–44 | 45–64 | 65–74 | 75+ |
|---|---|---|---|---|---|---|---|---|
| Male | 64 | 70 | 65 | 62 | 75 | 95 | 117 | 111 |
| Female | 64 | 68 | 66 | 67 | 69 | 96 | 122 | 117 |

Age group (years)

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

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

| | <1 | 1–4 | 5–14 | 15–24 | 25–44 | 45–64 | 65–74 | 75+ |
|---|---|---|---|---|---|---|---|---|
| Male | 57 | 61 | 57 | 52 | 58 | 64 | 72 | 68 |
| Female | 57 | 60 | 57 | 53 | 51 | 61 | 71 | 69 |

Age group (years)

# Types of medications prescribed

## Medications prescribed by major groups

The distribution of prescribed medications by major groups is presented graphically in Figure 9.7. Antibiotics were the most commonly prescribed group, representing 16.3% of all prescriptions. These were followed by cardiovascular (15.8%), central nervous system (12.1%), psychological (8.4%), musculoskeletal (7.0%) and respiratory (6.6%) medications.



| | Antibiotic | Cardiovascular | Central nervous system | Psychological | Musculo-skeletal | Respiratory |
|---|---|---|---|---|---|---|
| Per cent | 16.3 | 15.8 | 12.1 | 8.4 | 7.0 | 6.6 |

Medication group

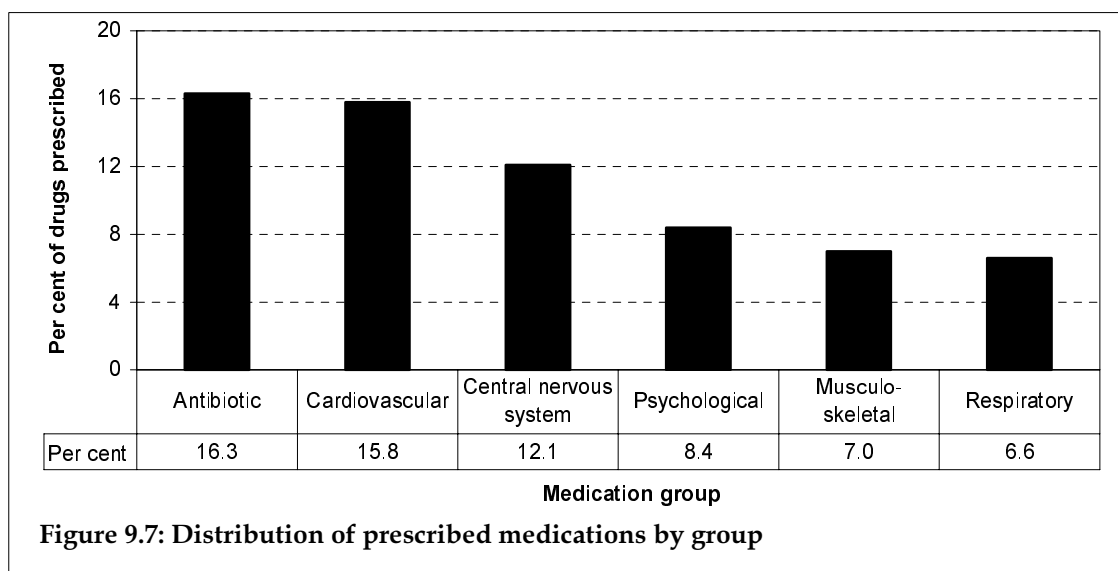**Figure 9.7: Distribution of prescribed medications by group**

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 4.5 per 100 encounters. Amoxycillin and

amoxycillin + potassium clavulanate were the most frequently prescribed generic drugs in that subgroup. Cephalosporins were prescribed almost as often, at 3.2 per 100 encounters.

Within cardiovascular medications, anti-hypertensives accounted for more than half the prescriptions (7.5 per 100 encounters). Other cardiovascular medications, principally lipid-lowering agents, contributed 2.7 prescriptions per 100 encounters. Beta-blockers and anti-angina medications were also frequently recorded.

Prescribed central nervous system medications were mainly simple analgesics (3.8 per 100 encounters) and compound analgesics (2.7). The psychological medications most frequently prescribed were anti-depressants. Musculoskeletal drugs were prescribed at a rate of 6.1 per 100 encounters. These were mainly non-steroidal anti-inflammatory drugs, in particular, celecoxib and rofecoxib.

Hormones were also commonly prescribed, with hypoglycaemics the most frequent followed by sex hormones and anabolic agents. In other groups, medications for the control or prevention of asthma were the most common in the respiratory group. Immunisation accounted for most of the allergy/immune system group, with influenza vaccine prescribed at a rate of 1.5 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 and generic medication**

