

# Time trends in GP outpatient referrals

Cathy Hodgson and  
Charlotte Ellis,  
Office for National Statistics

**This article uses the General Practice Research Database to examine time trends in GP outpatient referral data for the period 1994–98 in England and Wales. There was a steady increase in rates of GP referrals over the 5-year period. The NHS plan states “assuming GP referrals remain broadly in line with the current trend in the growth of referrals, then the maximum waiting time for a routine outpatient appointment will be halved...”. Future referral numbers need to be assessed accurately because they have a direct impact on waiting times. This article examines the growth in recent years and projects future numbers of referrals assuming alternative referral growth patterns.**

## INTRODUCTION

Within the NHS the GP performs a gatekeeper role. Patients’ main access to hospital services is via GP outpatient referrals. Waiting times for NHS services are generally calculated as the time between the hospital receiving the GP referral letter and the patient visiting the hospital consultant clinic for the first time.<sup>1</sup> The NHS Plan<sup>2</sup> sets a target for reducing maximum waiting times for a routine outpatient appointment from over 6 months to 3 months by 2005 based on the assumption that GP referrals remain broadly in line with the current trend. Looking at the changes in GP referrals and predicting future trends is an important method of assessing demand for hospital services.

The NHS plan<sup>2</sup> also says that “By April 2001 every GP practice and primary care group/trust must have in place systems to monitor referrals rates from every GP practice, ...”. The General Practice Research Database (GPRD) is a useful tool for examining GP referral rates because it contains information by age and sex and specialty which is not currently available from other national sources. Individual practices and primary care groups/trusts can use GPRD data for comparison with locally produced referral rates.

The objective of our analysis was to examine time trends in GP outpatient referral rates for the 5-year period 1994–98. We also estimated national referral figures for 1994–98 using referral rates from the GPRD and compared these to national data from the Department of Health. Finally, we projected referral numbers for the years 1999–2002 to assess the likely future demand for hospital services.

## METHODS

### GPRD referral data

The referral data used in this analysis were published in *Key Health Statistics from General Practice 1998*<sup>3</sup> (KHS98) in October 2000. This publication is the third in a series of reports produced using data from the General Practice Research Database (GPRD), a database of anonymised medical records (see Box 1). The analysis used data from 211 practices. Practices were included if they submitted data to the GPRD throughout the five-year period 1994–98 and the data passed quality checks. The practices had a total population of 1.4 million patients in 1998, representing 2.6 per cent of the population of England and Wales. There is some variation in coverage between regions, from 1.4 per cent in North Thames to 3.6 per cent in West Midlands. A comparison of the 1998 population (of the 211 practices) by age and sex with the mid-1998 population of England and Wales shows that the age distributions were very similar.<sup>3</sup>

## Box one

### GENERAL PRACTICE RESEARCH DATABASE (GPRD)

The General Practice Research Database (GPRD) was originally set up in 1987 by the VAMP software company and was subsequently acquired by Reuters Health Information Ltd. who donated it to the Department of Health in 1994. In July 2000 there were 371 practices across the UK submitting data to the GPRD. Initially all practices contributing to GPRD used VAMP Medical practice software. However, a proportion of the 371 practices now submitting data to GPRD have moved to Vision practice software and their data were not included in the production of *Key Health Statistics from General Practice 1998* (KHS98).<sup>3</sup> All 211 practices included in KHS98 were using VAMP Medical practice software during the period 1994 to 1998.

