10 Non-pharmacological management

For each problem managed, GPs could record up to two non-pharmacological treatments provided at the encounter. Non-pharmacological treatments were divided into clinical and procedural treatments, and these groups are defined in Appendix 3.

- clinical treatments, include general and specific advice, counselling or education, family planning and administrative processes.

- procedural treatments, which encompass all procedures carried out by general practitioners such as excision of skin lesion or application/removal of plaster cast.

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

Non-pharmacological treatments were frequently provided by general practitioners to manage patient morbidity. A total of 52,292 were recorded for the year, at a rate of 51.8 per 100 encounters and 35.7 per 100 problems managed. A breakdown of the non-pharmacological treatments showed that clinical treatments were far more common than procedural treatments (Table 10.1).

Table 10.1: Non-pharmacological treatments—summary table

	Number	Rate per 100 encs[a] (*n*=100,987)	95% LCL	95% UCL	Rate per 100 problems[a] (*n*=146,336)	95% LCL	95% UCL
Non-pharmacological treatments	52,292	51.8	49.3	54.3	35.7	34.1	37.3
Clinical treatments	37,543	37.2	35.0	39.4	25.7	24.2	27.1
Procedural treatments	14,748	14.6	13.9	15.3	10.1	9.6	10.6

(a)   Figures do not total 100 as more than one treatment can be described at each encounter and for each problem.

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

Table 10.2 shows the proportion of problems for which at least one non-pharmacological treatment was given. Pharmacological and non-pharmacological treatments were often combined to manage the presenting problem. However, for more than half of the problems that were managed with at least one non-pharmacological treatment, no pharmacological treatment was provided. At least one non-pharmacological treatment was used in the management of 30.9% of problems, and for 18.3% of problems, non-pharmacological treatment was not accompanied by any medication.

One in five problems were managed with a clinical treatment, and for more than half of these (56.6%), no pharmacological treatments were used. GPs used a procedural treatment for the management of one in ten problems, in two-thirds (64.1%) of which no medications were provided. The results presented in Table 10.2 also indicate that problems managed with a procedure were less likely to have concomitant pharmacological treatment than those managed with a clinical treatment (64.1% compared with 56.6%).

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

Co-management of problems with non-pharmacological treatments	Number of problems	Per cent within class	Per cent of problems (*n*=146,336)	95% LCL	95% UCL
At least one non-pharmacological treatment	45,257	100.0	30.9	29.7	32.2
Without pharmacological treatment	26,743	59.1	18.3	17.6	19.0
At least one clinical treatment	33,165	100.0	22.7	21.5	23.8
Without pharmacological treatment	18,762	56.6	12.8	12.2	13.5
At least one procedural treatment	13,749	100.0	9.4	9.0	9.8
Without pharmacological treatment	8,810	64.1	6.0	5.7	6.3

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

10.1 Clinical treatments

The total number of clinical treatments provided by GPs was 37,543, at a rate of 37.2 per 100 encounters (Table 10.1).

Most frequent clinical treatments

The three most common clinical treatments were advice and education in general (13.3% of total non-pharmacological treatments), counselling on the problem managed (10.6%) and advice and education pertaining to nutrition and weight (10.1%).

General advice/education was provided at a rate of 6.9 per 100 encounters, while counselling on the problem managed was given at a rate of 5.5 per 100 encounters and advice and education on nutrition and weight at a rate of 5.2 per 100 encounters. Advice and education on the treatment of the problem (4.2 per 100 encounters), psychological counselling (2.9) and advice on medication (2.5) were also frequently provided. Table 10.3 lists a range of clinical treatments provided in order of decreasing frequency. These treatments relate to various aspects of health, such as medication, alcohol consumption, smoking, exercise, lifestyle, occupational and relationship issues.

Problems managed with clinical treatments

A total of 33,165 problems included a clinical treatment as part of their management. The top ten problems accounted for almost 30% of all problems for which a clinical treatment was provided. The problem most often managed with a clinical treatment was URTI (5.6% of problems managed with a clinical treatment), followed by depression (5.3%), hypertension (4.6%) and lipid disorder (2.7%) (Table 10.4).

The two right-hand columns in Table 10.4 show the extent to which a clinical treatment was used for that problem and the relationship between the use of a clinical treatment and a medication. It can be seen that 49.4% of depression contacts were managed with a clinical treatment, most probably counselling, and of these, 44.1% were not given a prescription as part of the treatment. Likewise, 45.0% of anxiety was managed with a clinical treatment, and 61.7% of these did not receive a medication. Asthma was less likely to be managed with a clinical treatment (20.1%) and less likely to be managed without medication when clinical treatment was given (26.1%).