| Group | Subgroup | Generic | Number | Per cent of scripts (*n*=85,332) | Rate per 100 ens[a] (*n*=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|---|
| Antibiotics | | | 13,950 | 16.3 | 14.4 | 13.9 | 14.9 |
| | Broad-spectrum penicillin | | 4,386 | 5.1 | 4.5 | 4.2 | 4.8 |
| | | Amoxycillin | 2,825 | 3.3 | 2.9 | 2.7 | 3.2 |
| | | Amoxycillin/potass.clavulanate | 1,506 | 1.8 | 1.6 | 1.3 | 1.8 |
| | Cephalosporins | | 3,115 | 3.7 | 3.2 | 3.0 | 3.5 |
| | | Cephalexin | 1,966 | 2.3 | 2.0 | 1.8 | 2.2 |
| | | Cefaclor monohydrate | 1,053 | 1.2 | 1.1 | 0.8 | 1.3 |
| | Other antibiotics | | 2,874 | 3.4 | 3.0 | 2.8 | 3.2 |
| | | Roxithromycin | 1,367 | 1.6 | 1.4 | 1.2 | 1.6 |
| | | Erythromycin | 577 | 0.7 | 0.6 | 0.4 | 0.8 |
| | Penicillin | | 1,421 | 1.7 | 1.5 | 1.2 | 1.7 |
| | | Penicillin V (phen-meth benz) | 463 | 0.5 | 0.5 | 0.1 | 0.8 |
| | Tetracyclines | | 951 | 1.1 | 1.0 | 0.8 | 1.2 |
| | | Doxycycline | 766 | 0.9 | 0.8 | 0.6 | 1.0 |
| | Anti-infectives | | 614 | 0.7 | 0.6 | 0.5 | 0.8 |
| Cardiovascular | | | 13,487 | 15.8 | 13.9 | 13.2 | 14.7 |
| | Anti-hypertensives | | 7,310 | 8.6 | 7.5 | 7.1 | 8.0 |
| | | Irbesartan | 755 | 0.9 | 0.8 | 0.6 | 0.9 |
| | | Perindopril | 724 | 0.8 | 0.7 | 0.6 | 0.9 |
| | | Amlodipine | 699 | 0.8 | 0.7 | 0.6 | 0.9 |
| | | Ramipril | 596 | 0.7 | 0.6 | 0.4 | 0.8 |
| | | Irbesartan/hydrochlorothiazide | 503 | 0.6 | 0.5 | 0.3 | 0.7 |

*(continued)*

| Group | Subgroup | Generic | Number | Per cent of scripts (*n*=85,332) | Rate per 100 encs[a] (*n*=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|---|
| | Other CVS drugs | | 2,598 | 3.0 | 2.7 | 2.5 | 2.9 |
| | | Atorvastatin | 992 | 1.2 | 1.0 | 0.9 | 1.2 |
| | | Simvastatin | 908 | 1.1 | 0.9 | 0.8 | 1.1 |
| | Beta-blockers | | 1,635 | 1.9 | 1.7 | 1.5 | 1.9 |
| | | Atenolol | 962 | 1.1 | 1.0 | 0.8 | 1.2 |
| | Anti-angina | | 1,047 | 1.2 | 1.1 | 0.9 | 1.3 |
| CNS | | | 10,345 | 12.1 | 10.7 | 10.1 | 11.2 |
| | Simple analgesics | | 3,663 | 4.3 | 3.8 | 3.4 | 4.1 |
| | | Paracetamol | 2,984 | 3.5 | 3.1 | 2.7 | 3.4 |
| | | Aspirin | 648 | 0.8 | 0.7 | 0.5 | 0.8 |
| | Compound analgesics | | 2,634 | 3.1 | 2.7 | 2.5 | 2.9 |
| | | Paracetamol/codeine | 2,170 | 2.5 | 2.2 | 2.0 | 2.4 |
| | Narcotic analgesics | | 1,943 | 2.3 | 2.0 | 1.6 | 2.4 |
| | | Tramadol | 661 | 0.8 | 0.7 | 0.4 | 0.9 |
| | Anti-emetic/anti-nauseants | | 1,342 | 1.6 | 1.4 | 1.2 | 1.5 |
| | | Prochlorperazine | 638 | 0.7 | 0.7 | 0.5 | 0.8 |
| | | Metoclopramide | 617 | 0.7 | 0.6 | 0.5 | 0.8 |
| | Anti-convulsants | | 526 | 0.6 | 0.5 | 0.3 | 0.7 |
| Psychological | | | 7,167 | 8.4 | 7.4 | 7.0 | 7.8 |
| | Anti-depressants | | 2,811 | 3.3 | 2.9 | 2.7 | 3.1 |
| | | Sertraline | 550 | 0.6 | 0.6 | 0.4 | 0.7 |
| | | Citalopram | 429 | 0.5 | 0.4 | 0.3 | 0.6 |
| | Anti-anxiety agents | | 1,866 | 2.2 | 1.9 | 1.7 | 2.2 |
| | | Diazepam | 1,006 | 1.2 | 1.0 | 0.8 | 1.3 |
| | | Oxazepam | 664 | 0.8 | 0.7 | 0.5 | 0.9 |
| | Sedatives/hypnotics | | 1,848 | 2.2 | 1.9 | 1.7 | 2.1 |
| | | Temazepam | 1,301 | 1.5 | 1.3 | 1.2 | 1.5 |
| | Anti-psychotics | | 641 | 0.8 | 0.7 | 0.4 | 0.9 |
| Musculoskeletal | | | 5,933 | 7.0 | 6.1 | 5.8 | 6.4 |
| | NSAID | | 5,120 | 6.0 | 5.3 | 5.0 | 5.5 |
| | | Celecoxib | 1,365 | 1.6 | 1.4 | 1.3 | 1.6 |
| | | Rofecoxib | 1,191 | 1.4 | 1.2 | 1.0 | 1.5 |
| | | Diclofenac sodium systemic | 847 | 1.0 | 0.9 | 0.7 | 1.1 |
| Hormones | | | 5,925 | 6.9 | 6.1 | 5.8 | 6.4 |
| | Hypoglycaemic agents | | 2,129 | 2.5 | 2.2 | 1.9 | 2.5 |
| | | Metformin | 909 | 1.1 | 0.9 | 0.8 | 1.1 |
| | | Gliclazide | 467 | 0.5 | 0.5 | 0.3 | 0.7 |