Participating practices follow agreed guidelines for the recording of clinical data. These guidelines include entering all events resulting in a hospitalisation or referral to any specialist. Collected data are regularly assessed to ensure that practices are recording to the necessary levels. The accuracy and comprehensiveness of the data recorded in the GPRD has been documented previously.<sup>4,5,6</sup>

With information on several million patients and up to 12 years of longitudinal data the GPRD is a unique data source for research into many aspects of morbidity, disease management and treatment. Many studies have used data from this database; these include analyses of disease epidemiology, time trends, regional and seasonal variations, prescribing patterns, pharmaco-epidemiology, drug safety studies, and other public health research. A bibliography is available on request from the General Practice Research Database, Medicines Control Agency, Floor 15, Market Towers, 1 Nine Elms Lane, SW8 5NQ or email [gprd@mca.gov.uk](mailto:gprd@mca.gov.uk)

A GP outpatient referral is defined as a request by the GP that a patient is seen in a specialist clinic. The referrals counted here were all to consultant outpatient clinics. Emergency admissions and attendance at A&E were not included. In general GPs only record the first referral of a patient to a clinic for an episode of care and not follow-up appointments arranged by the clinic or further appointments initialised by the GP within the same episode of care. Only referrals made while patients were registered and therefore ‘at risk’ were included.

Referral rates were calculated as the number of referrals per 1,000 patient years at risk. Patient years at risk were calculated for each year as the number of days that patients were registered during the year, divided by the number of days in the year.

To account for differing population age structures between the sexes and over time we calculated age-standardised rates for each sex by applying the age specific referral rates to the European standard population. We applied the age specific rates by 5-year age groups (except 10–15 and 16–19) from age 0 to 85 and over.

Referrals were classified by their clinical specialty as recorded by the GP when making the referral. Practices included in the analysis were all using VAMP Medical software (see Box 1). Box 2 shows the list of medical specialties presented to GPs by the VAMP Medical software. GPs can only select a specialty on the list and are not able to add their own.

Referrals to some specialties were excluded from this analysis; these are Obstetrics, Genito-urinary, X-ray, Pathology and Others. They were excluded because of variations in the way that different GPs can record referrals to these specialties within the VAMP Medical software. For example, there are a number of ways to record X-rays and Pathology using the VAMP Medical software most of which would be missed by an extract of referrals. Obstetric care is often managed jointly with local midwives so the referral procedure, and associated records, will vary from area to area.

## Box two

### GPRD VAMP MEDICAL SPECIALTIES

- General Surgical
- General Medical
- Orthopaedic
- Rheumatology
- Ear, Nose and Throat
- Gynaecology
- Obstetrics
- Paediatric
- Ophthalmology
- Psychiatry
- Geriatrics
- Dermatology
- Neurology
- Genito-urinary
- X-ray
- Pathology
- Others

### Comparison with national data

For each calendar year we applied GPRD age-sex specific referral rates to the relevant England mid-year population estimates thus obtaining a GPRD-based estimate of the total number of referrals that took place in each year in England over the period 1994–98. In doing this, GPRD rates for England and Wales were used because rates for individual calendar years were not readily available for England only. However, referral rates published for the combined 5-year period 1994–98 show the rates for England to be very similar and in most cases identical to the England and Wales rates.

We compared the estimated GPRD-based national referrals with Department of Health data on GP written referral requests in England<sup>7</sup> (KH09 returns). This enabled us to assess whether changes over time in GPRD data could be explained by changing recording habits and whether GPRD data were consistent with national data. The KH09 national data are classified into 66 specialties, considerably more than those available to GPRD practices (see Box 2). We matched up the specialty groups in the two lists. For example, Gastroenterology and Medical Oncology (in the KH09 list) would be recorded under General Medicine (in the GPRD list). Using the selected subset of KH09 specialties that corresponded with those included in the GPRD analysis (that is excluding Obstetrics, Genito-urinary, X-ray, Pathology and Others), figures for national GP written referrals were estimated. The national KH09 figures are produced by financial year so an estimate for each calendar year was calculated by weighting the figures for the two relevant financial years; e.g. 1998 was calculated by using a quarter of the 1997/98 figure and three quarters of the 1998/99 figure.

### Projected referral numbers 1999–2002

To give an indication of the pressure that the number of referrals may put on the health services in the imminent future we used current trends in the GPRD referral rates to project the number of referrals that would occur in each of the years 1999–2002.

