

# 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 problem(s) associated with each order placed. This allows the linkage of test orders to 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 (81.9%) of encounters. There were 30,716 tests (23,872 pathology and 6,844 imaging) ordered or undertaken. At least one pathology order was recorded at 13.2% of encounters (for 10.0% of problems managed) and an imaging test was ordered at 6.3% of encounters (for 4.5% of problems managed) (Table 12.1).

**Table 12.1: Number of encounters and problems at which pathology or imaging ordered**

	Number of encs <sup>(a)</sup>	% of encs	95% LCI	95% UCI	Number of probs <sup>(a)</sup>	% of probs	95% LCI	95% UCI
Pathology and imaging ordered	1,424	1.5	1.3	1.6	1,063	0.8	0.6	0.9
Pathology only ordered	11,408	11.8	11.4	12.2	13,069	9.3	9.0	9.6
Imaging only ordered	4,700	4.8	4.6	5.1	5,255	3.7	3.6	3.9
No tests ordered	79,370	81.9	81.3	82.5	121,438	86.2	85.8	86.6
<b>Total</b>	<b>96901</b>	<b>100.0</b>	..	..	<b>140,824</b>	<b>100.0</b>	..	..
Pathology ordered	12,831	13.2	12.8	13.7	14,132	10.0	9.7	10.4
Imaging ordered	6,123	6.3	6.0	6.6	6,317	4.5	4.3	4.7

(a) Columns may not add to total due to rounding after post stratification weighting.

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

## 12.1 Pathology ordering

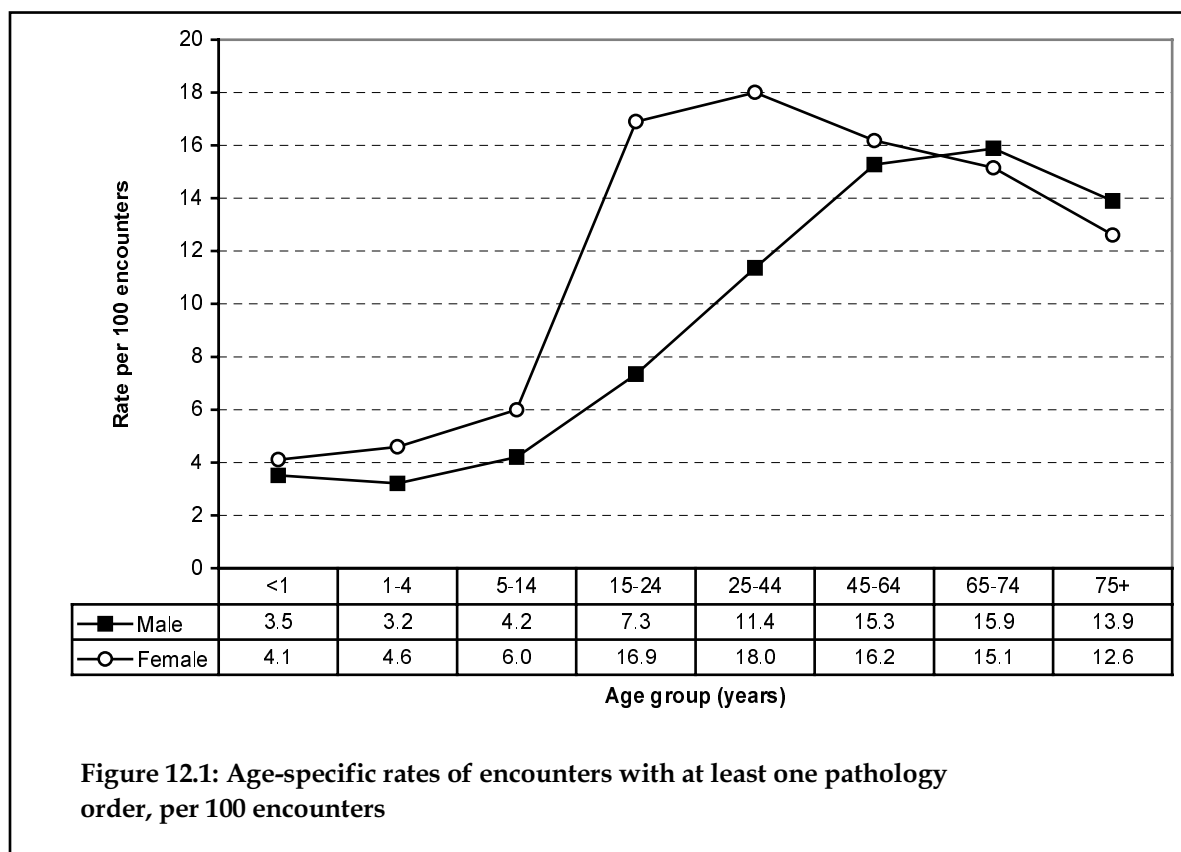
### 12.1.1 Number of pathology orders at encounter

There were 23,872 orders for a pathology test (or battery of tests) and these were made at a rate of 24.6 per 100 encounters. At least one pathology test was ordered at 13.2% of encounters and for 10.0% of problems.

