Cross sectional study of primary care groups in London: association of measures of socioeconomic and health status with hospital admission rates

Azeem Majeed, Martin Bardsley, David Morgan, Caoimhe O'Sullivan, Andrew B Bindman

Abstract

Objectives To calculate socioeconomic and health status measures for the primary care groups in London and to examine the association between these measures and hospital admission rates.
Design Cross sectional study.
Setting 66 primary care groups in London, total list size 8.0 million people.
Main outcome measures Elective and emergency standardised hospital admission ratios; standardised admission rates for diabetes and asthma.
Results Standardised hospital admission ratios varied from 74 to 116 for total admissions and from 50 to 124 for emergency admissions. Directly standardised admission rates for asthma varied from 152 to 801 per 100 000 (mean 364) and for diabetes from 235 to 1034 per 100 000 (mean 538). There were large differences in the mortality, socioeconomic, and general practice characteristics of the primary care groups. Hospital admission rates were significantly correlated with many of the measures of chronic illness and deprivation. The strongest correlations were with disability living allowance ($R=0.64$ for total admissions and $R=0.62$ for emergency admissions, $P<0.0001$). Practice characteristics were less strongly associated with hospital admission rates.
Conclusions It is feasible to produce a range of socioeconomic, health status, and practice measures for primary care groups for use in needs assessment and in planning and monitoring health services. These measures show that primary care groups have highly variable patient and practice characteristics and that hospital admission rates are associated with chronic illness and deprivation. These variations will need to be taken into account when assessing performance.

Introduction

Primary care groups came into existence in England in April 1999. The groups have unified budgets that are used to fund the health services needed by their patients, including primary and community health services, prescription drugs, and hospital care.[1 2] Although large variations are known to exist in hospital admission rates among general practices,[3] no information is available on variation in the use of hospital care by primary care groups. This is partly because of the lack of routinely available data on primary care groups, including information on the use of hospital care.[4]

Responsibility for the planning and commissioning of health services is rapidly being transferred from health authorities to primary care groups and trusts.[5] The government is also proposing to introduce performance measures and targets for primary care groups in areas such as improving the health of their population and access to both primary and secondary healthcare services. Hence, good information on the characteristics of primary care group populations and their use of hospital services is essential if the groups are to carry out their functions effectively.[6 7]

This study had two main objectives. The first was to derive baseline measures of health and socioeconomic status and rates of hospital use for the 66 primary care groups in London. The second was to use these measures with information on practice characteristics to examine the variation in admission rates among these primary care groups.

Methods

We obtained data from the NHS Executive and the Department of Health on each of the 66 primary care groups in London. These data comprised six main groups of variables: population estimates, hospital admissions, mortality, census data, benefits data, and practice characteristics (described below). The univariate association between admission rates and possible explanatory factors was assessed by Pearson's correlation coefficient.

Population estimates were obtained for each primary care group from the Department of Health. These were calculated from population estimates derived from 1998 general practice lists (the attribution data set) and adjusted to take into account differences between general practice lists and official population estimates. We also used the attribution data set to calculate the number of people in each primary care group living in each of the electoral wards in London. The underlying matrix for these calculations included 760 wards and 66 primary care groups.[8-11]

Hospital admissions—We obtained the total number of hospital admissions and the number of emergency

School of Public Policy, University College London, London WC1H 9EZ
Azeem Majeed *senior lecturer in general practice*
Andrew Bindman *Atlantic fellow*
Health of Londoners Project, East and the City London Health Authority, London E1 1RD
Martin Bardsley *project manager*
David Morgan *data analyst*
Research and Development Directorate, University College London Hospitals NHS Trust, London NW1 2LT
Caoimhe O'Sullivan *statistician*
Correspondence to: A Majeed a.majeed@ucl.ac.uk

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Details of social security benefits included in the study are available on the BMJ's website

Table 1 Socioeconomic characteristics, standardised mortality ratios, and composite needs indices of primary care groups in London and association with hospital admission rates (correlations ⩾0.32 significant at P<0.01)