We produced three alternative projections based on different assumptions as to how referral rates will behave in forthcoming years. These variant projections were calculated by applying the age-sex

specific rates to the projected population in each of the years 1999–2002. For a base projection we applied the age-sex specific 1998 GPRD referral rates to each subsequent year. The level one projection was calculated by applying the average change over 1994–98 in each age-sex group. This was calculated as the arithmetic mean of the change over each of the previous four years. The level two projection (the highest projection) was calculated by applying the 1997–98 change in each age-sex group.

## RESULTS

### Analysis of GPRD referral rates

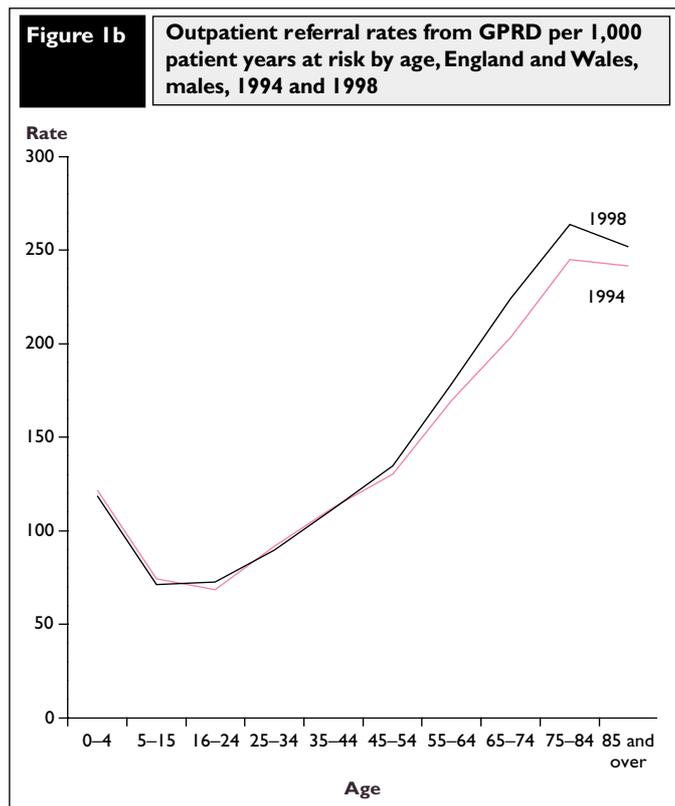
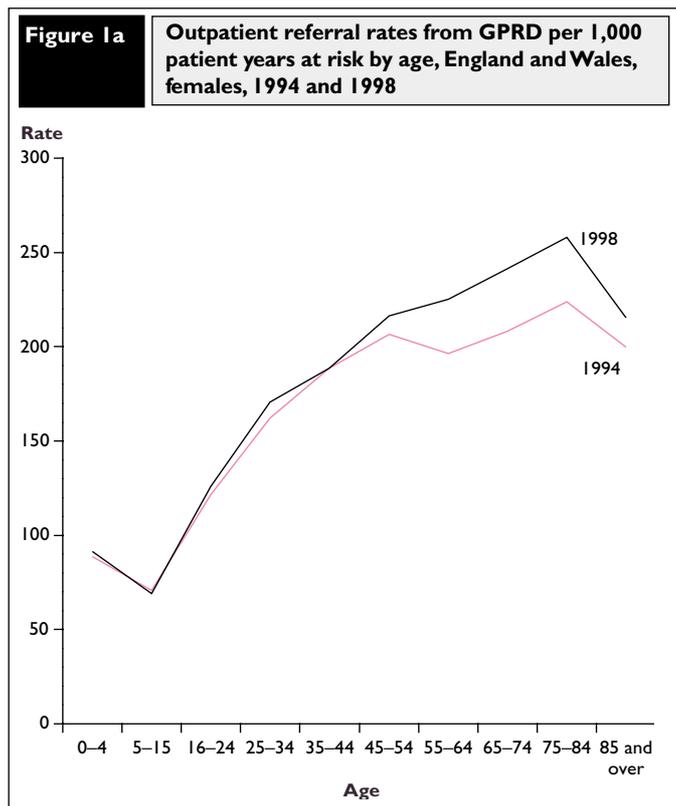
Table 1 shows GPRD outpatient referral rates for all specialties included in the analysis for the calendar years 1994–98. The age-standardised referral rate for females rose by 6.5 per cent between 1994 and 1998, to 166.0 per 1000 patient years at risk, while that for males also increased but by a lesser extent (2.6 per cent). Figure 1 shows that increases did not occur in all age groups. For females (Figure 1a), there was a slight decrease for 5- to 15- year-olds between 1994 and 1998. For females in other age groups below age 55 there were small increases, except for 35- to 44- year-olds which showed no change. Between ages 55 and 84 the increases in referral rates were much larger, in the region of 15 per cent. For males (Figure 1b) there were slight decreases in referral rates between 1994 and 1998 for all age groups under 45, except for 16- to 24- year-olds. Rates for those aged 45 and over increased, with the largest increases occurring at ages 65–74 (10 per cent) and 75–84 (8 per cent).