*(continued)*

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

| Group | Subgroup | Generic | Number | Per cent of scripts (*n*=85,332) | Rate per 100 encs[a] (*n*=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|---|
| | Sex hormones/anabolic agents | | 1,897 | 2.2 | 2.0 | 1.8 | 2.1 |
| | Cortico-steroids | | 1,300 | 1.5 | 1.3 | 1.2 | 1.5 |
| | | Prednisolone | 478 | 0.6 | 0.5 | 0.3 | 0.7 |
| | Other hormones | | 597 | 0.7 | 0.6 | 0.5 | 0.8 |
| | | Thyroxine | 515 | 0.6 | 0.5 | 0.4 | 0.7 |
| Respiratory | | | 5,600 | 6.6 | 5.8 | 5.3 | 6.2 |
| | Bronchodilator/spasm relaxants | | 2,773 | 3.2 | 2.9 | 2.6 | 3.1 |
| | | Salbutamol | 1,917 | 2.2 | 2 | 1.8 | 2.2 |
| | | Terbutaline | 429 | 0.5 | 0.4 | 0.2 | 0.7 |
| | Asthma preventives | | 2,114 | 2.5 | 2.2 | 2.0 | 2.4 |
| | | Iticasone/salmeterol | 600 | 0.7 | 0.6 | 0.4 | 0.8 |
| | | Budesonide | 435 | 0.5 | 0.4 | 0.3 | 0.6 |
| Allergy, immune system | | | 4,316 | 5.1 | 4.5 | 4.1 | 4.8 |
| | Immunisation | | 3,739 | 4.4 | 3.9 | 3.5 | 4.3 |
| | | Influenza virus vaccine | 1,442 | 1.7 | 1.5 | 0.8 | 2.2 |
| | Anti-histamines | | 428 | 0.5 | 0.4 | 0.2 | 0.7 |
| Skin | | | 3,992 | 4.7 | 4.1 | 3.9 | 4.4 |
| | Topical steroids | | 2,757 | 3.2 | 2.8 | 2.6 | 3 |
| | | Betamethasonetopical | 833 | 1.0 | 0.9 | 0.7 | 1.0 |
| | | Mometasone | 741 | 0.9 | 0.8 | 0.6 | 0.9 |
| | | Hydrocortisone topical | 489 | 0.6 | 0.5 | 0.3 | 0.7 |
| | Anti-infective skin | | 652 | 0.8 | 0.7 | 0.5 | 0.8 |
| | Other skin | | 560 | 0.7 | 0.6 | 0.4 | 0.8 |
| Digestive | | | 3,721 | 4.4 | 3.8 | 3.6 | 4.1 |
| | Anti-ulcerants | | 2,300 | 2.7 | 2.4 | 2.2 | 2.5 |
| | | Omeprazole | 821 | 1.0 | 0.8 | 0.7 | 1.0 |
| | | Ranitidine | 618 | 0.7 | 0.6 | 0.5 | 0.8 |
| | Anti-diarrhoeals | | 511 | 0.6 | 0.5 | 0.3 | 0.7 |
| Blood | | | 1,787 | 2.1 | 1.8 | 1.7 | 2.0 |
| | Other blood drugs | | 1,029 | 1.2 | 1.1 | 0.9 | 1.3 |
| | | Warfarin sodium | 852 | 1.0 | 0.9 | 0.7 | 1.1 |
| | Haemopoietic agents | | 758 | 0.9 | 0.8 | 0.6 | 0.9 |
| Ear, nose topical | | | 1,752 | 2.1 | 1.8 | 1.7 | 2.0 |
| | Topical otic | | 917 | 1.1 | 0.9 | 0.8 | 1.1 |
| | | Dexamethasone/framycetin | 482 | 0.6 | 0.5 | 0.3 | 0.7 |

*(continued)*

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

| Group | Subgroup | Generic | Number | Per cent of scripts (*n*=85,332) | Rate per 100 encs[(a)] (*n*=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|---|
| | Topical nasal | | 833 | 1.0 | 0.9 | 0.7 | 1.0 |
| | | Budesonidetopical nasal | 450 | 0.5 | 0.5 | 0.3 | 0.6 |
| Urogenital | | | 1,712 | 2.0 | 1.8 | 1.6 | 2.0 |
| | Diuretics | | 1,251 | 1.5 | 1.3 | 1.1 | 1.5 |
| | | Frusemide (furosemide) | 715 | 0.8 | 0.7 | 0.5 | 0.9 |
| Contraceptives | | | 1,611 | 1.9 | 1.7 | 1.5 | 1.8 |
| | Contraceptive oral/systemic | | 1,608 | 1.9 | 1.7 | 1.5 | 1.8 |
| | | Levonorgestrel/ethinyloestr | 1,153 | 1.4 | 1.2 | 1.1 | 1.3 |
| Nutrition, metabolism | | | 1,606 | 1.9 | 1.7 | 1.1 | 2.2 |
| | Minerals/tonics | | 550 | 0.6 | 0.6 | 0.3 | 0.8 |
| Eye medications | | | 1,450 | 1.7 | 1.5 | 1.4 | 1.6 |
| | Anti-infectives eye | | 912 | 1.1 | 0.9 | 0.8 | 1.1 |
| | | Chloramphenicol eye | 771 | 0.9 | 0.8 | 0.7 | 0.9 |
| Miscellaneous | | | 451 | 0.5 | 0.5 | 0.3 | 0.6 |
| Anti-neoplastics | | | 323 | 0.4 | 0.3 | 0.2 | 0.5 |
| Surgical preps | | | 131 | 0.2 | 0.1 | 0.0 | 0.5 |
| Diagnostic agents | | | 75 | 0.1 | 0.1 | 0.0 | 0.3 |