### 12.1.2 Age–sex specific rates of encounters where at least one pathology test was ordered

At least one pathology test (or battery of tests such as FBC) was ordered at 14.7% of encounters with females, compared with 11.4% of those with males. Pathology tests were ordered for a higher proportion of encounters with females in all age groups up to 65 years. In contrast a slightly higher proportion of encounters with males in the two oldest age groups, 65–74 and 75+, generated at least one order for pathology. The percentage of encounters at which a pathology test was ordered peaked for females aged 25–44 and males aged 65–74 (Figure 12.1).

The differences between males and females in the distributions of age-specific pathology rates are largely attributable to pregnancy tests and Pap smears among females. However, a difference of 5% remained among patients aged 15–24 after these two groups of tests were removed from the count of pathology tests.



### 12.1.3 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 VI. The main pathology groups reflect those used in previous analyses of pathology tests recorded by the HIC.

**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 <sup>(a)</sup>	% of group	Rate per 100 encs (N=96,901)	95% LCI	95% UCI
<b>Chemistry</b>	<b>10,929</b>	<b>45.8</b>	<b>100.0</b>	<b>11.3</b>	<b>10.6</b>	<b>11.9</b>
Lipids	2,248	9.4	20.6	2.3	2.1	2.6
Liver function	1,914	8.0	17.5	2.0	1.7	2.2
EUC	1,447	6.1	13.2	1.5	1.3	1.7
Glucose/tolerance	1,367	5.7	12.5	1.4	1.2	1.6
Thyroid function	1,142	4.8	10.5	1.2	1.1	1.3
Ferritin	423	1.8	3.9	0.4	0.3	0.6
HbA1c	409	1.7	3.8	0.4	0.2	0.6
Multibiochemical analysis	405	1.7	3.7	0.4	0.0	1.0
Prostate specific antigen	340	1.4	3.1	0.4	0.2	0.5
Hormone assay	308	1.3	2.8	0.3	0.1	0.5
<b>Haematology</b>	<b>4,942</b>	<b>20.7</b>	<b>100.0</b>	<b>5.1</b>	<b>4.8</b>	<b>5.4</b>
Full blood count	3,422	14.3	69.2	3.5	3.3	3.8
ESR	673	2.8	13.6	0.7	0.5	0.9
Coagulation	634	2.7	12.8	0.7	0.5	0.9
<b>Microbiology</b>	<b>3,953</b>	<b>16.6</b>	<b>100.0</b>	<b>4.1</b>	<b>3.8</b>	<b>4.4</b>
Urine MC&S	1,425	6.0	36.1	1.5	1.3	1.6
Hepatitis serology	515	2.2	13.0	0.5	0.2	0.8
Faeces MC&S	279	1.2	7.1	0.3	0.0	0.6
Vaginal swab and C&S	266	1.1	6.7	0.3	0.1	0.5
HIV	203	0.9	5.1	0.2	0.0	0.5
Skin swab C&S	197	0.8	5.0	0.2	0.0	0.4
Monospot	162	0.7	4.1	0.2	0.0	0.4
<b>Cytology</b>	<b>1,520</b>	<b>6.4</b>	<b>100.0</b>	<b>1.6</b>	<b>1.3</b>	<b>1.8</b>
Pap smear	1,451	6.1	95.5	1.5	1.3	1.7
<b>Other NEC</b>	<b>1,224</b>	<b>5.1</b>	<b>100.0</b>	<b>1.3</b>	<b>0.9</b>	<b>1.7</b>
Other NEC	615	2.6	50.2	0.6	0.0	1.3
Other blood test NEC	375	1.6	30.6	0.4	0.0	0.7
<b>Infertility/pregnancy</b>	<b>449</b>	<b>1.9</b>	<b>100.0</b>	<b>0.5</b>	<b>0.3</b>	<b>0.6</b>
<b>Histopathology</b>	<b>427</b>	<b>1.8</b>	<b>100.0</b>	<b>0.4</b>	<b>0.3</b>	<b>0.6</b>
Histology; skin	339	1.4	79.4	0.4	0.1	0.6
<b>Immunology</b>	<b>392</b>	<b>1.6</b>	<b>100.0</b>	<b>0.4</b>	<b>0.1</b>	<b>0.7</b>
Immunology; other	141	0.6	36.0	0.2	0.0	0.7
<b>Simple test; other</b>	<b>35</b>	<b>0.2</b>	<b>100.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.4</b>
<b>Total pathology tests</b>	<b>23,872</b>	<b>100.0</b>	<b>100.0</b>	<b>24.6</b>	<b>23.6</b>	<b>25.7</b>

(a) This column does not sum to 100% as only those groups which accounted for greater than 0.5% of all pathology tests were included.

Note: Abbreviations: Encs – encounters, UCI – Upper confidence interval, LCI – Lower confidence interval, NEC – not elsewhere classified.

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 5.1% of all pathology test orders. The relatively large size of this group is in part due to the non-specificity of the pathology orders 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 45.8% of all tests and was recorded at a rate of 11.3 per 100 encounters. Within this group the most frequently ordered test was lipids (20.6%), followed by liver function (17.5%). Full blood count (69.2%) was the largest group within **Haematology** and urine MC&S (36.1%) was the largest in **Microbiology**.