Table 2 shows the percentage change in referral rates by specialty between 1994 and 1998, for females and males respectively. This table also includes GPRD numbers of referrals in 1998 and the percentage distribution for the 211 practices and selected specialties included in this analysis. During the period 1994 to 1998, 40 per cent of referrals for men and over 50 per cent of referrals for women were to General Medicine, General Surgery or Orthopaedic. Therefore, despite decreases in some specialties, the increases in others (particularly in General Medicine - 10.2 per cent for men and 17.6 per cent for women) resulted in an overall rise in referral rates.

**Table 1** Outpatient referral rates from GPRD per 1,000 patient years at risk by age, sex and calendar year, England and Wales, 1994–98

	0–4	5–15	16–24	25–34	35–44	45–54	55–64	65–74	75–84	85 and over	Crude rate	Age-standardised rate
<b>Males</b>												
1994	121.6	74.3	68.6	91.6	112.5	130.2	169.6	203.3	244.9	241.5	121.0	119.1
1995	115.6	74.0	70.1	93.8	110.1	129.9	171.3	216.5	249.3	241.2	122.4	120.0
1996	114.8	74.7	70.8	90.9	111.7	132.1	174.5	217.0	257.1	229.5	123.5	120.7
1997	118.8	71.0	71.0	89.6	108.9	129.5	173.3	218.2	258.5	239.2	122.6	119.6
1998	118.6	71.2	72.6	89.7	111.7	134.6	178.2	224.1	263.7	251.8	125.6	122.2
<b>% change 1994–98</b>	<b>-2.5</b>	<b>-4.2</b>	<b>5.8</b>	<b>-2.1</b>	<b>-0.7</b>	<b>3.4</b>	<b>5.1</b>	<b>10.2</b>	<b>7.7</b>	<b>4.3</b>	<b>3.8</b>	<b>2.6</b>
<b>Females</b>												
1994	88.9	70.7	121.5	162.3	188.6	206.6	196.3	208.2	223.7	199.8	162.5	155.9
1995	89.5	70.9	124.8	167.4	192.0	211.7	207.6	218.4	234.8	207.7	168.1	160.8
1996	90.0	69.3	123.5	170.9	187.7	210.6	208.1	224.9	246.6	213.2	169.5	161.1
1997	90.6	69.5	124.7	167.5	187.5	207.2	214.2	234.3	248.7	215.4	170.5	161.9
1998	91.3	69.0	126.0	170.7	188.7	216.3	225.3	241.4	258.2	215.4	175.0	166.0
<b>% change 1994–98</b>	<b>2.7</b>	<b>-2.4</b>	<b>3.7</b>	<b>5.2</b>	<b>0.1</b>	<b>4.7</b>	<b>14.8</b>	<b>15.9</b>	<b>15.4</b>	<b>7.8</b>	<b>7.7</b>	<b>6.5</b>

Source: Key Health Statistics from General Practice 1998.