(a)     Column will not add to 100 because multiple prescriptions could be written at each encounter.
*Note:*     Scripts—prescriptions, encs—encounters, LCL—lower confidence limit, UCL—upper confidence limit,
        NSAIDs—non-steroidal anti-inflammatory drugs, CVS—cardiovascular system, CNS—central nervous system.

## Most frequently prescribed medications

The 30 most frequently prescribed individual medications are listed in Table 9.2. Together these accounted for almost half (42.4%) of all prescribed medications. Antibiotics accounted for four of the top ten medications, and analgesics were also frequently prescribed.

## Distribution of medications prescribed by ATC group

Table 9.3 shows the distribution of prescribed medications using the WHO ATC classification [14] 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 'other analgesics and anti-pyretics', which includes aspirin and paracetamol, was the most frequently prescribed group. They were followed by penicillins and non-steroidal anti-inflammatory drugs. Other beta-lactam anti-bacterials, principally cephalosporins, were fourth, followed by inhaled adrenergics and anti-depressants.

## Table 9.2: Most frequently prescribed medications

| Generic medication | Number | Per cent of prescriptions ($n$=85,332) | Rate per100 encounters ($n$=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|
| Paracetamol | 2,984 | 3.5 | 3.1 | 2.7 | 3.4 |
| Amoxycillin | 2,825 | 3.3 | 2.9 | 2.7 | 3.2 |
| Paracetamol/Codeine | 2,170 | 2.5 | 2.2 | 2.0 | 2.4 |
| Cephalexin | 1,966 | 2.3 | 2.0 | 1.8 | 2.2 |
| Salbutamol | 1,917 | 2.2 | 2.0 | 1.8 | 2.2 |
| Amoxycillin/potass.clavulanate | 1,506 | 1.8 | 1.6 | 1.3 | 1.8 |
| Influenza virus vaccine | 1,442 | 1.7 | 1.5 | 0.8 | 2.2 |
| Roxithromycin | 1,367 | 1.6 | 1.4 | 1.2 | 1.6 |
| Celecoxib | 1,365 | 1.6 | 1.4 | 1.3 | 1.6 |
| Temazepam | 1,301 | 1.5 | 1.3 | 1.2 | 1.5 |
| Rofecoxib | 1,191 | 1.4 | 1.2 | 1.0 | 1.5 |
| Levonorgestrel/ethinyloestradiol | 1,153 | 1.4 | 1.2 | 1.1 | 1.3 |
| Cefaclor monohydrate | 1,053 | 1.2 | 1.1 | 0.8 | 1.3 |
| Diazepam | 1,006 | 1.2 | 1.0 | 0.8 | 1.3 |
| Atorvastatin | 992 | 1.2 | 1.0 | 0.9 | 1.2 |
| Atenolol | 962 | 1.1 | 1.0 | 0.8 | 1.2 |
| Metformin | 909 | 1.1 | 0.9 | 0.8 | 1.1 |
| Simvastatin | 908 | 1.1 | 0.9 | 0.8 | 1.1 |
| Warfarin sodium | 852 | 1.0 | 0.9 | 0.7 | 1.1 |
| Diclofenac sodium systemic | 847 | 1.0 | 0.9 | 0.7 | 1.1 |
| Betamethasone topical | 833 | 1.0 | 0.9 | 0.7 | 1.0 |
| Omeprazole | 821 | 1.0 | 0.8 | 0.7 | 1.0 |
| Chloramphenicol eye | 771 | 0.9 | 0.8 | 0.7 | 0.9 |
| Doxycycline | 766 | 0.9 | 0.8 | 0.6 | 1.0 |
| Irbesartan | 755 | 0.9 | 0.8 | 0.6 | 0.9 |
| Mometasone | 741 | 0.9 | 0.8 | 0.6 | 0.9 |
| Perindopril | 724 | 0.8 | 0.7 | 0.6 | 0.9 |
| Frusemide (furosemide) | 715 | 0.8 | 0.7 | 0.5 | 0.9 |
| Amlodipine | 699 | 0.8 | 0.7 | 0.6 | 0.9 |
| Oxazepam | 664 | 0.8 | 0.7 | 0.5 | 0.9 |
| *Subtotal* | *36,205* | *42.4* | *. .* | *. .* | *. .* |
| **Total prescribed medications** | **85,332** | **100.0** | **88.0** | **85.6** | **90.4** |

(a)      Column will not add to 100 because multiple prescriptions could be written at each encounter.
*Note:*      LCL—lower confidence limit, UCL—upper confidence limit.