The most frequently ordered test types were full blood count, lipids, liver function, Pap smear and EUC tests. Full blood counts accounted for 14.3% of tests and were ordered at a rate of 3.5 per 100 encounters. Pap smears accounted for 6.1% of all tests and made up the greater proportion of the **Cytology** group (95.5%). Lipid tests were ordered at a rate of 2.3 per 100 encounters (Table 12.2).

### 12.1.4 Problems associated with pathology tests

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

There were 14,132 problems to which pathology tests were linked. The three problems accounting for the highest number of pathology tests ordered were lipid disorder (5.2% of problems managed with a pathology order), diabetes (4.8%) and female genital check-up/Pap smear (4.6%). 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 percentage of contacts (with the selected problem) that resulted in an order for pathology. The last column (right) shows the number of test orders placed when contact with the selected problem resulted in pathology tests.

Hypertension was the fifth most common problem managed in general practice and there were 8,000 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 more pathology tests than did hypertension. There were 1,120 tests orders (4.6%) associated with female genital check-up and 958 test orders (3.9%) associated with hypertension. This is explained by the fact that 67.2% of female genital check-ups resulted in a pathology test, compared to 5.9% of contacts with hypertension.

Weakness/tiredness was not a problem label which ranked in the top 30 problems managed in general practice, yet it ranked fourth highest in the problems associated with pathology ordering. This is because the decision to order a pathology test for weakness/tiredness was relatively frequent (51% of contacts generating an order) and where such a decision was made, multiple pathology tests were likely (averaging 300 test orders per 100 problems). A similar rate of multiple tests was apparent for depression, where 294 tests were ordered for every 100 contacts that led to a pathology test order. 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 30 most common problems for which a pathology test was ordered**

<b>Problem managed</b>	<b>Number of problems</b>	<b>Number of prob/path combinations <sup>(a)</sup></b>	<b>% of prob/path combinations</b>	<b>Percentage of problems with test <sup>(b)</sup></b>	<b>Rate of path orders per 100 problems with path <sup>(c)</sup></b>
Lipid disorder	2,392	1,276	5.2	30.7	173.9
Diabetes*	2,485	1,182	4.8	24.6	193.5
Fem genital check-up/Pap smear*	1,566	1,120	4.6	67.2	106.5
Weakness/tiredness general	724	1,105	4.5	51.0	299.4
Hypertension*	8,000	958	3.9	5.9	204.5
UTI*	1,569	850	3.5	48.4	112.0
General check-up*	1,501	758	3.1	22.0	230.0
Pre/post natal check-up*	1,000	382	1.6	23.3	163.7
Pregnancy*	708	370	1.5	31.8	164.2
Viral disease NOS	1,284	364	1.5	12.5	227.2
Anaemia*	634	340	1.4	28.7	187.1
Blood test endocrine/metabolic	281	313	1.3	71.9	155.2
Abdominal pain*	712	309	1.3	21.7	199.8
Abnormal test results*	505	308	1.3	39.6	154.1
Menstrual problems*	772	305	1.3	24.8	159.3
Depression*	3,367	290	1.2	2.9	294.5
Menopausal complaints	1,428	279	1.1	11.7	166.9
Atrial fibrillation/flutter	554	258	1.1	35.5	131.0
Hypothyroidism/myxoedema	472	257	1.1	40.0	136.5
Rheumatoid arthritis*	461	253	1.0	22.3	246.7
Blood test NOS	140	251	1.0	81.0	220.9
IHD without angina	1,054	249	1.0	11.4	207.8
Heart failure	846	238	1.0	15.0	187.2
Musculoskeletal disease	664	194	0.8	12.4	235.5
Arthritis*	743	188	0.8	9.0	280.7
Vertigo/dizziness	371	187	0.8	18.1	279.0
Endocrine/metab/nutrit'l disease	429	186	0.8	25.6	170.0
Gout	608	178	0.7	15.6	188.0
Gastroenteritis, presume infection	1,047	177	0.7	12.3	137.3
Risk factor NOS	211	174	0.7	43.2	191.0
<i>Subtotal</i>	<i>36,528</i>	<i>13,299</i>	<i>54.4</i>	<i>..</i>	<i>..</i>
<b>Total</b>	<b>140,824</b>	<b>24,458</b>	<b>100.0</b>	<b>..</b>	<b>..</b>

(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 23,872 pathology test orders and 24,458 problem/pathology combinations.

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

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

\* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix III).

Note: Abbreviations: Path – pathology order, prob – problem managed.

### **12.1.5 The inter-relationship between pathology ordered and other variables. Example: Full blood count**

Full blood count (FBC) was the most common pathology test ordered in general practice, accounting for 14.3% of all pathology orders. Overall 3,422 FBCs were ordered at a rate of 3.5 per 100 encounters.

Figure 12.2 illustrates the relationship between the ordering of an FBC 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 problems managed, the pathology order can be linked to the other variables collected at the encounter, such as drugs supplied and imaging ordered.