**Table 2** 1994-98 percentage changes in GPRD referral rates, by sex and specialty, England and Wales

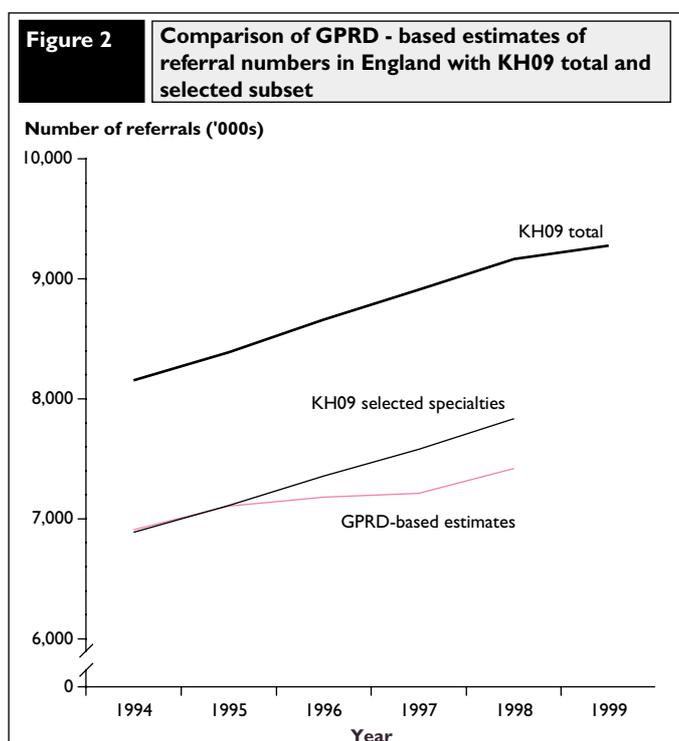
	Age-standardised rate (all ages)			Number of referrals	
	1994	1998	% change	1998	%
<b>Females</b>					
General medicine	17.0	20.0	17.6	13,840	12.5
General surgery	28.0	30.4	8.6	20,366	18.4
Orthopaedic	17.9	19.1	6.7	12,714	11.5
Rheumatology	4.7	4.9	4.3	3,252	2.9
Neurology	3.5	4.0	14.3	2,556	2.3
Gynaecology	30.8	30.5	-1.0	19,388	17.5
Ophthalmology	11.5	12.5	8.7	9,787	8.8
Geriatric	1.5	1.2	-20.0	1,430	1.3
Paediatric	5.6	6.5	16.1	3,138	2.8
Ear, nose and throat	15.5	15.3	-1.3	10,106	9.1
Psychiatry	6.9	7.7	11.6	5,183	4.7
Dermatology	13.0	13.9	6.9	9,206	8.3
<b>Total included specialties</b>	<b>155.9</b>	<b>166.0</b>	<b>6.5</b>	<b>110,966</b>	<b>100.0</b>
<b>Males</b>					
General medicine	16.7	18.4	10.2	12,112	15.6
General surgery	28.1	27.6	-1.8	17,870	23.0
Orthopaedic	18.5	19.1	3.2	12,140	15.6
Rheumatology	2.7	2.6	-3.7	1,665	2.1
Neurology	2.9	3.1	6.9	1,985	2.6
Gynaecology	0.1	0.1	0.0	49	0.1
Ophthalmology	10.3	10.7	3.9	7,047	9.1
Geriatric	1.3	0.9	-30.8	708	0.9
Paediatric	6.2	7.2	16.1	3,582	4.6
Ear, nose and throat	16.2	15.3	-5.6	9,574	12.3
Psychiatry	5.8	6.9	19.0	4,326	5.6
Dermatology	10.3	10.5	1.9	6,691	8.6
<b>Total included specialties</b>	<b>119.1</b>	<b>122.2</b>	<b>2.6</b>	<b>77,749</b>	<b>100.0</b>

Changes in referral rates varied considerably across specialties. Specifically, for both men and women, there were large increases to paediatric and psychiatry, as well as general medicine, and smaller increases to ophthalmology, dermatology, neurology and orthopaedic. While there was a large fall in referral rates to geriatric medicine this specialty only accounted for 1 per cent of total referrals.