Table 10.3: Most frequent clinical treatments

Treatment	Number	Per cent of non-pharmacological treatments (*n*=52,292)	Rate per 100 encounters[a] (*n*=100,987)	95% LCL	95% UCL
Advice/education*	6,955	13.3	6.9	5.9	7.9
Counselling—problem*	5,525	10.6	5.5	4.7	6.3
Counselling/advice—nutrition/weight*	5,266	10.1	5.2	4.6	5.9
Advice/education—treatment*	4,287	8.2	4.2	3.6	4.9
Counselling—psychological*	2,911	5.7	2.9	2.6	3.2
Advice/education—medication*	2,508	4.8	2.5	2.1	2.8
Counselling/advice—exercise*	1,626	3.1	1.6	1.2	2.0
Other admin/document*	1,563	3.0	1.6	1.3	1.8
Reassurance, support	1,389	2.7	1.4	1.0	1.7
Sickness certificate	1,311	2.5	1.3	0.8	1.8
Counselling/advice—smoking*	679	1.3	0.7	0.4	0.9
Counselling/advice—lifestyle*	508	1.0	0.5	0.0	1.5
Counselling/advice—alcohol*	378	0.7	0.4	0.1	0.6
Family planning*	368	0.7	0.4	0.1	0.6
Counselling/advice—health/body*	344	0.7	0.3	0.0	0.8
Counselling/advice—prevention*	315	0.6	0.3	0.0	0.8
Subtotal	*35,933*	*68.7*	—	—	—
Total clinical treatments	*37,543*	*71.8*	*37.2*	*35.0*	*39.4*
Total non-pharmacological treatments	**52,292**	**100.0**	**51.8**	**49.3**	**54.3**

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

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

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

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

Problem managed	Number	Per cent of problems with clinical treatment	Rate per 100 encounters[a] [b] (*n*=100,987)	95% LCL	95% UCL	Per cent this problem[c]	Per cent of treated problems– no meds[d]
Acute upper respiratory infection	1,853	5.6	1.8	1.5	2.2	28.7	48.7
Depression*	1,760	5.3	1.7	1.5	2.0	49.4	44.1
Hypertension*	1,510	4.6	1.5	1.1	1.9	16.9	46.4
Lipid disorder	904	2.7	0.9	0.7	1.1	29.7	67.8
Diabetes*	852	2.6	0.8	0.7	1.0	28.9	64.0
Anxiety*	703	2.1	0.7	0.5	0.9	45.0	61.7
Gastroenteritis, presumed infection	618	1.9	0.6	0.4	0.8	50.1	54.4
Viral disease, other/NOS	569	1.7	0.6	0.2	0.9	40.1	49.4
Back complaint*	560	1.7	0.6	0.3	0.8	21.4	49.5
Asthma	553	1.7	0.6	0.3	0.8	20.1	26.1
Subtotal	9,882	29.8	—	—	—	—	—
Total problems	**33,165**	**100.0**	**32.8**	**31.0**	**34.7**	—	—

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

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

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

(d)   The numerator is the number of cases of this problem that generated at least one clinical treatment but generated no medications. The denominator is the total number of contacts for this problem that generated at least one clinical treatment (with or without medications).

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

Note: LCL—lower confidence limit; UCL—upper confidence limit; meds—medications; NOS—not otherwise specified.

10.2 Procedural treatments

Number of procedures at encounter

Procedural treatments included therapeutic actions and diagnostic procedures undertaken by the GP. ICPC-2 codes were grouped across ICPC-2 chapters for this analysis because of small numbers within each chapter. There were 14,748 procedural treatments recorded, at a rate of 14.6 per 100 encounters (Table 10.1).

Most frequent procedures

Table 10.5 lists the most frequent therapeutic procedures. The most common procedure was the excision or removal of tissue (including destruction, debridement or cauterisation). It accounted for 5.5% of all non-pharmacological treatments and occurred at a rate of 2.9 per 100 encounters. This was followed by physical medicine or rehabilitation (including physiotherapy, massage and therapeutic exercises) which occurred at a rate of 2.1 per 100 encounters, and accounted for 4.1% of all non-pharmacological treatments.

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

Table 10.5: Most frequent procedural treatments

Treatment	Number	Per cent of non-pharmacological treatments	Rate per 100 encounters[a] (*n*=100,987)	95% LCL	95% UCL
Excision/removal tissue/biopsy/ destruction/debridement/cauterisation*	2,876	5.5	2.9	2.6	3.1
Physical medicine/rehabilitation*	2,140	4.1	2.1	1.6	2.6
Dressing/pressure/compression/tamponade*	1,972	3.8	2.0	1.8	2.2
Local injection/infiltration*	1,477	2.8	1.5	1.2	1.8
Other therapeutic procedures/surgery NEC*	1,187	2.3	1.2	0.8	1.6
Incision/drainage/flushing/aspiration/removal body fluid*	1,134	2.2	1.1	1.0	1.3
Pap smear	1,090	2.1	1.1	0.8	1.4
Repair/fixation-suture/cast/prosthetic device (apply/remove)*	901	1.7	0.9	0.7	1.0
Physical function test*	538	1.0	0.5	0.0	1.1
Electrical tracings*	320	0.6	0.3	0.1	0.6
Urine test*	271	0.5	0.3	0.0	0.6
Subtotal	*13,906*	*26.6*	*—*	*—*	*—*
Total procedural treatments	*14,748*	*28.2*	*14.6*	*13.9*	*15.3*
Total non-pharmacological treatment	**52,292**	**100.0**	**51.8**	**49.3**	**54.3**

(a)   Figures do not total 100 as more than one treatment can be described for each problem and only per cents >0.5% are included.

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

Note: LCL—lower confidence limit; UCL—upper confidence limit; NEC—not elsewhere classified.

Problems managed with a procedural treatment

A total of 13,749 problems involved a procedure in their management. The top ten problems accounted for 37.5% of all problems for which a procedure was used (Table 10.6).

Solar keratosis/sunburn was the most common problem managed with a procedural treatment, accounting for 6.1% of problems managed with a procedural treatment. Other problems frequently managed with a procedure were female genital check-ups (5.7%), lacerations/cuts (4.4%), excessive ear wax (3.9%) and sprains/strains (3.5%).