#### *Age and sex distribution of patients*

Sixty per cent of patients for whom an FBC was ordered were female, which is similar to the proportion for general practice as a whole. There were relatively few patients aged under 5 years who had an FBC, compared to the general practice population.

#### *Reasons for encounter*

There were 5,876 reasons for encounter recorded at the 3,422 encounters at which an FBC was ordered. The most common reasons for encounter for patients with an FBC were weakness/tiredness (15.5 per 100 encounters), general check-up (7.2), prescription all (5.3) and abdominal pain (5.2).

#### *Problems managed*

There were 3,531 problems associated with an order for an FBC. Weakness/tiredness was the most common of these problems, followed by anaemia and hypertension. Four of the top ten problems managed with an order for an FBC do not appear in the top 30 problems managed in general practice and these were weakness/tiredness, anaemia, rheumatoid arthritis and abdominal pain.

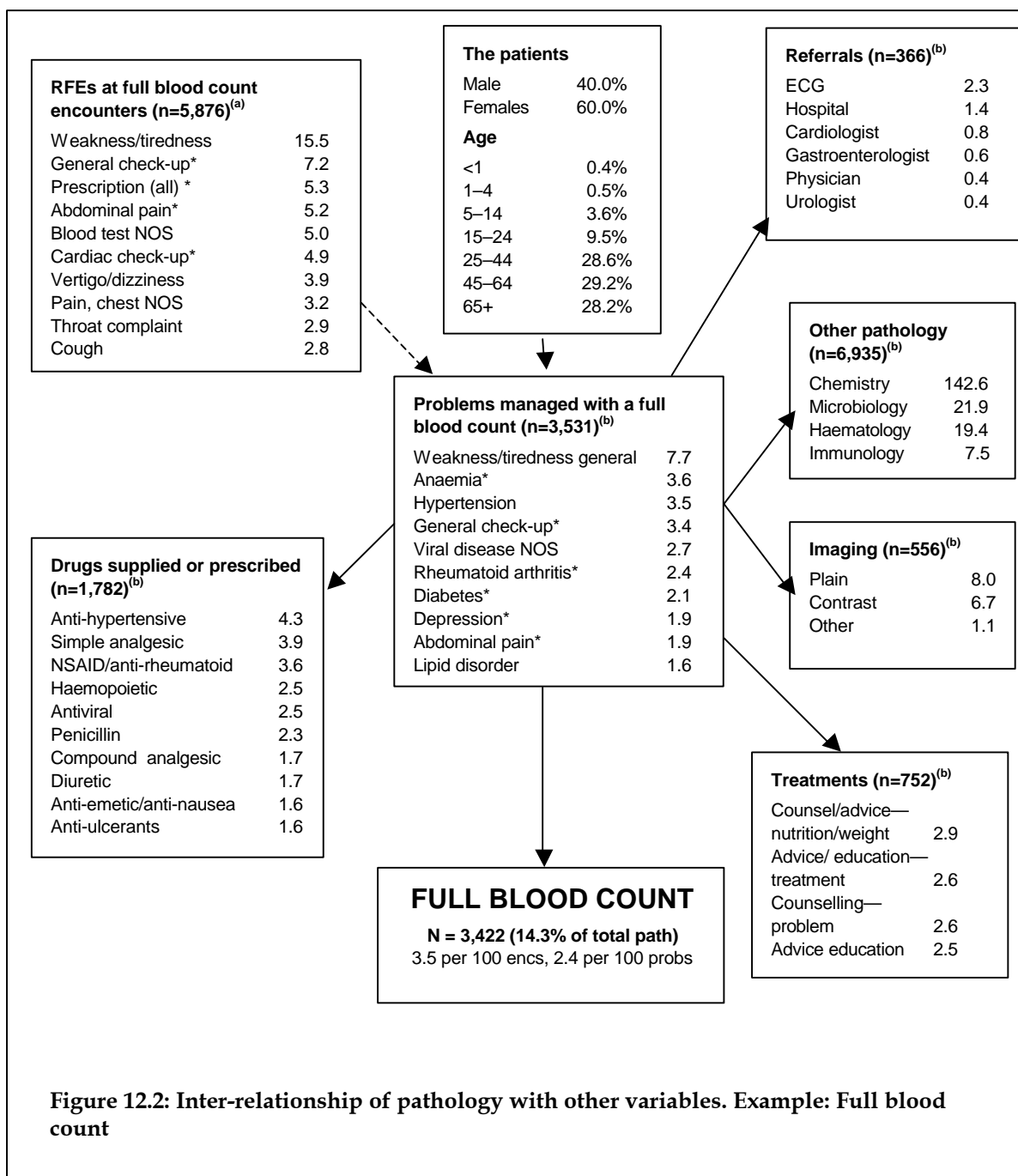
#### *Prescriptions and other treatments*

Drugs supplied or prescribed for problems managed with an order for an FBC numbered 1,782. The most common drug groups were anti-hypertensives (4.3 per 100 problems managed), simple analgesics (3.9) and NSAID/anti-rheumatoids (3.6).