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## Table 9.3: Distribution of prescribed medications, by ATC medication group

| Generic medication | Number | Per cent of prescriptions (*n*=85,332) | Rate per 100 encounters (*n*=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|
| Other analgesics and anti-pyretics | 5,944 | 7.0 | 6.1 | 5.7 | 6.5 |
| Beta-lactam anti-bacterials, penicillins | 5,778 | 6.8 | 6.0 | 5.6 | 6.3 |
| Anti-inflammatory and anti-rheumatic | 5,117 | 6.0 | 5.3 | 5.0 | 5.5 |
| Other beta-lactam anti-bacterials | 3,115 | 3.7 | 3.2 | 3.0 | 3.5 |
| Adrenergics, inhalants | 3,060 | 3.6 | 3.2 | 2.9 | 3.4 |
| Anti-depressants | 3,020 | 3.5 | 3.1 | 2.9 | 3.3 |
| Ace inhibitors, plain | 2,694 | 3.2 | 2.8 | 2.6 | 3.0 |
| Viral vaccines | 2,531 | 3.0 | 2.6 | 2.2 | 3.0 |
| Cholesterol and triglyceride reducers | 2,366 | 2.8 | 2.4 | 2.3 | 2.6 |
| Corticosteroids, plain | 2,305 | 2.7 | 2.4 | 2.2 | 2.6 |
| Drugs for peptic ulcer and GORD | 2,300 | 2.7 | 2.4 | 2.2 | 2.5 |
| Macrolides, lincosamides and streptogramins | 2,286 | 2.7 | 2.4 | 2.2 | 2.6 |
| Opioids | 1,994 | 2.3 | 2.1 | 1.8 | 2.3 |
| Anxiolytics | 1,866 | 2.2 | 1.9 | 1.7 | 2.2 |
| Other drugs for obstructive airway | 1,863 | 2.2 | 1.9 | 1.7 | 2.1 |
| Hypnotics and sedatives | 1,842 | 2.2 | 1.9 | 1.7 | 2.1 |
| Oral blood glucose lowering drugs | 1,810 | 2.1 | 1.9 | 1.6 | 2.1 |
| Hormonal contraceptives for systemic use | 1,808 | 2.1 | 1.9 | 1.7 | 2.0 |
| Beta blocking agents | 1,719 | 2.0 | 1.8 | 1.6 | 2.0 |
| Selective calcium channel blockers | 1,454 | 1.7 | 1.5 | 1.3 | 1.7 |
| Corticosteroids for systemic use, plain | 1,283 | 1.5 | 1.3 | 1.1 | 1.5 |
| Anti-psychotics | 1,279 | 1.5 | 1.3 | 1.1 | 1.5 |
| Angiotensin II antagonists, plain | 1,253 | 1.5 | 1.3 | 1.1 | 1.5 |
| Anti-thrombotic agents | 1,097 | 1.3 | 1.1 | 0.9 | 1.3 |
| Anti-infectives | 1,003 | 1.2 | 1.0 | 0.9 | 1.2 |
| Tetracyclines | 951 | 1.1 | 1.0 | 0.8 | 1.2 |
| Decongestants and other nasal preparations | 800 | 0.9 | 0.8 | 0.7 | 1.0 |
| Estrogens | 794 | 0.9 | 0.8 | 0.7 | 0.9 |
| High-ceiling diuretics | 746 | 0.9 | 0.8 | 0.6 | 1.0 |
| Corticosteroids and anti-infectives | 719 | 0.8 | 0.7 | 0.5 | 0.9 |
| *Subtotal* | *64,796* | *75.9* | . . | . . | . . |
| **Total prescribed medications** | **85,332** | **100.0** | **88.0** | **85.6** | **90.4** |

(a)    Column will not add to 100 because multiple prescriptions could be written at each encounter.
*Note:*    UCL—upper confidence limit, LCL—lower confidence limit, GORD—gastro-oesophageal reflux disorder.

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## Significant changes from 1998–99 to 2001–02

### Changes in medications when classified in CAPS

Table A4.7 (Appendix 4) provides a summary of the annual results for specific groups of medications (classified according to CAPS) prescribed over the period 1998–99 to 2001–02. They suggest there has been a significant decrease in prescribing rates of:

- total antibiotic and cephalosporins in particular with a possible decrease in tetracyclines
- simple and compound analgesics
- total respiratory medications, and in prescribing of bronchodilators in particular
- ear and nose topical medications, and topical nasal medications in particular.

The annual results suggest significant increases in prescribing rates of:

- other medications acting on the cardiovascular system including lipid-lowering drugs
- non-steroidal anti-inflammatory/anti-rheumatoid medications.

### Changes in medications prescribed by ATC medication group

When the results for prescribed medication rates were compared using the ATC classification the following trends emerged:

Significant decreases were apparent in the rate of prescribing of:

- other analgesics and anti-pyretics
- other beta-lactam anti-bacterials
- plain ace inhibitors
- macrolides and lincosamides
- other asthmatic inhalants.

Significant increases were apparent in the rate of prescribing of:

- anti-inflammatory/anti-rheumatic non-steroids
- cholesterol & triglyceride reducers.