Again, the two columns on the right side of the table show the proportion of contacts with each problem that was managed with a procedure and the proportion of problems being managed with a procedure without a concomitant medication. Contacts with warts or excessive ear wax were the most likely to result in a procedure (76.0%), followed by lacerations (74.6%). Many of the problems that were managed with a procedure did not have a medication prescribed, advised or given. More than 70% of solar keratoses cases were managed with a procedure, and of these, 98.1% did not have a concomitant medication used.

Table 10.6: The ten most common problems managed with a procedural treatment

Problem managed	Number	Per cent of problems with procedure	Rate per 100 encounters[a][b] (*n*=100,987)	95% LCL	95% UCL	Per cent of this problem[c]	Per cent of treated problems no meds[d]
Solar keratosis/sunburn	832	6.1	0.8	0.5	1.1	70.9	98.1
Female genital check-up*	786	5.7	0.8	0.4	1.1	44.1	97.5
Laceration/cut	598	4.4	0.6	0.4	0.7	74.6	74.3
Excessive ear wax	536	3.9	0.5	0.4	0.7	76.0	89.9
Sprain/strain*	484	3.5	0.5	0.2	0.8	28.4	45.6
Warts	471	3.4	0.5	0.3	0.7	76.0	97.7
Back complaint*	446	3.3	0.4	0.0	1.0	17.0	49.8
Malignant neoplasm skin	376	2.7	0.4	0.0	0.7	44.5	97.1
Chronic ulcer skin (incl varicose ulcer)	317	2.3	0.3	0.1	0.6	59.8	74.1
Asthma	316	2.3	0.3	0.1	0.6	11.5	18.7
Subtotal	*5,162*	*37.5*	—	—	—	—	—
Total problems	**13,749**	**100.0**	**13.6**	**13.0**	**14.2**	—	—

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

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

(c)   Percentage of contacts with this problem that generated at least one procedural treatment.

(d)   The numerator is the number of cases of this problem that generated at least one procedural treatment but generated no medications. The denominator is the total number of contacts for this problem that generated at least one procedural treatment (with or without medications).
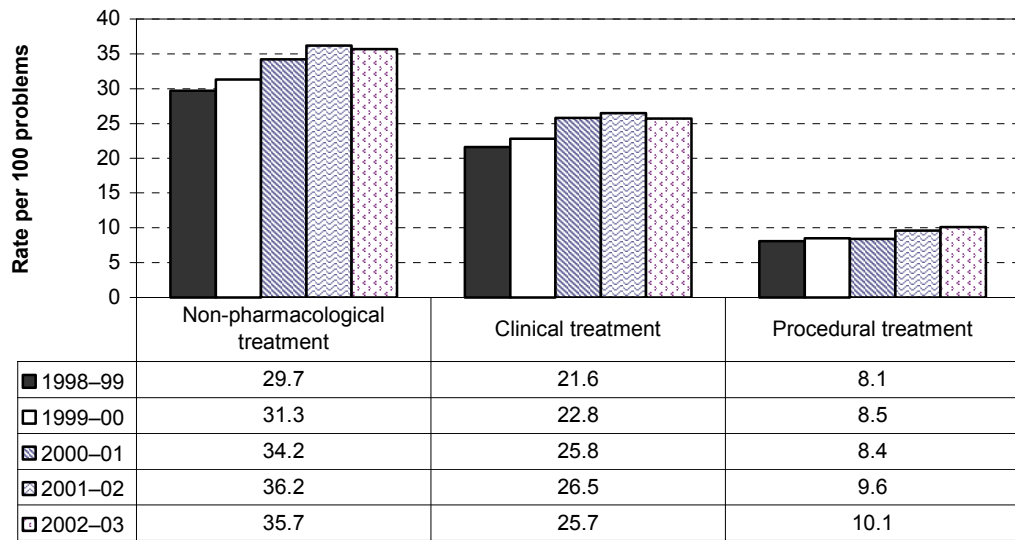
*   Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 3).

Note: LCL—lower confidence limit; UCL—upper confidence limit; meds—medications; incl—including.

10.3 Changes from 1998–99 to 2002–03

Over the last five years, there has been a significant increase in the relative rates of provision of non-pharmacological treatments, from 43.2 (95% CI: 41.3–45.0) per 100 encounters in 1998–99 to 51.8 (95% CI: 49.3–54.3) in 2002–03. This was reflected in the rate of clinical treatments (such as advice and counselling) which increased from 31.4 per 100 encounters (95% CI: 29.7–33.0) to 37.2 per 100 (95% CI: 35.0–39.4) and of therapeutic procedures (11.8 per 100, 95% CI: 11.2–12.5, to 14.6 per 100, 95% CI: 13.9–15.3) (Appendix 4, Table A4.2).

Figure 10.1 shows the rates of non-pharmacological treatments per 100 problems managed for each year of the BEACH program and, demonstrates that the increase was not due to a rise in the rates of problems managed.

	Non-pharmacological treatment	Clinical treatment	Procedural treatment
■ 1998–99	29.7	21.6	8.1
□ 1999–00	31.3	22.8	8.5
▨ 2000–01	34.2	25.8	8.4
▧ 2001–02	36.2	26.5	9.6
▦ 2002–03	35.7	25.7	10.1

Non-pharmacological managements

Figure 10.1: Changes in rates of non-pharmacological treatment

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 healthcare 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 emergency department. Referrals to hospital outpatient clinics were classified as specialist referrals.