Other treatments were carried out for problems managed with an FBC at a rate of 21.3 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 managed by an FBC. An order for imaging was recorded at 15.7 of every 100 problems managed by an FBC. Plain 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 FBC. Pathology tests categorised as Chemistry made up 70% of these tests.



(a) Results are presented as rates per 100 encounters at which this pathology was ordered (N=3,422).

(b) Results are presented as rates per 100 problems for which this pathology was ordered (N=3,351).

\* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix III).

## 12.2 Imaging ordering

### 12.2.1 Number of imaging orders at encounter

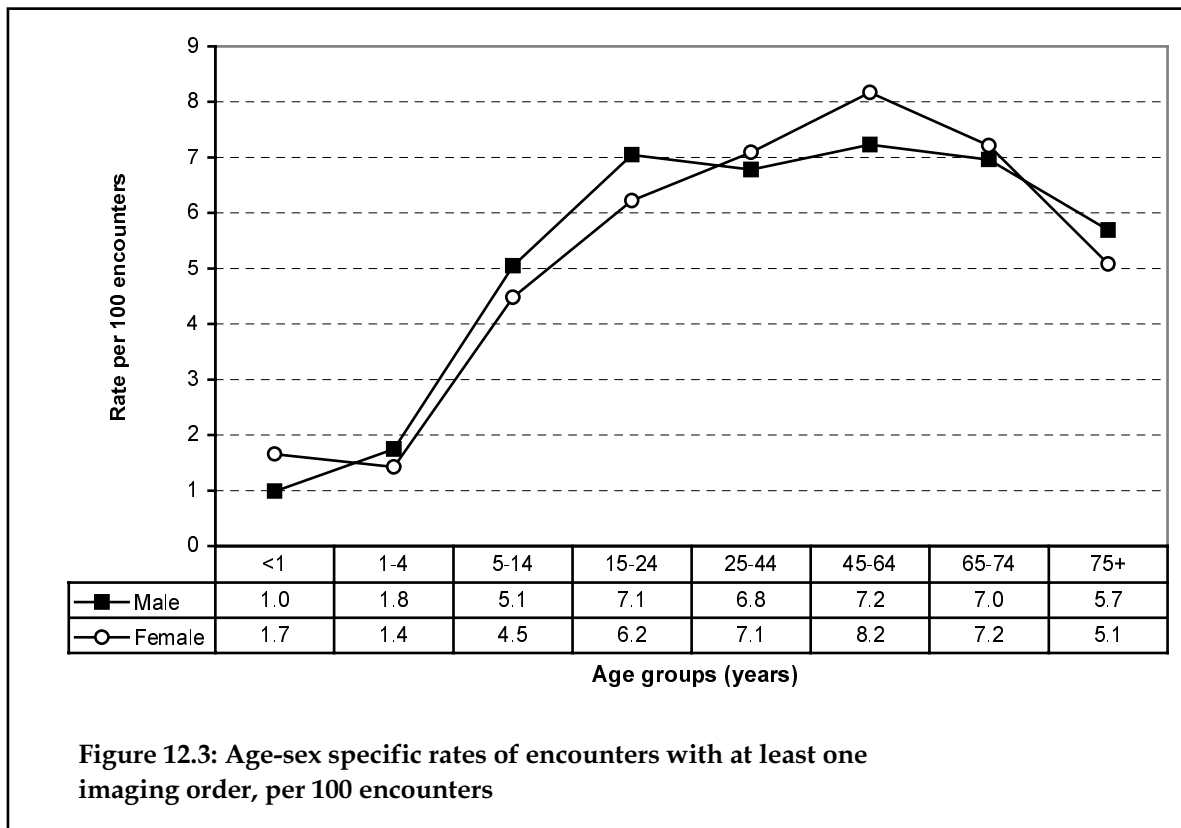
There were 6,844 orders for imaging and these were made at a rate of 7.1 per 100 encounters. At least one imaging was ordered at 6.3% of encounters and for 4.5% of problems managed.

### 12.2.2 Age–sex specific rates of encounters where at least one imaging test was ordered

One or more imaging tests were ordered at 6.2% of encounters with males and 6.4% of encounters with females. Although the overall rate and the age-specific distribution of rates were similar for both males and females, the small differences that did arise may reflect differences in the ordering of certain types of imaging tests for males and females. The two age groups where the largest differences occurred were the 15–24 years and the 45–64 years (Figure 12.3).

Males aged 15–24 were more likely to have an imaging test ordered than females of this age group. This may be due to the higher proportion of young males with fractures and other injuries.

Females aged 45–64 were more likely to have an imaging test than males of this age group. Females over 50 are encouraged to have a mammography every two years in order to detect breast cancer and this may explain the difference. However, more specific analyses would be required to define this difference.





### 12.2.3 Nature of imaging orders

The imaging tests recorded were grouped into one of three categories—**Plain**, **Contrast/US/CT** and **Other** imaging (see Appendix VII). **Plain** X-rays made up almost two-thirds (60.7%) of all imaging tests, **Contrast/US/CT** accounted for 35.0% and **Other** imaging only 4.3% (Table 12.4).

