

Do referral rates vary widely between practices and does supply of services affect demand? A study in Milton Keynes and the Oxford region

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SUMMARY. *Two commonly held beliefs about referral rates were investigated in this study: first that demand for services is determined by supply and secondly that there is wide variation between general practices in their referral rates.*

All referrals to specialist outpatient clinics were recorded during two 11-week periods by general practitioners in eight practices in the new town of Milton Keynes and in 17 practices elsewhere in the Oxford region. During the first period, only a limited outpatient service was available in the new town: for many specialist services, people had to be referred to hospitals outside the district. Referral rates from Milton Keynes were very similar to those from the rest of the region. By the second period the range of specialist facilities available locally had expanded considerably with the opening of the new district general hospital and during this period there was a statistically significant but rather small increase in referral rates from Milton Keynes. Variation in referral rates between general practices within each geographical group was greater than that between the two groups. Overall, there was about a three-fold variation between general practices in outpatient referral rates which is considerably less than that commonly thought to exist.

Introduction

IT is an almost axiomatic belief in health care that the supply of services is a major determinant of demand for them.¹ The development of specialist services in the new town of Milton Keynes during 1984 afforded the opportunity to test this view. A study of general practitioners' referrals was undertaken, first, to compare the referral practices of general practitioners in Milton Keynes with those of their counterparts elsewhere in the Oxford region before there was a local district general hospital and, second, to determine whether referral practices changed radically in Milton Keynes with the arrival of the full range of local specialist medical services.

The philosophy underlying planning of health services for the new city of Milton Keynes in the late 1960s was that of a community based service. Emphasis was placed on the role of the purpose-built health centres within communities from which a

range of primary care and social services would be available. Until 1984 there was a limited outpatient service at clinics held at the health centres. The only local specialist inpatient services were those for geriatrics and psychiatry. General practitioner inpatient beds were available in the local community hospital. For all other specialties residents of the new town were admitted to hospitals in other districts and, in particular, in the neighbouring districts of Aylesbury and Northampton. With the opening of the Milton Keynes district hospital in the spring of 1984 a much wider range of outpatient facilities and the full range of inpatient facilities became available within the district. This study looks at referrals from general practices before and after the opening of the new hospital.

A further objective was to study variation in referral rates between individual practices both within and outside the new town. It is commonly held that wide variation exists between general practices in their referral rates. However, Dowie² has pointed out that the interpretation of differences in general practice referral rates in the literature is obscured by variations in the methodology and definitions used. For example, it is not always clear whether outpatient studies include or exclude antenatal visits; whether they only include referrals to specialties with consultant responsibility or whether they include referrals to (say) chiropody, physiotherapy and hearing aid clinics; most studies report crude rather than age-standardized or age-specific referral rates; and many studies report on small numbers from individual practices. Our study used agreed definitions and protocols common to all practices. Age-sex analyses of participating practices were available and it was therefore possible to calculate age-sex standardized referral rates.

Method

Two groups of general practitioners participated in the study. An invitation to take part was sent to all practices in Milton Keynes and 10 out of 22 practices in the district agreed to participate; two of the original 10 dropped out in the second phase of the study and their results are excluded. Approaches were made through the Oxford community health project and the Thames Valley faculty of the Royal College of General Practitioners to practices in the rest of the Oxford region. Altogether 22 practices from elsewhere in the region agreed to participate, but five of these were unable to supply age-sex breakdowns of their practice populations so these have been excluded. Of the remaining 17 practices, two were in Oxford city, six in other parts of Oxfordshire, three in Berkshire, and six in Northamptonshire.

Data were collected on all outpatient referrals, both private and National Health Service, made to any hospital specialty in any district by each general practitioner in each practice during two 11-week periods: (1) before the opening of the Milton Keynes general hospital, from 3 October 1983 to 18 December 1983 and (2) after the opening of the hospital, from 1 October 1984 to 16 December 1984. The hospital opened between April and May 1984.

Each time an outpatient referral was made a standard proforma was completed which included the patient's date of birth, sex, information about the referring general practitioner, the

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specialty, hospital and district of referral, diagnoses made by the referring general practitioner, and reason for referral. Considerable effort was made to ensure complete coverage of all outpatient referrals during the two periods by enlisting the cooperation of an administrative staff member in each practice to supervise data collection.

