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Catchment areas in general practice and their relation to size and quality of practice and deprivation: a descriptive study in one London borough

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Abstract

Objective—To relate the sizes of general practice catchment areas in one London borough to list size, deprivation payments, medical staffing, and locally and nationally recognised measures of quality.

Design—Study of general practice catchment area maps.

Setting—London borough of Lambeth.

Subjects—60 out of the 71 general practices in Lambeth.

Main outcome measures—Practice catchment area size with corrections for numbers of doctors and patients.

Results—Catchment area size varied greatly between practices, showing an almost 150-fold difference between the largest and smallest practices. This size differential was even more marked when the size of the catchment area was corrected for the number of general practitioners in the practice, where a 300-fold difference was found. Substantial differences existed between practices in each of the four locally assigned quality bands. The weakest practices had catchment areas three times as large as those of the strongest practices. When corrected for medical staffing, the difference was eight times as great. A calculated measure of patient dispersion showed that the practice population of the strongest practices was four times as densely clustered as that of the weakest practices, whose patients were more widely geographically dispersed.

Conclusions—Large variations exist in the size of catchment areas of inner city practices even when corrected for numbers of doctors and

patients. These differences are associated with variations in quality of care.

Introduction

All NHS general practitioners are required to provide a map of the geographical boundaries of their practices,¹ which should be reproduced in the practice leaflet. While the location of a practice is controlled to some extent by the Medical Practices Committee,² there is no such control over the practice's boundaries. Research interest has tended to focus on administrative characteristics such as list size, partnership size, length of consultation, and staffing and activities such as prescribing and referrals, while the issue of catchment areas has received little attention. General practitioners may set their boundaries wherever they choose, with no legislative constraints and a dearth of published research findings to guide their choice. We performed a study of general practices in one London borough to describe the size of practices' catchment areas and examine the relation between their size and other practice characteristics.

Method

All 71 practices in the London borough of Lambeth were invited to contribute to the study by submitting an up to date map of their catchment areas. Non-responders were followed up by letter, telephone, and visit if necessary. The catchment area boundaries were digitised and catchment area size calculated using the MAPINFO mapping package. Practice location within the borough was classified into three groups—northern, middle, and southern—on the basis of postcode. Further information was obtained from Lambeth,

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Table 1—*Catchment area size for 60 general practices in Lambeth*

Catchment area size (square miles)	No of practices
≤0.50	10
0.50–0.99	14
1.00–1.49	9
1.50–1.99	10
2.00–2.49	4
2.50–2.99	3
3.00–3.49	3
3.50–3.99	0
4.00–4.49	0
4.50–4.99	1
≥5.00	6

1 square mile = 2.59 km².

Southwark, and Lewisham Family Health Services Authority on total list size, the number of partners and whole time equivalents, the practice's banding status (a four category variable attributed to each practice by the family health services authority after consideration of the range and quality of services offered by the practice, with A indicating the weakest practices and D the strongest³ (see appendix)), fundholding status, the level of deprivation payment, and patient turnover (the percentage of patients registering with the practice during the year). We also used two prescribing measures: the percentage of all items generically prescribed and the net ingredient cost of items prescribed per ASTRO-PU after excluding four high cost categories of drug (the ASTRO-PU is a measure that weights patients according to their age, sex, and temporary resident status,⁴ and the excluded drugs were dornase alpha, growth hormone, anti-rejection drugs after transplantation, and erythropoietin). These data were analysed using SPSS for Windows, the Kruskal-Wallis test being used to compare variation between the four quality bands.

Three new variables were calculated: by dividing the size of the total practice catchment area by the number of whole time equivalent general practitioners in the practice we obtained a measure of the geographical area nominally covered by each general practitioner (the personal catchment area); by dividing the number of registered patients by the number of whole time equivalent

general practitioners in the practice we obtained the practice personal list size; and by dividing the number of registered patients by the catchment area size we obtained the number of patients registered per square mile of the practice's catchment area, a measure of dispersion.

Results

During the study six singlehanded general practitioners retired and their practices closed. One general practitioner provided medical services only for the residents of a nursing home, and four practices, three in band A and one in band C, had ill defined catchment areas for which they could not provide a detailed map. The remaining 60 practices provided detailed maps, and the data from these practices form the basis of this study.