Chest X-rays were by far the most common **Plain** X-ray (22.8%) while mammography (8.9%) and X-ray of the knee (8.8%) followed. **Contrast** X-rays were usually of the abdomen (16.2%), the pelvis (12.2%) or of an unspecified site (9.0%). Bone scans (32.8%), unspecified imaging (30.6%) and Doppler tests (15.3%) 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 13.8% 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 5.7% of all imaging tests and were ordered at a rate of 0.4 per 100 encounters.

**Table 12.4: Most frequent imaging tests ordered**

Imaging test ordered	Number	% of tests <sup>(a)</sup>	% of group	Rate per 100 encs	95% LCI	95% UCI
<b>Plain</b>	<b>4,155</b>	<b>60.7</b>	<b>100.0</b>	<b>4.3</b>	<b>4.0</b>	<b>4.5</b>
X-ray;chest	947	13.8	22.8	1.0	0.8	1.1
Mammography;F	369	5.4	8.9	0.4	0.2	0.6
X-ray;knee	365	5.3	8.8	0.4	0.2	0.5
X-ray;foot/feet	279	4.1	6.7	0.3	0.1	0.5
X-ray;spinal	269	3.9	6.5	0.3	0.1	0.4
X-ray;lumbosacral	231	3.4	5.6	0.2	0.0	0.5
X-ray;hand	230	3.4	5.5	0.2	0.1	0.4
X-ray;shoulder	191	2.8	4.6	0.2	0.0	0.4
X-ray;ankle	176	2.6	4.2	0.2	0.0	0.4
X-ray;hip	174	2.5	4.2	0.2	0.0	0.4
X-ray;wrist	138	2.0	3.3	0.1	0.0	0.4
X-ray;cervical	110	1.6	2.6	0.1	0.0	0.4
X-ray;abdomen	97	1.4	2.3	0.1	0.0	0.4
Plain X-ray;bone(s)	80	1.2	1.9	0.1	0.0	0.5
X-ray;elbow	77	1.1	1.8	0.1	0.0	0.4
X-ray;face	60	0.9	1.4	0.1	0.0	0.4
X-ray;pelvis	51	0.7	1.2	0.1	0.0	0.5
X-ray;leg	42	0.6	1.0	0.0	0.0	0.5
X-ray;ribs	41	0.6	1.0	0.0	0.0	0.4

(continued)

**Table 12.4 (continued): Most frequent imaging tests ordered**

Imaging test ordered	Number	% of tests <sup>(a)</sup>	% of group	Rate per 100 encs	95% LCI	95% UCI
<b>Contrast / US / CT</b>	<b>2,397</b>	<b>35.0</b>	<b>100.0</b>	<b>2.5</b>	<b>2.3</b>	<b>2.6</b>
Test;US/CT/contrast;abdomen	387	5.7	16.2	0.4	0.3	0.5
Test;US/CT/contrast;pelvis	293	4.3	12.2	0.3	0.1	0.5
Test;US/CT/contrast	215	3.1	9.0	0.2	0.0	0.4
Test;US/CT/contrast;spine	172	2.5	7.2	0.2	0.0	0.4
Test;US/CT/contrast;breast;F	150	2.2	6.3	0.2	0.0	0.4
Test;US/CT/contrast;obstetric	149	2.2	6.2	0.2	0.0	0.5
Test;US/CT/contrast;shoulder	121	1.8	5.0	0.1	0.0	0.4
Test;US/CT/contrast;head	117	1.7	4.9	0.1	0.0	0.4
Test;US/CT/contrast;urin tract	109	1.6	4.6	0.1	0.0	0.3
Test;US/CT/contrast;brain	84	1.2	3.5	0.1	0.0	0.4
Pyelogram;intravenous	63	0.9	2.6	0.1	0.0	0.3
Test;US/CT/contrast;stom/duod	62	0.9	2.6	0.1	0.0	0.4
Test;US/CT/contrast;musculosk	60	0.9	2.5	0.1	0.0	0.4
Test;US/CT/contrast;chest	56	0.8	2.3	0.1	0.0	0.5
Test;US/CT/contrast;colon	51	0.7	2.1	0.1	0.0	0.4
Test;US/CT/contrast;neck	47	0.7	2.0	0.1	0.0	0.4
Test;US/CT/contrast;extremity	38	0.6	1.6	0.0	0.0	0.4
<b>Other</b>	<b>292</b>	<b>4.3</b>	<b>100.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.5</b>
Scan;bone(s)	96	1.4	32.8	0.1	0.0	0.4
Imaging other	89	1.3	30.6	0.1	0	0.4
Test;Doppler	45	0.7	15.3	0.1	0.0	0.4
Echocardiography	41	0.6	14.1	0.0	0.0	0.5
<b>Total imaging tests</b>	<b>6,844</b>	<b>100.0</b>	<b>100.0</b>	<b>7.1</b>	<b>6.7</b>	<b>7.4</b>

(a) This column does not sum to 100% as only those groups which accounted for greater than 0.5% of all imaging tests were included.