Age and sex standardized referral rates were calculated for all specialties combined and for individual specialties by the direct method of standardization using the population from the practices in the rest of the region for the two periods combined as the standard. 'All specialties' included all referrals to a hospital specialist except those to an obstetrician. Referrals to paramedical specialties and to dentistry were excluded.

Results

During each of the two periods data were collected on about 5000 referrals from a total practice population of about 220 000 people. Table 1 gives information on the number of participating general practices and general practitioners, practice populations and total numbers of referrals in each of the two periods. The same groups of general practitioners and practices participated in each of the two phases.

Between 70% and 75% of the referrals in each group of practices in each of the two phases of the study consisted of referrals to five specialties: general surgery (including urology),

Table 1. Number and characteristics of participating practices in the two periods of the study, 3 October 1983 to 18 December 1983 and 1 October 1984 to 16 December 1984.

	Period 1	Period 2
<i>Number of practices</i>		
Milton Keynes	8	8
Rest of Oxford region	17	17
<i>Number of general practitioners</i>		
Milton Keynes	25	26
Rest of Oxford region	72	73
<i>Total practice population</i>		
Milton Keynes	53 814	58 865
Rest of Oxford region	165 390	168 625
<i>Total number of outpatient referrals</i>		
Milton Keynes	1146	1382
Rest of Oxford region	3517	3723

general medicine, trauma and orthopaedic surgery, ear, nose and throat surgery, and gynaecology. Table 2 shows age and sex standardized referral rates and numbers of referrals made to all specialties and to each of the major district specialties in the two periods of the study from the practices in Milton Keynes and from the rest of the Oxford region. These results show a striking similarity in the all-specialty age-sex standardized referral rate in the two groups of practices before the Milton Keynes general hospital opened. Standardized referral rates from Milton Keynes were lower than elsewhere for general surgery and urology, trauma and orthopaedic surgery and dermatology, but only in the case of the referral rate for trauma and orthopaedic surgery was the value significantly lower at the 5% level. Standardized referral rates for referrals to ear, nose and throat surgery, general medicine, mental illness and to gynaecology were higher in Milton Keynes than elsewhere but not significantly so.

Six months after the opening of the Milton Keynes general hospital the overall referral rate had increased, as had referrals to several individual specialties — general surgery and urology, general medicine, trauma and orthopaedic surgery, ear, nose and throat surgery, gynaecology, and paediatrics (Table 2). These were specialties to which consultants had been appointed and for which (except for ear, nose and throat) inpatient beds were provided in the new hospital. One effect of this change was to reduce the proportions of Milton Keynes residents attending outpatient clinics outside the district from 60% in 1983 to 27% in 1984 (Table 3).

Analysis of the age-specific data suggested that, in the first period of the study, referral rates for the older age groups (especially for males) were a little lower from Milton Keynes than elsewhere (Table 4). Much of the increase from Milton Keynes in the second period of the study was accounted for by an increase in referrals for the elderly.

The age-standardized referral rates of individual practices showed a similar spread in both groups of practices in both periods (Figure 1). There was significant variation between the practice referral rates in each area in each phase of the study ($P < 0.01$) and, as Table 5 shows, the degree of variation was fairly constant. In each of the two time periods variation in practice referral rates ranged from two- to three-fold. In Milton Keynes four of the practices had higher standardized referral rates in period 2 than in period 1 and four were lower. In the rest of the region referral rates for 10 practices were higher in period 2 than in period 1 and seven were lower.

Table 2. Standardized^a referral rates per 1000 population per year from practices in Milton Keynes and the rest of the Oxford region by specialty.

Specialty	Referral rates per 1000 population (number of referrals) from:			
	Milton Keynes		Rest of Oxford region	
	Period 1	Period 2	Period 1	Period 2
General surgery and urology	20.3 (230)	24.7 (296)	23.3 (815)	23.3 (832)
General medicine	14.8 (158)	15.2 (174)	12.5 (436)	14.9 (530)
Trauma and orthopaedic surgery	9.7 (107)	14.7 (173)	12.8 (449)	12.8 (458)
ENT surgery	13.2 (154)	16.3 (204)	12.2 (427)	12.9 (460)
Gynaecology	13.7 (157)	15.9 (199)	12.8 (445)	13.5 (483)
Ophthalmology	8.6 (93)	8.1 (90)	8.3 (291)	7.3 (260)
Dermatology	6.1 (69)	6.7 (80)	7.7 (270)	7.6 (272)
Mental illness	5.3 (61)	3.5 (47)	3.6 (125)	3.7 (133)
Paediatrics	2.7 (40)	3.5 (56)	2.6 (93)	2.4 (86)
All specialties	101.8 (1146)	114.0 (1382)	100.6 (3517)	104.3 (3723)
95% confidence intervals	95.7–107.8	107.8–120.2	97.2–103.9	101.0–107.7

^a Standard population was the population of the practices in the rest of Oxford region for the two time periods combined.