11.1 Number of referrals and admissions

The patient was given at least one referral at 10.6% of all encounters for 7.3% of all problems managed. More than one referral could be recorded at an encounter. As a result, there were 11,254 referrals made at a rate of 11.1 per 100 encounters. The most frequent were referrals to a medical specialist (7.7 per 100 encounters), followed by referrals to allied health services (2.5). Very few patients were referred to hospital for admission (0.6 per 100 encounters) or to the hospital emergency department (0.1 per 100). Referrals to a specialist were given more often (5.3 per 100 problems managed) than to an allied health professional (1.7) (Table 11.1).

Table 11.1: Summary of referrals and admissions

	Number	Rate per 100 encounters (*n*=100,987)	95% LCL	95% UCL	Rate per 100 problems (*n*=146,336)	95% LCL	95% UCL
At least one referral	10,696	10.6	10.2	11.0	7.3	7.0	7.6
Referrals	11,254	11.1	10.7	11.6	7.7	7.4	8.0
Specialist	7,743	7.7	7.3	8.0	5.3	5.1	5.5
Allied health service	2,536	2.5	2.3	2.8	1.7	1.6	1.9
Hospital	566	0.6	0.3	0.8	0.4	0.2	0.6
Emergency department	137	0.1	0.0	0.4	0.1	0.0	0.3
Other referrals	271	0.3	0.0	0.5	0.2	0.0	0.4

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

11.2 Most frequent referrals

Of the 11,254 referrals, 91.3% (*n*=10,279) were referrals to specialists or allied health services. The top ten provider types in each category accounted for 52.7% of all referrals to medical specialists and 20.3% of those to allied health services (Table 11.2).

The most frequent referrals made to specialist medical practitioners were to orthopaedic surgeons (9.9% of all referrals to medical specialists), ophthalmologists (9.7%), surgeons (9.7%) and gynaecologists (8.3%).

More than 40% of referrals to allied health services were to physiotherapists, and these accounted for 10.4% of all referrals to specialists and allied health services. These were followed by referrals to podiatrists or chiropodists (7.4% of all referrals to allied health professionals), dieticians (7.1%), psychologists (7.0%) and dentists (6.0%) (Table 11.2).

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

Professional to whom patient referred	Number	Per cent of referrals[a]	Per cent of referral group	Rate per 100 encounters (n=100,987)	95% LCL	95% UCL
Medical specialist	**7,743**	**75.3**	**100.0**	**7.7**	**7.3**	**8.0**
Referral; orthopaedic surgeon	766	7.5	9.9	0.8	0.6	0.9
Referral; ophthalmologist	748	7.3	9.7	0.7	0.6	0.9
Referral; surgeon	747	7.3	9.7	0.7	0.6	0.9
Referral; gynaecologist	645	6.3	8.3	0.6	0.5	0.8
Referral; dermatologist	576	5.6	7.4	0.6	0.4	0.7
Referral; ENT	532	5.2	6.9	0.5	0.4	0.6
Referral; cardiologist	425	4.1	5.5	0.4	0.2	0.6
Referral; gastroenterologist	406	4.0	5.2	0.4	0.2	0.6
Referral; urologist	304	3.0	3.9	0.3	0.1	0.5
Referral; neurologist	265	2.6	3.4	0.3	0.1	0.4
Subtotal: top ten specialist referrals	*5,414*	*52.7*	*69.9*	*—*	*—*	*—*
Allied health and other professionals	**2,536**	**24.7**	**100.0**	**2.5**	**2.3**	**2.8**
Referral; physiotherapy	1,069	10.4	42.2	1.1	0.8	1.3
Referral; podiatrist/chiropodist	188	1.8	7.4	0.2	0.0	0.4
Referral; dietician/nutrition	180	1.8	7.1	0.2	0.0	0.4
Referral; psychologist	178	1.7	7.0	0.2	0.0	0.4
Referral; dentist	153	1.5	6.0	0.2	0.0	0.4
Referral; optometrist	93	0.9	3.7	0.1	0.0	0.4
Referral; counsellor	91	0.9	3.6	0.1	0.0	0.5
Referral; drug and alcohol	46	0.5	1.8	0.1	0.0	0.4
Referral; aged care assessment	43	0.4	1.7	0.0	0.0	0.4
Referral; diabetes education	43	0.4	1.7	0.0	0.0	0.4
Subtotal: top ten allied health referrals	*2,084*	*20.3*	*82.2*	*—*	*—*	*—*
Total specialist & allied health referrals	**10,279**	**100.0**	**—**	**10.2**	**9.7**	**10.6**

(a)   Percentage of referrals refers to the proportion of the combined number of specialist, allied health and other health professional referrals.

Note: LCL—lower confidence limit; UCL—upper confidence limit; ENT—ear, nose and throat.

11.3 Problems that were referred

A referral to a specialist was provided as part of the management of 7,928 problems. The ten problems most commonly associated with a referral to a specialist accounted for 17.4% of all problems referred to a specialist. The problems most often referred were diabetes (accounting for 2.4% of problems referred to a specialist), pregnancy (2.2%) and malignant neoplasms of the skin (2.2%) (Table 11.3).