The comparative results are provided in Appendix 4, Table A4.9. These trends are further investigated with more sophisticated statistical techniques in Chapter 14 and some are evaluated relative to the management of selected morbidities in Chapter 15.

### Changes in prescription rates of individual generic medications

Between 1998–99 and 2001–02 decreased prescribing rates of the following medications were noted (Appendix 4, Table A4.8):

- paracetamol, paracetamol and codeine
- salbutamol
- cefaclor monohydrate
- diclofenac sodium systemic
- ranitidine.

There were also trends for decreased prescribing rates of other medications but these have not yet reached statistical significance. These trends will be further investigated at the end of the fifth year of BEACH. They included the prescribing rates of:

- doxycycline hydrocholoride
- erythromycin
- salbutamol.

The only notable increases in prescribing rates related to celecoxib and rofecoxib, which were accepted on the PBS during years 3 and 4 of the BEACH program.
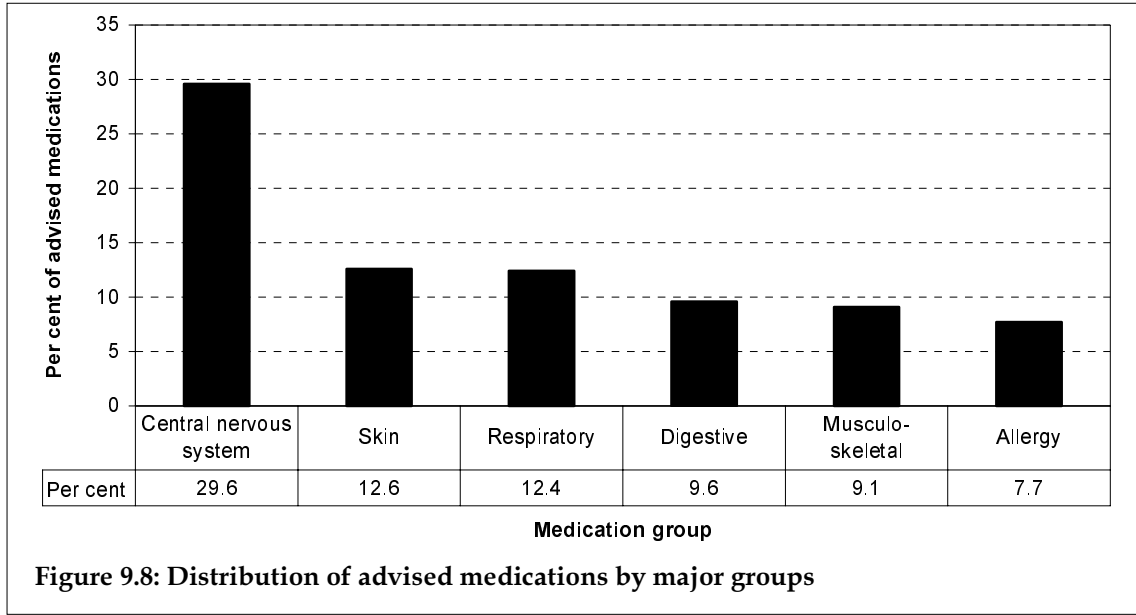
# 9.3 Medications advised for over-the-counter purchase

The total number of medications recorded as recommended by the GP for over-the-counter purchase was 8,606, a rate of 8.9 per 100 encounters and 6.2 per 100 problems managed. At least one medication was recorded as advised at 8.0% of encounters and for 5.7% of problems.

## Types of medications advised

### Medications advised by major groups

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



| | Central nervous system | Skin | Respiratory | Digestive | Musculo-skeletal | Allergy |
|---|---|---|---|---|---|---|
| Per cent | 29.6 | 12.6 | 12.4 | 9.6 | 9.1 | 7.7 |

**Medication group**

**Figure 9.8: Distribution of advised medications by major groups**

The distribution of the most frequently advised medications by generic name shows that paracetamol was the most common, accounting for 24.1% of all advised over-the-counter medications (Table 9.4). Although other medications were advised in relatively small numbers, the range of medications was wide. Most frequent of these included analgesics, anti-histamines and skin preparations. The 30 medications listed in this table accounted for two-thirds of all over-the-counter medications advised.