Table 3. Percentage of outpatient referrals of Milton Keynes' residents to selected districts within the Oxford region and to all other regions, by specialty (all referrals in each time period = 100%).

Specialty	Percentage of outpatient referrals from Milton Keynes to:					
	Milton Keynes district		Elsewhere in Oxford region		Outside Oxford region	
	Period 1	Period 2	Period 1	Period 2	Period 1	Period 2
General surgery and urology	36	86	52	7	12	7
General medicine	39	75	55	15	6	10
Trauma and orthopaedics	48	88	48	7	4	5
ENT surgery	37	55	54	26	9	19
Gynaecology	29	90	57	7	14	3
Ophthalmology	34	36	62	55	4	9
Dermatology	22	21	77	70	1	9
Mental illness	78	87	20	11	2	2
Paediatrics	78	91	17	4	5	5
All specialties	40	73	52	19	8	8

Table 4. Age-specific referral rates to all specialties combined, expressed as annual rates per 1000 population in each age-sex group from Milton Keynes and the rest of Oxford region.

	Referral rates to all specialties per 1000 population from:			
	Milton Keynes		Rest of Oxford region	
	Period 1	Period 2	Period 1	Period 2
Males				
0-4 years	108	119	107	106
5-14	65	85	62	59
15-24	57	47	48	57
25-34	96	100	76	73
35-44	94	91	83	80
45-54	99	104	92	107
55-64	87	158	130	124
65-74	120	174	182	171
75+	108	141	154	192
Females				
0-4 years	72	83	88	71
5-14	67	65	54	58
15-24	105	90	86	95
25-34	135	152	113	130
35-44	157	148	146	138
45-54	128	181	148	134
55-64	129	135	119	136
65-74	119	161	132	132
75+	105	123	130	166

Discussion

Prior to the study, the volume and pattern of referral from the new town of Milton Keynes was the subject of speculation. On the one hand, it seemed possible that referral rates might be higher than elsewhere in the region. The Milton Keynes population contains a larger proportion of people in social classes 3M, 4 and 5 than the Oxford region as a whole.³ Some studies have found relatively high referral rates for patients in manual groups⁴ although others have produced equivocal findings.⁵⁻⁷ On the other hand, there was also an expectation that the orientation of health care in the new town towards community-based

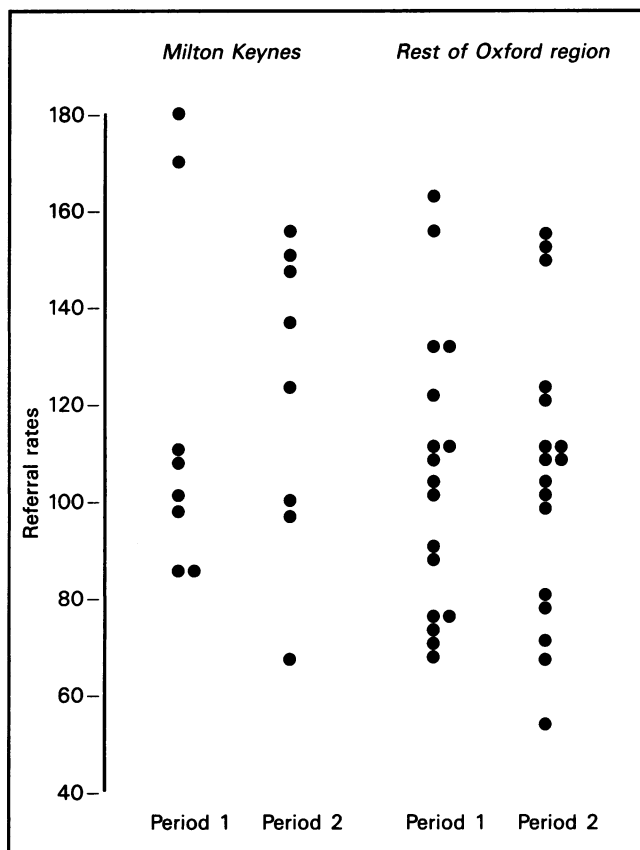


Figure 1. Standardized referral rates per 1000 population per annum in individual practices.