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

Problem managed	Number	Per cent of problems referred	Rate per 100 encounters (n=100,987)	95% LCL	95% UCL
Diabetes*	191	2.4	0.2	0.0	0.4
Pregnancy*	176	2.2	0.2	0.0	0.4
Malignant skin neoplasm	171	2.2	0.2	0.0	0.4
Osteoarthritis*	163	2.1	0.2	0.0	0.4
Depression*	146	1.8	0.1	0.0	0.4
Menstrual problems*	116	1.5	0.1	0.0	0.4
Back complaint*	115	1.5	0.1	0.0	0.4
Ischaemic heart disease*	113	1.4	0.1	0.0	0.4
Abnormal test results*	97	1.2	0.1	0.0	0.3
Carpal tunnel syndrome	95	1.2	0.1	0.0	0.4
Subtotal: top ten problems referred to a specialist	*1,383*	*17.4*	—	—	—
Total problems referred to specialist	**7,928**	**100.0**	**7.9**	**7.5**	**8.2**

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

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

Referrals to allied health services were fewer in number (*n*=2,536, Table 11.2), possibly because formal referrals to such services are not always required. There were 2,621 problems referred to an allied health professional or service. Table 11.4 shows the ten most common of these. They accounted for 42.4% of all problems referred to allied health services.

Back complaints were the problem most frequently referred to allied health services (8.2% of problems referred), followed by sprains and strains (7.4%). These problems are those that would be likely to be referred to physiotherapists. Depression (5.5%), diabetes (4.8%) and teeth/gum disease (4.2%) also featured in the top ten problems referred to allied health services. Note that diabetes, depression and back complaints were referred relatively frequently to both allied health services and medical specialists.

There were 566 referrals for hospital admission (Table 11.1). The ten problems most commonly associated with hospital admission referral are shown in Table 11.5. Although the numbers involved are very small, it is interesting to note the types of problems for which hospital admission was sought. These included fracture (4.7% of problems referred for admission), appendicitis (2.9%) and pneumonia (2.7%). Cardiovascular problems such as heart failure, ischaemic heart disease and acute myocardial infarction were also referred to hospital relatively frequently.

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

Problem managed	Number	Per cent of problems referred	Rate per 100 encounters (*n*=100,987)	95% LCL	95% UCL
Back complaint*	215	8.2	0.2	0.0	0.4
Sprain/strain*	195	7.4	0.2	0.0	0.4
Depression*	144	5.5	0.1	0.0	0.4
Diabetes*	126	4.8	0.1	0.0	0.4
Teeth/gum disease	109	4.2	0.1	0.0	0.4
Osteoarthritis*	97	3.7	0.1	0.0	0.4
Musculoskeletal injury NOS	66	2.5	0.1	0.0	0.4
Skin injury, other	57	2.2	0.1	0.0	0.6
Bursitis/tendonitis/synovitis NOS	52	2.0	0.1	0.0	0.4
Musculoskeletal disease, other	50	1.9	0.1	0.0	0.5
Subtotal: top ten problems referred to AHS	*1,111*	*42.4*	—	—	—
Total problems referred to AHS	**2,621**	**100.0**	**2.6**	**2.3**	**2.9**

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

Note: LCL—lower confidence limit; UCL—upper confidence limit; NOS—not otherwise specified; AHS—allied health service.

Table 11.5: The ten problems most frequently referred to hospital

Problem managed	Number	Per cent of problems referred	Rate per 100 encounters (*n*=100,987)	95% LCL	95% UCL
Fracture*	28	4.7	0.03	0.0	0.5
Appendicitis	17	2.9	0.02	0.0	0.6
Pneumonia	16	2.7	0.02	0.0	0.8
Heart failure	15	2.6	0.01	0.0	0.8
Pregnancy*	14	2.3	0.01	0.0	0.7
Ischaemic heart disease*	11	1.8	0.01	0.0	0.8
Abdominal pain*	11	1.8	0.01	0.0	0.9
Infectious disease, other/NOS	10	1.8	0.01	0.0	0.8
Acute myocardial infarction	10	1.8	0.01	0.0	0.8
Back complaint*	10	1.7	0.01	0.0	0.8
Subtotal: top ten problems referred for admission	*142*	*24.2*	—	—	—
Total problems referred to hospital	**586**	**100.0**	**0.58**	**0.3**	**0.8**

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

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

11.4 Changes from 1998–99 to 2002–03

There were no significant changes across the five years of BEACH data in the rates of referral and types of referral (Appendix 4, Table A4.2).

12 Investigations

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

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

There were no tests recorded at the vast majority (79.7%) of encounters. At least one pathology test order was recorded at 14.7% of encounters (for 11.4% of problems managed) and at least one imaging test was ordered at 7.5% of encounters (for 5.3% of problems managed) (Table 12.1).

Table 12.1: Number of encounters and problems at which a pathology or imaging test was ordered

	Number of encs	Per cent of encs (*n*=100,987)	95% LCL	95% UCL	Number of problems	Per cent of problems (*n*=146,336)	95% LCL	95% UCL
Pathology and imaging ordered	1,896	1.9	1.7	2.1	1,378	0.9	0.8	1.1
Pathology only ordered	12,994	12.9	12.4	13.3	15,254	10.4	10.1	10.8
Imaging only ordered	5,628	5.6	5.3	5.8	6,419	4.4	4.2	4.6
No tests ordered	80,469	79.7	79.0	80.3	123,285	84.3	83.8	84.7
At least one pathology ordered	14,890	14.7	14.2	15.3	16,632	11.4	11.0	11.8
At least one imaging ordered	7,524	7.5	7.1	7.8	7,797	5.3	5.1	5.6

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

12.1 Pathology ordering

A comprehensive report on pathology ordering by GPs in Australia in 1998, written by the GP Statistics and Classification Unit using BEACH data, was published on the Internet by the Diagnostics and Technology Branch of the Department of Health and Aged Care during 2000.[27] For a more detailed study of pathology ordering, consult that publication; readers may wish to compare those results with the information presented below.