	Summary values		Correlation with admissions			
	Mean (SD)	Range	Total	Emergency	Asthma	Diabetes
Census derived variables (%)						
Adults unable to work due to permanent sickness	3.3 (0.9)	2-5	0.46	0.57	0.29	0.55
Adults unemployed at 1991 census	11.5 (4.0)	6-22	0.38	0.53	0.15	0.34
People in households headed by someone in unskilled socioeconomic group	2.7 (1.2)	1-6	0.51	0.55	0.28	0.49
Households with no car	39.5 (12.1)	19-64	0.25	0.48	0.11	0.32
Households without central heating	18.3 (5.4)	9-34	0.25	0.39	0.46	0.45
Households lacking amenities	1.5 (0.9)	0-4	–0.09	0.06	–0.08	0.12
People living in households that are overcrowded	8.4 (4.2)	2-26	0.21	0.36	0.00	0.37
Pensioners living alone	6.1 (1.1)	3-9	0.05	0.19	–0.04	–0.14
People living in single parent households	12.5 (5.4)	6-27	0.23	0.45	0.19	0.29
People aged 18 or over with an educational qualification beyond A level	17.7 (6.6)	4-36	–0.41	–0.22	–0.24	–0.33
Working age people who were students	6.0 (1.5)	3-10	–0.26	–0.12	–0.30	–0.08
People who have changed address in the past year	11.5 (3.0)	6-21	–0.26	–0.04	–0.14	0.03
People born in New Commonwealth	11.0 (6.3)	2-32	0.06	0.02	–0.11	0.25
Standardised mortality ratios						
<75 year olds	104 (13.8)	77-130	0.47	0.61	0.31	0.53
All age groups	100 (7.2)	80-118	0.33	0.49	0.26	0.39
Diabetes	101 (32.0)	33-186	0.22	0.19	0.08	0.29
Respiratory disorders	112 (14.0)	82-153	0.12	0.24	0.20	0.27
Needs indices (proportion from mean)						
Acute needs index	–0.01 (0.09)	–0.17-0.17	0.41	0.58	0.25	0.47
General Medical Services cash limited index	0.00 (0.05)	–0.09-0.09	0.48	0.58	0.28	0.51

admissions by age group and sex to NHS hospitals from each primary care group area during 1997-8 from the NHS Executive. We also determined the number of admissions for asthma and diabetes. These data were used with population estimates to calculate indirectly age standardised admission ratios for total and emergency admissions in each primary care group (mean for London for each ratio = 100). We also derived two of the high level NHS performance indicators for each primary care group (admission rates for diabetes and asthma directly standardised for age and sex).[12] Admissions for asthma and diabetes have been shown to be inversely associated with the availability and effectiveness of primary care in the United States.[13]

Census data—We calculated a range of census variables for each primary care group by combining information on the proportion of people in each electoral ward in London registered with each primary care group and census data for each electoral ward. This method is analogous to that used to calculate census derived variables for general practices but uses primary care group rather than general practice as the unit of attribution.[14 15]

Benefits data—We determined the number of claims in each electoral ward for selected social security benefits during specific months in 1998 and 1999 from the Department of Social Security (see *BMJ*'s website for details of included benefits). We then calculated the estimated proportion of people claiming benefits in each primary care group using the same method as for the census derived variables.

Standardised mortality ratios—As there is currently no readily available method of linking deaths to general practitioner lists, we calculated standardised mortality ratios for each primary care group in a three stage process that gives an approximate measure of the ratios. The number of deaths by age and sex for each electoral ward in London was obtained from national mortality statistics. We then attributed the deaths in each electoral ward to primary care groups in proportion to the number of people in each ward registered with the primary care group. Finally, we used the estimated numbers of deaths by age and sex for each primary care group and population estimates to calculate an overall standardised mortality ratio for all age groups and in people younger than 75 years (mean for London = 100).

Practice characteristics—Information on the characteristics of general practices in London was obtained from the NHS Executive.

Results

The 66 primary care groups had a total population of 8.0 million people and ranged in size from 47 200 to 230 200 (mean 108 200). Standardised hospital admission ratios varied from 74 to 116 for total admissions and from 50 to 124 for emergency admissions. Directly standardised admission rates varied from 152 to 801 per 100 000 (mean 364) for asthma and from 235 to 1034 per 100 000 (mean 538) for diabetes.