services and the limited availability and accessibility of specialist services might result in lower referral rates than elsewhere. In fact, prior to the opening of the new specialist services, the average and range of referral rates in Milton Keynes were remarkably similar to those in the other practices. It could be surmised that the factors described above exactly balanced out. While we cannot refute this possibility, the simpler explanation is that referral practices were similar in the two populations despite the relative lack of specialist facilities in Milton Keynes. The general similarity of referral rates for individual specialties, as well as for all specialties combined, also suggests that a fortuitous 'cancelling out' effect is the less likely explanation.

There had been speculation about the likely impact of open-

Table 5. Practice variations in standardized referral rates per 1000 population per annum from Milton Keynes and from rest of Oxford region.

	Milton Keynes		Rest of Oxford region	
	Period 1	Period 2	Period 1	Period 2
Highest practice referral rate (per 1000 population)	181	159	164	151
Lowest practice referral rate (per 1000 population)	84	67	69	51
Ratio of highest to lowest	2.2	2.4	2.4	3.0
Coefficient of variation (%)	32	27	28	28

ing the new district general hospital. Some felt that the arrival of additional specialist services would have no major effect on the volume and nature of referrals; others argued that it would precipitate a substantial increase in referrals including an increase in 'unnecessary' referrals. In fact, six months after the opening of the new hospital the standardized referral rate in the Milton Keynes group of practices had risen from 102 to 114 referrals per 1000 practice population per year. This compares with a rise from 101 to 104 per 1000 in the rest of the region. The changes in specialty specific referral rates in the two phases provide some pointers to possible reasons for the increase in Milton Keynes. Standardized referral rates for general surgery and urology, trauma and orthopaedics, and dermatology, were lower in the Milton Keynes group than elsewhere in the first period. Following the opening of the new hospital, referral rates to the surgical specialties and gynaecology increased while the referral rate to dermatology remained low. Data from the SH3 routine hospital activity returns in the last quarter of 1984 show that the availability of outpatient clinics in Milton Keynes, and the number of patients seen increased in all these surgical specialties except ear, nose and throat surgery and in dermatology. The findings appear to reflect increased use following the increased availability of facilities, a pattern demonstrated for inpatient services by Forsyth and Logan,⁸ but the increase in referral rates in our study was small. However, two points of qualification need to be made. First, while the rise in rates was small, the increase in total numbers of referrals represented a considerable increase in workload from the district as a whole. Secondly, our data relate to changes in the relatively short term after the opening of the hospital: we cannot comment on referral patterns in the longer term.

Variation in referral rates was greater between individual practices than between the two geographical populations in aggregate. Variation in referral rates between practices or between general practitioners has been described in a number of studies.⁹ Some authors have reported up to 10-fold and even 20-fold variation between practitioners, although most studies quote crude unstandardized rates calculated as a proportion of consultations rather than list size and many previous studies have been based on small samples. The extent of variation found will depend, at least to some extent, on whether crude or age-standardized rates are calculated, whether the comparisons are made between general practices or individual practitioners, and whether referrals are expressed as a proportion of consultations or list size.¹⁰ Much effort has gone into attempts to measure the extent of variation in the referral behaviour of individual practitioners. This approach gives rise to considerable methodological problems and it is probable that the true extent of variation between individuals is less than is commonly supposed.^{11,12} Our approach, which involved looking at standardized practice referral rates per practice list size, is, we believe, methodologically more robust than studies based on individual practitioners' referrals. We also believe that it has a sound theoretical basis, in that the primary health care team is seen to take collective responsibility for their practice population as a whole.

Crombie and Fleming found four-fold variation between practice referral rates in the national morbidity studies.¹³ The three-fold variation we have observed in the Oxford region is slightly less than this, but perhaps it is not surprising that there is greater homogeneity within one region. Three- and four-fold variation, while substantial, is smaller than the degree of variation commonly believed to exist between general practices in referral rates.¹⁴ On the basis both of the before and after comparisons in Milton Keynes and of the comparison of referral rates between individual practices, we conclude that general practitioners' referral patterns may be rather less variable than is often assumed.

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