Nature of pathology orders at encounter

There were 33,234 orders for a pathology test (or battery of tests) and these were made at a rate of 32.9 per 100 encounters. Table 12.2 provides a summary of the different types of pathology tests that were ordered by the participating GPs.

The pathology tests recorded were grouped according to the categories set out in Appendix 3. The main pathology groups reflect those used in previous analyses of pathology tests recorded by the HIC.[28]

The top four pathology test groups were Chemistry, Haematology, Microbiology and Cytology, together these accounted for more than 90% of pathology test orders. The fifth largest group was Other NEC (other pathology test orders that could not be classified elsewhere), which made up 2.3% of pathology test orders. The size of this group was in part due to non-specificity of recording of some pathology orders by some GPs (e.g. blood test).

The largest of the groups, Chemistry, accounted for 53.8% of all tests and was recorded at a rate of 17.7 per 100 encounters. Within this group the most frequently ordered test was lipids (18.4%) followed by liver function tests (11.9%). Full blood count (69.0%) was the largest group within Haematology and urine, microscopy, culture and sensitivity (urine MC&S) (31.9%) was the largest in Microbiology.

The most frequently ordered test types were full blood count; lipids; liver function; electrolytes, urea and creatinine (EUC); glucose; thyroid function; urine MC&S and Pap smear tests. Full blood counts accounted for 13.2% of tests and were ordered at a rate of 4.3 per 100 encounters. Pap smears accounted for 4.9% of all tests and made up the greater proportion of the Cytology group (96.6%). Lipid tests were ordered at a rate of 3.3 per 100 encounters (Table 12.2).

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

Pathology test ordered	Number	Per cent of all pathology	Per cent of group	Rate per 100 encs (n=100,987)	95% LCL	95% UCL
Chemistry	**17,870**	**53.8**	**100.0**	**17.7**	**16.8**	**18.6**
Lipids	3,296	9.9	18.4	3.3	3.0	3.5
Liver function	2,120	6.4	11.9	2.1	1.9	2.3
EUC	2,114	6.4	11.8	2.1	1.8	2.4
Glucose—all*	2,110	6.4	11.8	2.1	1.9	2.3
Thyroid function	1,818	5.5	10.2	1.8	1.6	2.0
Multi-biochemical analysis	1,494	4.5	8.4	1.5	0.9	2.1
Hormone assay	863	2.6	4.8	0.9	0.6	1.2
Ferritin	778	2.3	4.4	0.8	0.6	0.9
HbA1c	773	2.3	4.3	0.8	0.6	0.9
Chemistry, other	625	1.9	3.5	0.6	0.4	0.8
Haematology	**6,354**	**19.1**	**100.0**	**6.3**	**5.9**	**6.6**
Full blood count	4,385	13.2	69.0	4.3	4.1	4.6
Erythrocyte sedimentation rate	997	3.0	15.7	1.0	0.8	1.2
Coagulation	722	2.2	11.4	0.7	0.5	0.9

(continued)

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

Pathology test ordered	Number	Per cent of all pathology	Per cent of group	Rate per 100 encs (*n*=100,987)	95% LCL	95% UCL
Microbiology	**5,188**	**15.6**	**100.0**	**5.1**	**4.8**	**5.5**
Urine MC&S	1,653	5.0	31.9	1.6	1.5	1.8
Microbiology, other	682	2.1	13.2	0.7	0.5	0.8
Hepatitis serology	574	1.7	11.1	0.6	0.3	0.8
Vaginal swab and C&S	340	1.0	6.6	0.3	0.1	0.6
HIV	282	0.9	5.4	0.3	0.0	0.6
Faeces MC&S	280	0.8	5.4	0.3	0.1	0.5
Chlamydia	238	0.7	4.6	0.2	0.0	0.5
Cytology	**1,690**	**5.1**	**100.0**	**1.7**	**1.4**	**1.9**
Pap smear	1,631	4.9	96.6	1.6	1.4	1.9
Other NEC	**777**	**2.3**	**100.0**	**0.8**	**0.4**	**1.1**
Blood test	281	0.9	36.2	0.3	0.0	1.3
Other test NEC	281	0.9	36.1	0.3	0.1	0.5
Infertility/pregnancy	**290**	**0.9**	**100.0**	**0.3**	**0.1**	**0.5**
Tissue pathology	**528**	**1.6**	**100.0**	**0.5**	**0.2**	**0.8**
Histology, skin	417	1.3	79.0	0.4	0.1	0.8
Immunology	**454**	**1.4**	**100.0**	**0.5**	**0.2**	**0.7**
Anti nuclear antibodies	136	0.4	29.9	0.1	0.0	0.4
Simple basic tests	**84**	**0.3**	**100.0**	**0.1**	**0.0**	**0.4**
Total pathology tests	**33,234**	**100.0**	**—**	**32.9**	**31.5**	**34.4**

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

Problems associated with pathology tests

Table 12.3 describes, in decreasing order of frequency, the most common problems under management for which pathology was ordered. There were 16,632 problems to which pathology tests were linked (Table 12.1), the average number of pathology tests being 2.04 per tested problem. The five problems accounting for the highest number of pathology tests ordered were hypertension (6.0% of problem–pathology combinations), diabetes (5.8%), lipid disorder (5.0%), general check-up (4.0%), female genital check-up (including Pap smear) (3.9%) and weakness/tiredness (3.7%). 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 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 8,935 hypertension problems recorded in the data set (6.1% of problems). Diabetes (2.0% of problems) was managed far less frequently but accounted for almost as many pathology tests as did hypertension. There were 1,981 test orders (5.8%) associated with diabetes and 2,022 test orders (6.0%) associated with hypertension. This is because 27.4% of diabetes contacts resulted in a pathology test compared with only 9.0% of contacts with hypertension.