### Comparison of GPRD estimates with routine national data

Estimating national referral figures using the GPRD rates gives the estimated national number of GP outpatient referrals in 1994 as 6,909,000. Compared with this, the number of GP written referral requests in 1994 (for the subset of specialties included in the GPRD analysis) from the routine national KH09 data was 6,887,000.

Figure 2 illustrates for England both the GPRD-based estimate, the routine national KH09 figure and the KH09 subset of GPRD matched



specialties, for each year in the period 1994–98. The total national numbers are included to show that the KH09 subset increases are consistent with overall increases. The GPRD-based estimates follow the same upward trend as the national data but with some variation.

The 1999 national KH09 figure for all specialties has been included in Figure 2. This shows a slowing down of the upward trend present between 1994 and 1998. The change between 1998–99, an increase of 1.3 per cent, is less than the rise in 1997–98 (2.9 per cent).

### Projected referral numbers

Table 3 contains projected referral numbers for 1999–2002 for England and also the differences between these and the 1998 GPRD-based estimates. The first section shows the base projections for the number of referrals that will occur in each year up to 2002 if the 1998 GPRD referral rates are prevailing to that date. Even with the rate remaining constant the number of referrals will rise steadily with an expected extra 165 thousand referrals in 2002, compared with 1998 (2.2 per cent increase).

The second section of the table shows the level one projections. If the average trend in each age group from 1994–98 continued in each year 1999–2002 this would result in a projected extra 594 thousand referrals in 2002, 8 per cent more than in 1998.

The final section of the table shows the level two projections. If the increase between 1997 and 1998 is applied in subsequent years, the number of projected referrals in 2002 is 937 thousand (12.6 per cent) higher than the number in 1998.

### DISCUSSION

Our analysis shows that age-standardised referral rates increased over the 5-year period 1994–98 by 2.6 per cent for males and 6.5 per cent for females. The largest increases were amongst the middle aged and the elderly, while there has been a small decrease in most age specific rates for children.

This overall increase in referral rates may be due to a combination of factors. One important factor is a rise in disease prevalence. KHS98<sup>3</sup> shows increases in the prevalence of several major diseases over the period 1994–98 such as diabetes, treated coronary heart disease and treated hypertension. For example, the age-standardised prevalence rate

**Table 3** Projected referral numbers, England, 1999–2002

Alternative Projections	Assumption		1998	1999	2000	2001	2002
Base	Rates remain constant at 1998 level	Referral numbers	7,422,017	7,465,309	7,507,462	7,546,086	7,587,236
		Increase on previous year		43,292	42,153	38,624	41,150
		Increase on 1998		43,292	85,445	124,069	165,219
		% increase on 1998		0.6	1.2	1.7	2.2
Level 1	Rates increase in line with (1994–98) average	Referral numbers	7,422,017	7,565,775	7,712,105	7,859,258	8,016,191
		Increase on previous year		143,758	146,330	147,153	156,933
		Increase on 1998		143,758	290,088	437,241	594,174
		% increase on 1998		1.9	3.9	5.9	8.0
Level 2	Rates increase in line with 1997–98 changes	Referral numbers	7,422,017	7,643,897	7,873,603	8,109,512	8,359,343
		Increase on previous year		221,880	229,705	235,910	249,830
		Increase on 1998		221,880	451,586	687,495	937,326
		% increase on 1998		3.0	6.1	9.3	12.6

for insulin treated diabetes increased from 4.1 to 5.1 per 1,000 patients for females (24 per cent) and from 4.6 to 5.7 per 1000 patients for males (24 per cent). This rise in the prevalence of diabetes is likely to have a significant influence on the number of referrals to secondary care. Many newly diagnosed patients will be referred to hospital for specialist services, included here under General Medicine and Ophthalmology, for assessment, since diabetes is a risk factor in heart disease, stroke, visual problems and kidney disease.