Practice size overall ranged from 0.19 to 28.27 square miles (0.49–73.3 km²) with a mean of 2.42 square miles (6.27 km²), an almost 150-fold difference. The largest catchment area was more than twice the size of the next largest, and when this value was removed the mean size of the catchment areas of the remaining 59 practices was 1.98 square miles (5.13 km²). Even then, however, there was still a 66-fold difference in size. Overall the catchment areas of 24 practices were less than 1 square mile (2.56 km²), of 43 less than 2 square miles (5.18 km²), and of 54 less than 5 square miles (12.9 km²) (table 1).

Mean catchment area varied with the location of the practice. The mean catchment area of the 22 practices in the north of the borough was 1.45 square miles (3.78 km²), of the 21 in the middle 2.31 square miles (5.98 km²), and of the 17 in the south 3.81 square miles (9.87 km²). When the practice with the extreme catchment area value was removed from this last group, the mean catchment area of the southern practices fell to 2.28 square miles (5.91 km²). Variation in personal catchment area size according to geographical location was small: 1.12, 1.30, and 3.12 (1.54 with the extreme value removed) square miles (2.90, 3.37, 8.08, 3.99 km²) respectively.

Five practices held fundholding status during 1995, of which four were classified as being in quality band D and one in band B. They had a mean catchment area of 1.71 square miles (4.43 km²).

Table 2—*Practice characteristics and quality banding for 60 general practices in Lambeth. Data are means, medians, and ranges for practices in each band (median, range)*

	Band A	Band B	Band C	Band D	χ^2 *
No of practices in band:	8	13	6	33	
Whole time equivalent GPs	1, 1 (1–1)	1.23, 1.0 (1.0–2.0)	1.47, 1.0 (1.0–3.8)	3.07, 3.0 (1.0–7.6)	25.68 P<0.001
Total registered patients	2775, 2881 (1821–3440)	2801, 2876 (1546–3446)	3585, 3068 (2501–6299)	6927, 6088 (1793–18 443)	24.13 P<0.001
Catchment area size (sq miles)	5.48, 1.71 (0.61–28.27)	2.69, 0.92 (0.19–12.57)	2.39, 1.35 (0.28–8.16)	1.58, 1.33 (0.34–5.10)	3.17 P = 0.37
Personal catchment area (sq miles)	5.48, 1.71 (0.61–28.27)	2.07, 0.81 (0.19–9.99)	2.29, 1.35 (0.21–8.16)	0.62, 0.45 (0.09–2.27)	16.03 P<0.001
Patient dispersion (patients per sq mile)	1668, 1482 (102–4690)	3195, 3212 (270–8010)	4609, 2173 (341–14 030)	7399, 4334 (1142–33 686)	13.31 P = 0.004
Personal list size	2775, 2881 (1821–3440)	2452, 2523 (1132–3446)	2812, 2749 (1658–3859)	2308, 2266 (1518–3442)	5.45 P = 0.14
% Patients receiving deprivation payments	68.3, 88.7 (6.6–95.5)	50.5, 46.3 (2.6–95.0)	57.0, 51.3 (26.2–95.6)	66.2, 71.8 (7.0–98.8)	3.75 P = 0.29
% Receiving high deprivation payments	9.9, 2.0 (0–53.6)	1.5, 0.1 (0–7.6)	2.3, 0.6 (0–11.3)	6.5, 0.5 (0–54.2)	1.24 P = 0.75
% Items prescribed generically	51.5, 52.2 (37.4–64.6)	53.1, 58.2 (12.2–74.1)	56.9, 58.1 (42.3–71.7)	56.0, 56.7 (29.9–74.6)	1.72 P = 0.63
Net ingredient cost per ASTRO-PU (£) (excluding high cost items)	15.06, 15.99 (9.94–20.32)	17.29, 17.24 (8.79–30.35)	17.55, 15.52 (12.74–29.63)	17.95, 17.50 (11.32–31.68)	3.17 P = 0.37
% Patients registering in calendar year†	6.1, 6.8 (0–12.7)	10.4, 10.3 (5.4–14.3)	13.3, 14.8 (5.0–17.1)	14.2, 11.9 (0–58.4)	12.65 P = 0.005

*Kruskal Wallis test used to assess variation between the four quality bands.