Weakness/tiredness was not a problem label that ranked in the top 30 problems managed in general practice, yet it ranked sixth highest in the problems associated with pathology ordering. This is because the decision to order a pathology test for weakness/tiredness was relatively frequent (58.5% of contacts generating an order) and where such a decision was made, multiple pathology tests were likely (averaging 344.0 test orders per 100 problems). The problem label of female genital check-up/Pap smear, and the associated Pap smear test, provide a useful contrast as multiple tests were rarely ordered.

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

Problem managed	Number of problems	Number of problem–path combinations[a]	Per cent of problem–path combinations[a]	Per cent of problems with test[b]	Rate of path orders per 100 problems with pathology[c]
Hypertension*	8,935	2,022	6.0	9.0	252.4
Diabetes*	2,949	1,981	5.8	27.4	245.4
Lipid disorder	3,043	1,707	5.0	28.4	197.6
General check-up*	1,952	1,349	4.0	27.5	251.5
Female genital check-up*	1,781	1,333	3.9	66.3	112.9
Weakness/tiredness general	616	1,239	3.7	58.5	344.0
Urinary tract infection*	1,686	973	2.9	50.4	114.7
Blood test NOS	250	624	1.8	83.6	297.8
Abnormal test results*	770	577	1.7	44.5	168.5
Pregnancy*	855	558	1.6	33.1	197.2
Subtotal	*22,837*	*12,363*	*36.4*	—	—
Total	**146,336**	**33,961**	**100.0**	**11.4**	**199.8**

(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 33,234 pathology test orders and 33,961problem–pathology combinations.

(b)   The percentage of total contacts with the problem that 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; NOS—not otherwise specified.

12.2 Imaging ordering

A comprehensive report on imaging orders by GPs in Australia in 1999–00, written by the GP Statistics and Classification Unit using BEACH data, was published by the AIHW in 2001.[29] Readers wishing a more detailed study of imaging orders should consult that publication and may wish to compare those results with the information presented below.

Nature of imaging orders at encounter

There were 8,678 orders for imaging and these were made at a rate of 8.6 per 100 encounters. At least one imaging test was ordered at 7.5% of encounters and for 5.3% of problems managed. The imaging tests recorded were grouped into one of five categories—Diagnostic radiology, Ultrasound, Computerised tomography, Nuclear medicine imaging and Magnetic resonance imaging (Appendix 3). Diagnostic radiology made up almost two-thirds (59.6%) of

all imaging tests, Ultrasound accounted for 30.5%, CT scanning 9.1%, Nuclear medicine 0.5% and MRI 0.4% (Table 12.4).

Table 12.4: The most frequent imaging tests ordered, by MBS group and most frequent tests

Imaging test ordered	Number	Per cent of tests	Per cent of group	Rate per 100 encounters (*n*=100,987)	95% LCL	95% UCL
Diagnostic radiology	**5,171**	**59.6**	**100.0**	**5.1**	**4.9**	**5.4**
X-ray; chest	1,138	13.1	22.0	1.1	1.0	1.3
X-ray; knee	430	5.0	8.3	0.4	0.3	0.6
Mammography	399	4.6	7.7	0.4	0.2	0.6
X-ray; shoulder	249	2.9	4.8	0.3	0.1	0.4
Test; densiometry	235	2.7	4.5	0.2	0.0	0.4
X-ray; hip	234	2.7	4.5	0.2	0.1	0.4
X-ray; foot/feet	219	2.5	4.2	0.2	0.0	0.4
X-ray; ankle	199	2.3	3.9	0.2	0.0	0.4
X-ray; spine, lumbosacral	198	2.3	3.8	0.2	0.0	0.4
X-ray; wrist	146	1.7	2.8	0.1	0.0	0.4
X-ray; spine, lumbar	141	1.6	2.7	0.1	0.0	0.4
X-ray; hand	140	1.6	2.7	0.1	0.0	0.4
X-ray; spine, cervical	139	1.6	2.7	0.1	0.0	0.4
X-ray; finger(s)/thumb	128	1.5	2.5	0.1	0.0	0.3
X-ray; abdomen	98	1.1	1.9	0.1	0.0	0.3
Scan; bone(s)	91	1.0	1.8	0.1	0.0	0.4
X-ray; spine, thoracic	82	1.0	1.6	0.1	0.0	0.4
X-ray; elbow	67	0.8	1.3	0.1	0.0	0.4
Ultrasound	**2,643**	**30.5**	**100.0**	**2.6**	**2.5**	**2.8**
Ultrasound; pelvis	521	6.0	19.7	0.5	0.3	0.7
Ultrasound; abdomen	287	3.3	10.8	0.3	0.1	0.4
Ultrasound; breast, F	264	3.0	10.0	0.3	0.0	0.5
Ultrasound; shoulder	247	2.8	9.3	0.2	0.1	0.4
Ultrasound; obstetric	176	2.0	6.7	0.2	0.0	0.4
Ultrasound	152	1.8	5.8	0.2	0.0	0.4
Ultrasound; renal tract	95	1.1	3.6	0.1	0.0	0.3
Echocardiography	94	1.1	3.6	0.1	0.0	0.4
Test; doppler	93	1.1	3.5	0.1	0.0	0.4
Computerised tomography	**793**	**9.1**	**100.0**	**0.8**	**0.7**	**0.9**
CT scan; brain	141	1.6	17.8	0.1	0.0	0.4
CT scan; head	107	1.2	13.5	0.1	0.0	0.4
CT scan; abdomen	86	1.0	10.9	0.1	0.0	0.4
Nuclear medicine imaging	**40**	**0.5**	**100.0**	**0.0**	**0.0**	**0.4**
Magnetic resonance imaging	**32**	**0.4**	**100.0**	**0.0**	**0.0**	**0.6**
Total imaging tests	**8,678**	**100.0**	**—**	**8.6**	**8.2**	**9.0**