There may be other factors contributing to the overall increase in referral rates. For example, greater demand from patients for a hospital referral, a wider range of services being offered by hospitals or new treatments being available. However, there is currently little quantitative information in the literature which allows us to assess the effects of these factors on the numbers of referrals.

A shift in hospital organisation over the period 1994–98 may have contributed to the considerable variation in referral rate changes across specialties. The precise clinical boundaries between specialties can vary with local circumstances depending on the organisation of the NHS Trust within a particular area and are liable to change over time. The rise in referrals to the general medicine specialty may be partly linked to the fact that older patients are now less likely to be treated on geriatric wards for common conditions such as heart disease. This is supported by our analysis that shows a fall in referral rates to geriatric medicine.

Comparison of GPRD-based estimates of referral numbers with national KH09 data shows that GPRD data are consistent with national sources. While there is some variation between the KH09 subset of specialties and GPRD data this may be due to problems in matching GPRD specialty headings to KH09 specialties. Although the maximum discrepancy between national KH09 and GPRD estimates was 5 per cent in 1998, between 1997 and 1998 increases in referral numbers occurred at the same rate in both datasets.

A strength of our study is that GPRD provides information on the age-sex distribution of referral rates which is not available from other national sources. The GPRD sample is also well matched to the age-sex distribution of England and Wales. GPRD data, at least for some practices, includes private referrals which would not be in GP written request data (from KH09). It is not possible to distinguish private from NHS referrals within the GPRD, but the comparison shows GPRD data at or below KH09 levels, so private referral contribution to the GPRD total is small. Also, the GPRD is under-represented in inner city and deprived areas<sup>3</sup> which may not have the same pattern of referrals as other areas.

Applying referral rates for 1998 to the 2002 projected population for England, we estimate a 2.2 per cent increase in the number of referrals over the period. This increase in numbers of referrals despite static rates is found because of projected increases in the number of elderly people in the population and the high proportion of referrals in this age group. If referral rates continue increasing and rise above the 1998 level, specifically if the 1997–98 rate increase continues in the years 1999–2002, referral numbers in 2002 will be 12.6 per cent above the 1998 GPRD-based estimate.

By applying the 1998 GPRD referral rates to population projections for 1999–2002, we are making the assumption that referral rates will not continue increasing. As discussed above there has been a trend of increasing referral rates over the period 1994–98. Thus if the upward trend was to continue until 2002, by applying the 1998 rates we have calculated cautious estimates of the number of referrals. However, the most recent national data show a slowing down of the upward trend so

the baseline projections (assuming no increase in referral rates from 1998) are in fact likely to be our best estimate of future numbers of referrals. Even these figures would mean a year on year increase in referral numbers with consequent extra pressures on health services.

Orthopaedics, dermatology and ophthalmology have all seen increases in referral rates between 1994 and 1998. These three specialties have waiting times among the longest and the NHS plan promises to target these areas. Considerable extra resources have been committed to improving waiting times but the NHS Plan notes “.. it will take time to get the right supply of consultants and other staff into each specialty.” However, our analysis suggests that in the very short term, while these resources are put in place, there will be extra pressure on hospital services due to more referrals from GPs. Further research is needed to explain why referrals have risen. Increased disease prevalence and availability of new treatments are trends likely to continue leading to greater demand on the NHS.

## Key findings

- GP outpatient referral rates rose between 1994 and 1998, by 6.5 per cent for females and 2.6 per cent for males.
- Increases in referral rates were largest in the older age groups. Referral rates for children and young adults either decreased or rose slightly.
- Comparison of GPRD-based estimates of referral numbers with national KH09 data shows that GPRD data are consistent with national sources.
- If the referral rate remained constant between 1998 and 2002, the number of referrals in 2002 would still be 2.2 per cent higher than in 1998.

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