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

## 12.2.4 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 6,318 problems to which imaging tests were linked. Thirteen (including the top four) of the 30 most common problems were related to the musculoskeletal system. The remaining problems were related to a range of body systems including the genital, skin and respiratory systems.

Fractures, the most common problem for which imaging was ordered, accounted for 6% of all imaging. Over one-third (37.3%) of contacts with this problem resulted in an order for imaging. Back complaints accounted for the same proportion of imaging orders but only 14% of contacts with a back complaint resulted in an imaging order.

The ordering of multiple imaging for a single problem was less common than the ordering of multiple pathology. All problems associated with imaging resulted in less than 1.5 imaging orders per problem. Shoulder syndrome had the highest rate of multiple test orders, 142.4 tests being ordered for every 100 contacts.

**Table 12.5: The 30 most frequent problems managed for which imaging test ordered**

<b>Problem managed</b>	<b>Number of probs</b>	<b>Number of prob/imaging combinations<sup>(a)</sup></b>	<b>% of prob/imaging combinations</b>	<b>% of problems with test<sup>(b)</sup></b>	<b>Rate of image orders per 100 problems with imaging<sup>(c)</sup></b>
Fracture*	1,051	411	6.0	37.3	104.8
Back complaint*	2,573	407	6.0	13.9	114.0
Sprain/strain*	1,790	306	4.5	15.2	112.7
Osteoarthritis*	2,118	294	4.3	12.6	110.1
Abdominal pain*	712	201	2.9	25.7	109.5
Injury musculoskeletal NOS	720	155	2.3	19.1	112.9
Breast lump/mass (female)	178	141	2.1	57.3	138.4
Shoulder syndrome	480	139	2.0	20.3	142.4
Injury skin, other	524	136	2.0	22.5	115.3
Acute bronchitis/bronchiolitis	3,185	131	1.9	4.1	100.0
Female genital check-up*	1,566	107	1.6	5.9	116.1
Bursitis/tendonitis/synovitis NOS	670	100	1.5	13.7	108.4
Pneumonia	295	98	1.4	32.3	103.2
Pre/post natal check-up*	1,000	90	1.3	9.0	100.0
Bruise/contusion	536	88	1.3	14.9	110.6
Arthritis*	743	84	1.2	10.3	109.5
Pain, chest NOS	348	81	1.2	22.1	105.7
Acute internal damage knee	255	75	1.1	29.1	101.5
Cholecystitis, cholelithiasis	185	75	1.1	39.0	103.5
Cough	618	71	1.0	11.4	100.9
Menstrual problems*	772	71	1.0	8.7	106.0
Knee symptom/complaint	238	68	1.0	26.1	110.3
UTI*	1,569	66	1.0	4.0	104.6
Musculoskeletal disease, other	664	65	1.0	9.2	107.5
Headache	495	65	1.0	13.0	101.7

*(continued)*

**Table 12.5 (continued): The 30 most frequent problems managed for which imaging test ordered**

<b>Problem managed</b>	<b>Number of probs</b>	<b>Number of prob/imaging combinations<sup>(a)</sup></b>	<b>% of prob/imaging combinations</b>	<b>% of problems with test<sup>(b)</sup></b>	<b>Rate of image orders per 100 problems with imaging<sup>(c)</sup></b>
Hip symptom/complaint	126	62	0.9	44.0	113.1
Sinusitis acute/chronic	1,513	62	0.9	3.8	108.9
Shoulder symptom/complaint	198	61	0.9	23.8	128.9
Heart failure	846	60	0.9	6.5	108.2
Asthma	3,079	59	0.9	1.9	100.0
<i>Subtotal</i>	<i>29,074</i>	<i>3,830</i>	<i>55.3</i>	<i>..</i>	<i>..</i>
<b>Total</b>	<b>140,824</b>	<b>6,922</b>	<b>100.0</b>	<b>..</b>	<b>..</b>

(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 6,844 imaging test orders and 6,922 problem/imaging combinations.

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

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

\* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix III).

Note: Abbreviations: Probs – problems managed, NOS –Not otherwise specified.

## 12.2.5 The inter-relationship between imaging ordered and other variables: Example: Chest X-ray

The most common imaging ordered was a chest X-ray. The 947 orders accounted for 13.8% of all imaging and occurred at a rate of 1.0 per 100 encounters.

Figure 12.4 illustrates the relationship between the ordering of a chest X-ray and other variables that are collected at the general practice encounter. 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 collected such as referrals and treatments carried out.

### *Age and sex distribution of patients*

Just over 50% of patients who had a chest X-ray were male which is slightly higher than the overall percentage of males seen in general practice. Older patients (aged 65 and over) were also over-represented.

### *Reasons for encounter*

There were 1,533 reasons for encounter recorded at encounters where a chest X-ray was ordered. Cough and chest pain were the most common RFEs recorded.

### *Problems managed*

Acute bronchitis was the most common problem managed of the 971 problems managed with a chest X-ray. As well as problems related to the respiratory system and of problems of unspecified nature, problems related to the cardiovascular system featured in the ten most common problems.