Note: LCL—lower confidence limit; UCL—upper confidence limit; F—female; CT—computerised tomography.

Chest x-rays were by far the most common subgroup in Diagnostic radiology (22.0%), followed by x-ray of the knee (8.3%) and mammography (7.7%). Ultrasound was commonly of the pelvis (19.7%), abdomen (10.8%), breast (10.0%) and shoulder (9.3%). CT scans were most commonly performed on the brain (17.9%), head (13.5%) and abdomen (10.9%).

Overall, the most frequently ordered imaging test was chest x-ray which accounted for 13.1% of all imaging and was ordered at a rate of 1.1 per 100 encounters. Pelvic ultrasound, the second most frequently ordered, accounted for 6.0% of all imaging tests and was ordered at a rate of 0.5 per 100 encounters (Table 12.4).

Problems associated with orders for imaging

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

There were 8,747 problem–imaging combinations. Six (including the top five) of the ten most common problems were related to the musculoskeletal system. The remaining problems were related to abdominal, breast, skin and chest problems.

Back complaint, the most common problem for which imaging was ordered, accounted for 5.5% of all imaging, and 15.7% of contacts with a back complaint resulted in an imaging order. Although fracture accounted for slightly fewer imaging orders (4.7%), 37.7% of contacts with this problem resulted in an order for imaging.

The ordering of multiple imaging for a single problem was far 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, 135.8 tests being ordered for every 100 problems.

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

Problem managed	Number of problems	Number of problem–imaging combinations[a]	Per cent of problem–imaging combinations	Per cent of problems with test[b]	Rate of imaging orders per 100 tested problems[c]
Back complaint*	2,624	479	5.5	15.7	116.2
Fracture*	992	406	4.7	37.7	108.5
Osteoarthritis*	2,586	399	4.6	13.2	117
Sprain/strain*	1,702	366	4.2	19.1	112.7
Injury musculoskeletal NOS	724	214	2.5	26.9	110
Abdominal pain*	560	210	2.4	32.8	114.5
Injury skin, other	734	185	2.1	21.4	117.5
Breast lump/mass (female)	192	165	1.9	63.3	135.8
Acute bronchitis/bronchiolitis	2,599	157	1.8	6.0	100.7
Bursitis/tendonitis/synovitis NOS	784	147	1.7	15.4	121.7
Subtotal	*13,497*	*2,728*	*31.2*	—	—
Total	**146,338**	**8,747**	**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 7,643 imaging test orders and 7,695 problem–imaging combinations.

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

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

* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix 3).   *Note:* NOS—not otherwise specified.

12.3 Changes from 1998–99 to 2002–03

Changes in pathology

There was a significant increase in the number of pathology tests ordered per
100 encounters, from 24.6 per 100 encounters (95% CI: 23.5–25.7) in 1998–99 to 32.9 per 100
(95% CI: 31.5–34.4) in 2002–03, representing an increase of approximately 25% over the 5
years of the BEACH program (Appendix 4, Table A4.2). Two-thirds of the increase in
pathology ordering in the last three years was accounted for by an increase in chemical
pathology from 15.7 per 100 encounters (95% CI: 14.8–16.5) in 2000–01 to 17.7 per 100 (95%
CI: 16.8–18.6) in 2002–03 (Appendix 4, Table A4.16(b)).

The general upward trend has continued annually, and the change over the first three years
was investigated in detail in a specific study of pathology ordering patterns undertaken for
the Commonwealth Department of Health and Ageing. The results have been reported in a
separate publication.[30] Since the beginning of the third year of BEACH, a change in coding of
pathology orders allowed more specificity in recording these orders.

Changes in imaging

Although it would appear from the annual BEACH summary results that there has been a
significant increase in the relative rate of orders for imaging each year, this is partly due to a
change in the coding of imaging orders between years 2 and 3 of the program, when more
specific coding of the exact type of test ordered was introduced. In years 1 and 2 of BEACH,
only broad test types were coded. This year we were able to investigate apparent changes in
ordering rates from 2000–01 to 2002–03 as three measurement points, using the same detailed
coding system, are now available. There has been a significant increase in the rate of imaging
tests ordered over the past three years from 7.7 per 100 encounters (95% CI: 7.3–8.0) in
2000–01 to 8.6 per 100 encounters (95% CI: 8.2–9.0) in 2002–03 (Appendix 4, Table A4.2).