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

| Generic medication | Number | Per cent of OTCs (n=8,606) | Rate per 100 encounters (n=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|
| Paracetamol | 2,073 | 24.1 | 2.1 | 1.7 | 2.6 |
| Ibuprofen | 481 | 5.6 | 0.5 | 0.2 | 0.8 |
| Loratadine | 262 | 3.0 | 0.3 | 0.0 | 0.5 |
| Clotrimazole topical | 208 | 2.4 | 0.2 | 0.0 | 0.4 |
| Diclofenac topical | 182 | 2.1 | 0.2 | 0.0 | 0.5 |
| Paracetamol/codeine | 171 | 2.0 | 0.2 | 0.0 | 0.5 |
| Aspirin | 150 | 1.7 | 0.2 | 0.0 | 0.5 |
| Fexofenadine | 143 | 1.7 | 0.1 | 0.0 | 0.5 |
| Sodium/potassium/citric/glucose | 141 | 1.6 | 0.1 | 0.0 | 0.6 |
| Brompheniramine/phenylephrine | 134 | 1.6 | 0.1 | 0.0 | 0.7 |
| Clotrimazole vaginal | 128 | 1.5 | 0.1 | 0.0 | 0.4 |
| Sorbolene/glycerol/cetomac | 121 | 1.4 | 0.1 | 0.0 | 0.5 |
| Cetirzine | 115 | 1.3 | 0.1 | 0.0 | 0.6 |
| Chlorpheniramine/pseudoephidrine | 111 | 1.3 | 0.1 | 0.0 | 0.5 |
| Sodium chloride topical nasal | 102 | 1.2 | 0.1 | 0.0 | 0.6 |
| Bromhexine | 85 | 1.0 | 0.1 | 0.0 | 0.6 |
| Calamine lotion | 82 | 1.0 | 0.1 | 0.0 | 0.6 |
| Codeine/paracetamol/pseudoephedrine | 78 | 0.9 | 0.1 | 0.0 | 0.9 |
| Pholcodine | 78 | 0.9 | 0.1 | 0.0 | 0.5 |
| Mouthwash/gargle other | 76 | 0.9 | 0.1 | 0.0 | 1.3 |
| Pseudoephedrine | 75 | 0.9 | 0.1 | 0.0 | 0.5 |
| Beclomethasone nasal spray | 74 | 0.9 | 0.1 | 0.0 | 0.5 |
| Cold and flu medication NEC | 71 | 0.8 | 0.1 | 0.0 | 0.8 |
| Saline bath/solution/gargle | 71 | 0.8 | 0.1 | 0.0 | 0.6 |
| Simple analgesic | 69 | 0.8 | 0.1 | 0.0 | 1.0 |
| Povidone-iodine topical | 68 | 0.8 | 0.1 | 0.0 | 0.5 |
| Sodium citrotartrate/tartaric acid | 67 | 0.8 | 0.1 | 0.0 | 0.6 |
| Promethazine hydrochloride | 64 | 0.7 | 0.1 | 0.0 | 0.4 |
| Chlorpheniramine/phenylephrine | 62 | 0.7 | 0.1 | 0.0 | 0.6 |
| Hyoscine butylbromide | 57 | 0.7 | 0.1 | 0.0 | 0.4 |
| *Subtotal* | *5,599* | *65.1* | . . | . . | . . |
| **Total medications advised** | **8,606** | **100.0** | **8.9** | **8.1** | **9.6** |

*Note:*   OTCs–over-the-counter medications, LCL—lower confidence limit, UCL—upper confidence limit, NEC—not elsewhere classified.
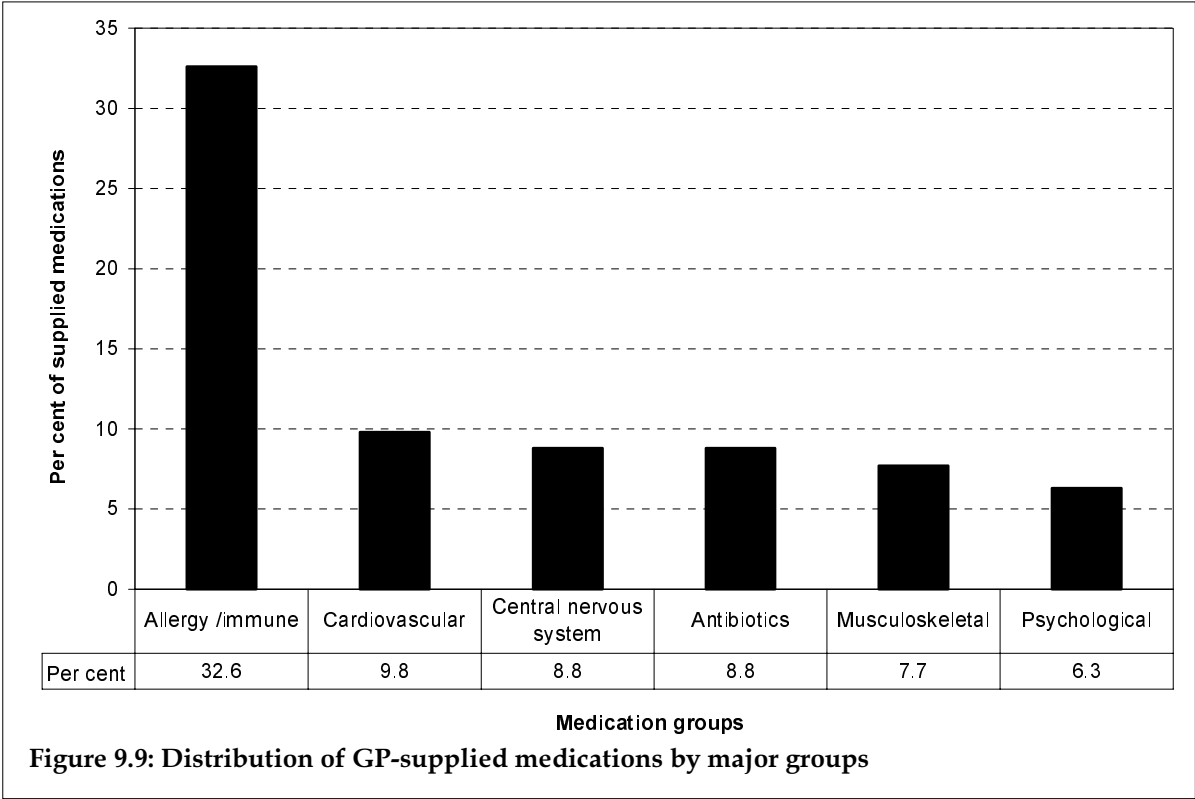
# 9.4 Medications supplied by general practitioners

General practitioners supplied their patients with a total of 7,413 medications in this study, at a rate of 7.6 medications per 100 encounters and 5.3 per 100 problems. At least one medication was supplied at 5.8% of encounters and for 4.3% of problems.