### *Prescriptions and other treatments*

There were 771 drugs prescribed or supplied for problems managed with a chest X-ray. The most common were broad spectrum penicillins (10.9), followed by bronchodilators (10.6) and other antibiotics (8.1).

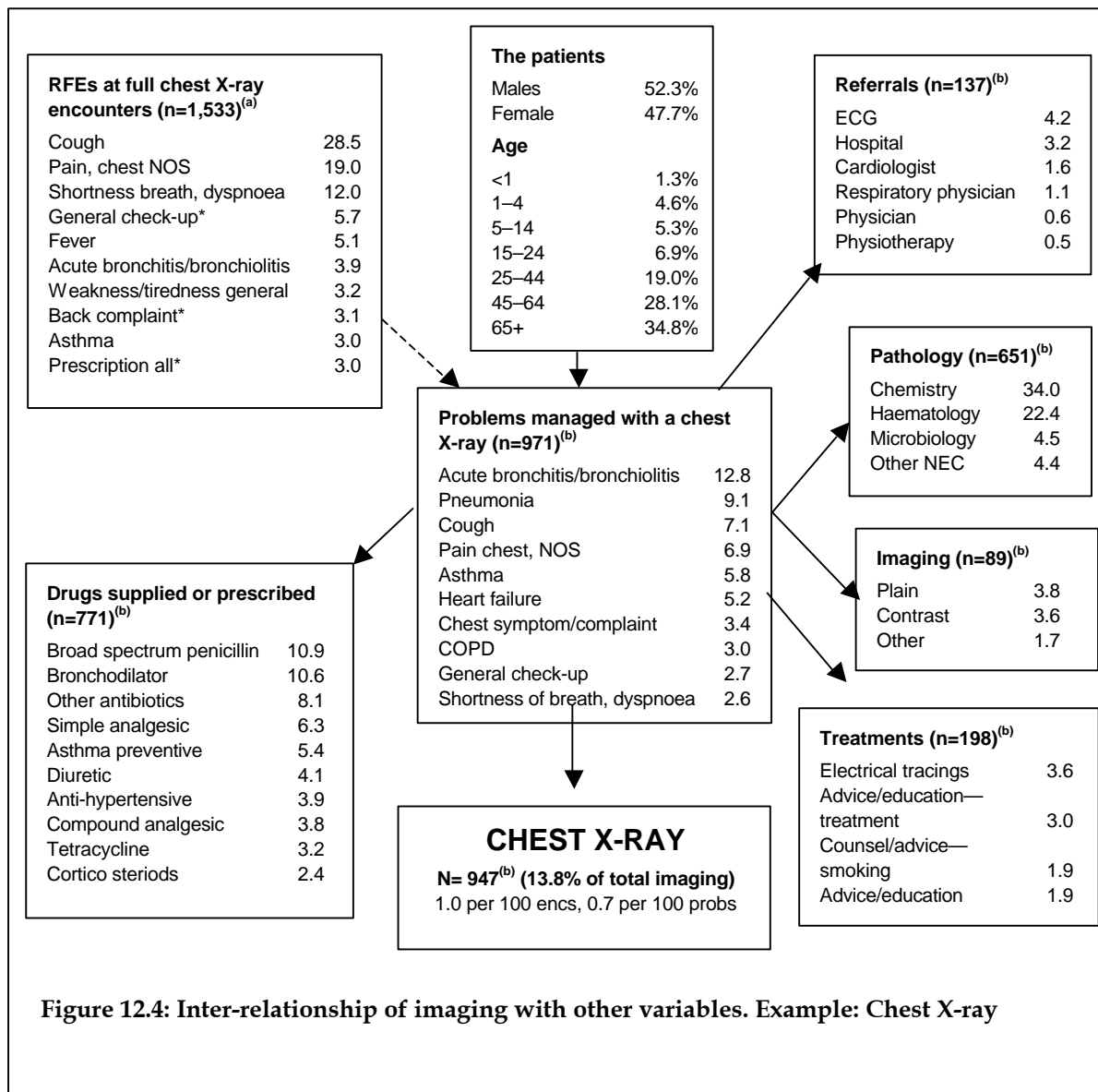
Other treatments were carried out at a rate of 20.4 per 100 problem contacts. Electrical tracings was the most common other treatment carried out for these problems.

### *Referrals, tests and investigations*

One hundred and thirty-seven referrals were recorded for problems managed with a chest X-ray. A referral for an ECG was recorded for 4.2 of every 100 problem contacts, a hospital referral for 3.2 and a referral to a cardiologist for 1.6.

A pathology test order was recorded at 67 per 100 problem contacts. The majority of these tests were either chemistry or haematology tests.

Only 89 other imaging tests were ordered for the same problem contact as those with a chest X-ray. Less than 10 per 100 problems had an imaging test ordered concurrently with a chest X-ray.



**Figure 12.4: Inter-relationship of imaging with other variables. Example: Chest X-ray**

(a) Results are presented as rates per 100 encounters at which this imaging was ordered (N=947).

(b) Results are presented as rates per 100 problems for which this imaging was ordered (N=971).

\* Includes multiple ICPC-2 and ICPC-2 PLUS codes (see Appendix III).