†Data unavailable for one practice.

1 square mile = 2.59 km².

Personal catchment area size ranged from 0.09 square miles (0.23 km²) per general practitioner to 28.27 square miles (73.2 km²) with a mean of 1.75 square miles (4.53 km²), a 314-fold difference. Again, even when the extreme value was omitted, there was still an 111-fold variation in this variable. Overall, 39 practices had personal catchment areas of less than 1 square mile, 52 of less than 2, and 55 of less than 5.

The number of patients registered with the practices ranged from 1546 to 18 443, with a mean of 5145. Practice personal lists ranged from 1132 to 3859 with a mean of 2452.

The number of patients per square mile ranged from 102 to 33 686 patients, with a mean of 5445, representing a 330-fold variation in patient dispersion between the practices.

The 60 practices were unequally distributed among the four banding levels (table 2), with 33 practices being in band D, 6 in band C, 13 in band B, and 8 in band A. A size gradient was clearly visible, with practices in band A having average catchment areas more than three times as large as those of practices in band D. These differences were even more pronounced when personal catchment area size was considered, with practices in band A having areas more than eight times as large as those in band D. Mean practice personal list sizes varied less between the bands, but practices in band D had smaller personal lists on average than those in any of the three other bands. The measure of patient dispersion showed a marked gradient between bands, with patients in band A practices being more than four times more widely scattered geographically than those of practices in band D. Deprivation payments were payable for more patients in band A practices on average than in any of the three other bands, although the figure for band D practices was only slightly lower. The proportion of prescription items prescribed generically was lowest on average in the band A practices, as was the net ingredient cost per ASTRO-PU. The number of new patients registering with the practice during the previous calendar year as a proportion of the total list size showed a gradient between bands, with those in the weakest practices registering proportionally fewer patients on average than those in any of the other bands.

Discussion

The geographical area over which the general practitioner contracts to provide medical services is important to both patients and doctors. For patients, accessibility of services is a major factor influencing their choice of practice⁵⁻⁷ and use of its services.^{8,9} The advantages of being registered with a local general practitioner include reduced travelling time to the surgery, being within the area of responsibility of local care teams, and not losing out to "more distant but mobile patients."¹⁰ However, when they move home some patients prefer to maintain links with a practice they know even though they may have to travel further.¹¹ For general practitioners, increased travelling time to attend home visits and the problems of coordinating their use of services and making referrals in areas distant from the practice may prove problematic.

We found that catchment areas varied widely: while some practices operated very small catchment areas, others had patient populations that were widely scattered. We cannot say with any certainty why these wide differences existed because we did not examine the administrative and historical reasons why practices had particular catchment areas. Possibly weaker practices need to "cast the net" wider as a result of financial constraints, while stronger practices can fulfil their capitation requirements by drawing their practice population from within a few streets of the surgery. The size

Key messages

- All general practitioners are required to define their practice catchment areas
- The organisation and distribution of catchment areas in general practice have received little attention
- Data from general practices in one inner London borough were used to investigate the relation between catchment area size and a range of practice characteristics.
- The variation in size of catchment areas between practices was large, even when corrected for medical staffing and practice list size
- An inverse relation was reported between the quality of service provision and the size of the catchment area

of the catchment area appeared to be related both to location within the borough and to fundholding status, although the differences we observed were not great. We plan to undertake further work with a sample of practices to explore qualitatively the issues surrounding the setting up and operation of catchment area policies.

Our study was based on catchment area maps provided by the practices themselves. While the maps are likely to reflect current practice policy, a practice's patients may be more or less widely scattered than the map suggests. Clearly, also, actual patient location may be unrelated to the dispersion we calculated, but our measure does give an initial indication of the practice population density. We plan further work investigating the extent to which the distribution of the practice population relates to the stated catchment area.