## Types of medications supplied by GPs

### GP-supplied medications by major groups

The distribution of supplied medications by group showed that those acting on the allergy/immune system constituted one-third of all medications supplied. Cardiovascular medications made up 9.8%, while central nervous system medications and antibiotics each accounted for 8.8% of GP-supplied medications (Figure 9.9).



| | Allergy /immune | Cardiovascular | Central nervous system | Antibiotics | Musculoskeletal | Psychological |
|---|---|---|---|---|---|---|
| Per cent | 32.6 | 9.8 | 8.8 | 8.8 | 7.7 | 6.3 |

Medication groups

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

Of the ten most common medications supplied by the GP, seven were vaccines, principally influenza virus vaccine, which accounted for 11.7% 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 are often supplied by the GP (e.g. vaccines). Others may be needed urgently, or samples may be supplied to test efficacy for a particular patient, or where cost is an issue. The most common of these were the non-steroidal anti-inflammatory drugs (NSAIDs) rofecoxib and celecoxib, accounting for 2.9% and 2.3% of all medications supplied.

**Table 9.5: Medications most frequently supplied by GPs**

| Generic medication | Number | Per cent of GP-supplied (n=7,412) | Rate per 100 encounters (n=96,973) | 95% LCL | 95% UCL |
|---|---|---|---|---|---|
| Influenza virus vaccine | 866 | 11.7 | 0.9 | 0.0 | 2.1 |
| Polio vaccine oral sabin/injection | 312 | 4.2 | 0.3 | 0.0 | 0.7 |
| Rofecoxib | 216 | 2.9 | 0.2 | 0.0 | 0.5 |
| Triple antigen (diphtheria/pertussis/tetanus) | 172 | 2.3 | 0.2 | 0.0 | 0.6 |
| Celecoxib | 171 | 2.3 | 0.2 | 0.0 | 0.5 |
| Haemophilus B vaccine | 169 | 2.3 | 0.2 | 0.0 | 0.5 |
| Mumps/measles/rubella vaccine | 150 | 2.0 | 0.2 | 0.0 | 0.5 |
| Diphtheria/pertussis/tetanus/Hep B | 148 | 2.0 | 0.2 | 0.0 | 0.6 |
| Amoxycillin | 140 | 1.9 | 0.1 | 0.0 | 1.6 |
| ADT/CDT (diphtheria/tetanus) vaccine | 131 | 1.8 | 0.1 | 0.0 | 0.5 |
| Hepatitis B vaccine | 130 | 1.8 | 0.1 | 0.0 | 0.5 |
| Metoclopramide | 118 | 1.6 | 0.1 | 0.0 | 0.4 |
| Salbutamol | 117 | 1.6 | 0.1 | 0.0 | 0.8 |
| Paracetamol/codeine | 110 | 1.5 | 0.1 | 0.0 | 0.6 |
| Omeprazole | 108 | 1.5 | 0.1 | 0.0 | 0.6 |
| Prochlorperazine | 99 | 1.3 | 0.1 | 0.0 | 0.6 |
| Levonorgestrel/ethinyloestradiol | 98 | 1.3 | 0.1 | 0.0 | 0.4 |
| Paracetamol | 98 | 1.3 | 0.1 | 0.0 | 0.6 |
| Cephalexin | 76 | 1.0 | 0.1 | 0.0 | 1.0 |
| Amoxycillin/potassium clavulanate | 74 | 1.0 | 0.1 | 0.0 | 1.5 |
| Sertraline | 70 | 0.9 | 0.1 | 0.0 | 0.5 |
| Citalopram | 70 | 0.9 | 0.1 | 0.0 | 0.4 |
| Pantoprazole | 64 | 0.9 | 0.1 | 0.0 | 0.4 |
| Mometasone | 62 | 0.8 | 0.1 | 0.0 | 0.5 |
| Roxithromycin | 60 | 0.8 | 0.1 | 0.0 | 0.7 |
| Atorvastatin | 59 | 0.8 | 0.1 | 0.0 | 0.5 |
| Diazepam | 57 | 0.8 | 0.1 | 0.0 | 0.8 |
| Pethidine | 52 | 0.7 | 0.1 | 0.0 | 0.4 |
| Chloramphenicol eye | 52 | 0.7 | 0.1 | 0.0 | 0.7 |
| Perindopril | 50 | 0.7 | 0.1 | 0.0 | 0.6 |
| *Subtotal* | *4,099* | *55.3* | . . | . . | . . |
| **Total medications supplied** | **7,412** | **100.0** | **7.6** | **6.3** | **9.0** |

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

## Changes from 1998–99 to 2001–02

As shown in Appendix 4, Tables A4.10 and A4.11, there were no significant changes apparent in the relative rate of provision of advice for over-the-counter purchase of any of the medications that were commonly available in 1998–99. However, for medications supplied directly by the GP, the availability of the Cox-2 inhibitors in the last 2 years of the BEACH program had a significant impact.