The literature relating to geographical location and accessibility of general practitioner services suggests that there is an "inverse care law" effect in the location of surgery premises, these being less likely to be located in areas where need may be greatest.¹² Accessibility is also reported to decline at increasing distances from the surgery.¹³ In this study weaker practices, which had higher levels of deprivation payments than stronger practices, tended to have larger catchment areas and more widely dispersed populations. The patients of these practices will therefore probably have greater distances to travel to the surgery and be more socially deprived than patients in other practices.

Several family health services authorities are developing performance indicators to measure aspects of practice activity.¹⁴ The quality banding measure we used in this study was set up in Lambeth, Southwark, and Lewisham by the family health services authority in cooperation with the local medical committee. Used to determine staffing budgets and as a management technique to improve the quality of services provided locally, the initial banding was based on questionnaire returns from each practice. Rebanding takes place continuously using information gathered from the practice and in house data, such as those produced for target payments.

We have failed to find other studies that have mapped and measured catchment areas in general practice. As a result, we cannot comment on the relevance of our results to other locations. The issue of catchment areas in general practice, particularly in the inner city, is complex, with large numbers of practices providing their services over small geographical areas.¹⁵ While it has been suggested that a rationalisation of catchment areas in general practice might be more practical and cost effective,¹⁶ such a move is likely to compromise patient choice.

The size of the differences we observed was surprising and, along with the inverse relation we have described between quality of service provision and practice catchment area, suggests that the time may have come to re-examine the geographical distribution of general medical practices. Optimal practice list size has not yet been defined, although larger practice lists have been suggested to be disadvantageous to patients.¹⁷ Larger practice catchment areas may also be associated with disadvantages to patient care, and further research is needed into this neglected but important area of health care planning.

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Appendix—Services and quality indicators for practices in each band³

Band A: practices providing a basic service

Patient registration
Appropriate personal general medical services to all registered patients
Prescribing and system for repeat prescribing
Arrangements for out of hours cover
Over 75 health check
Fulfil availability requirements
Approved premises
Suitably qualified staff, job descriptions, and contracts
Agreed practice area
Adequate medical record keeping
Appropriate certification
Practice leaflet
Participation in training

Band B: practices providing a normal service

All services provided in band A
Ensure patients have access to child health surveillance services
Maternity medical services
Contraceptive services
Health promotion band 1
Practice nurse
Partnership agreement

Band C: practices providing a full range of services

All services provided in bands A and B
Child health surveillance services
Minor surgery
Health promotion band 2
Achieve 50% target for cervical screening
Achieve 70% target for vaccinations and immunisations
Partial computerisation
Meet health and safety requirements
Participation in audit
Regular team meetings

Band D: practices providing an extended range of services

All services provided in bands A, B, and C
Health promotion band 3
Practice based complaints procedure
Staff development plans
Achieve 80% target for cervical screening
Achieve 90% target for vaccinations and immunisations
Service development plan
Needs assessment and service audit
Written prescribing policy
Teaching and training
Service innovation and development

Genital *Chlamydia trachomatis* infections in primary care

Jonathan D C Ross, Sheena Sutherland, John Coia

Chlamydia trachomatis remains one of the commonest causes of pelvic pain, infertility, and ectopic pregnancy in young women^{1,2} and is often asymptomatic. Genitourinary medicine clinics in Britain provide information on the prevalence of sexually transmitted disease which is used for monitoring and to set targets for disease control. Increasing recognition of *C trachomatis* as a genital pathogen is likely to result in patients presenting in other health care settings, including general practice. The resources to ensure resolution

of infection or to trace sexual contacts who, if untreated, may reinfect the patient may not be available in the community.

We conducted a study to determine the number of genital *C trachomatis* infections diagnosed by general practitioners in the Lothian region of Scotland and what proportion of patients were subsequently referred to the genitourinary medicine clinic. Lothian, which includes Edinburgh, has a population of 750 000 and has only one genitourinary medicine clinic. We also assessed variation between practices in the number of patients tested for *C trachomatis*.

Subjects, methods, and results

We included all patients who had a genital swab taken by their general practitioner to test for chlamydia in 1995, excluding repeat tests. Specimens were analysed by the three microbiology laboratories in Lothian by

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