Large differences existed in the morbidity, mortality, and socioeconomic characteristics of the primary care groups. The proportion of adults unable to work because of permanent sickness varied from 2% to 5% (mean 3%) (table 1). The standardised mortality ratio in people aged under 75 years at death varied from 77 to 130. The estimated number of claims per 100 population varied from 1.7 to 5.2 (mean 2.9) for disability living allowance; from 2.6 to 9.7 (mean 5.5) for incapacity benefit; and from 0.4 to 0.9 (mean 0.6) for severe disability allowance (table 2). The estimated percentage of people living in households without a car varied from 19% to 64%, and the percentage living in overcrowded households varied from 2% to 26% (table 1).

We also found large differences in the general practice characteristics of the primary care groups (table 3). The mean list size per whole time equivalent

Table 2 Benefits variables of primary care groups in London and association with hospital admission rates (correlations ≥0.32 significant at P<0.01)

	Summary values		Correlation with admissions			
Benefits variables (claims)	**Mean (SD)**	**Range**	**Total**	**Emergency**	**Asthma**	**Diabetes**
Family credit/100 people aged 15 to pensionable age*	1.2 (0.5)	0.4-3.5	0.48	0.56	0.19	0.38
Income support/100 people aged 15 to pensionable age*	10.0 (3.5)	4.7-18.5	0.45	0.54	0.19	0.43
Job seekers allowance/100 people aged 15 to pensionable age*	4.0 (2.1)	1.2-9.4	0.37	0.50	0.14	0.30
Attendance allowance/100 people aged ≥65	12.5 (2.2)	8.7-17.5	0.45	0.49	0.03	0.30
Disability living allowance/100 people aged <65	2.9 (0.7)	1.7-5.18	0.64	0.62	0.36	0.56
Incapacity benefit/100 people aged 15 to pensionable age*	5.5 (1.8)	2.6-9.7	0.50	0.54	0.22	0.48
Severe disability allowance/100 people aged <65	0.6 (0.1)	0.4-0.9	0.25	0.22	0.22	0.36

*60 for women and 65 for men.

general practitioner varied from 1815 to 2456 (mean 2156); the proportion of general practitioners who were women varied from 19% to 53% (mean 38%); and the proportion of general practitioners who were approved trainers varied from 0 to 27% (mean 11%).

Association with total and emergency admission ratios

Many of the measures were significantly correlated with hospital admission rates (tables 1 and 2). The strongest correlations were with disability living allowance ($R=0.64$ for total admissions and $R=0.62$ for emergency admissions, $P<0.0001$). Among the census derived variables, the strongest correlations were with households headed by someone from an unskilled socioeconomic group ($R=0.51$ and $R=0.55$ for total and emergency admissions respectively, $P<0.0001$). There were also strong correlations between standardised mortality ratios and hospital admission rates.

By contrast, correlations between admission rates and practice variables were weaker (table 3). The proportions of general practitioners who were women or approved trainers or course organisers were all negatively associated with admission rates. The percentages of general practitioners approved for minor surgery and child health surveillance were also negatively associated with admission rates. These associations became non-significant after deprivation was adjusted for (data not shown).

Association with standardised admission rates for diabetes and asthma

The strongest association between admission rates for diabetes and the predictor variables was with disability living allowance ($R=0.56$, $P<0.0001$). Strong correlations also existed with several other variables—for example, standardised mortality ratios. Negative correlations existed with most of the practice variables (table 3).

The association between admission rates for asthma and the predictor variables was much weaker than for the other categories of admissions included in this study. The strongest association ($R=0.46$, $P=0.0001$) was with the estimated proportion of people living in households without central heating (table 1). There was a negative association with the percentage of general practitioners who were approved trainers (table 3).

Discussion

The most striking finding of this study was the wide variation in the characteristics of the patients and practices in the primary care groups in London. Primary care groups have been set challenging objectives, including planning and commissioning health services, implementing health improvement programmes, and ensuring that effective clinical governance programmes are in place.[16 17] Our study shows that primary care groups start from very different baselines, with many groups having to deal with the effects of deprivation, poor health, and underdeveloped general practices while trying to plan and commission health services for their population.

We also found that hospital admission rates vary widely among the primary care groups in London and that admission rates are strongly associated with population factors. In particular, strong correlations existed with the proportion of people claiming disability living allowance and with other measures of chronic illness. Deprivation was also associated with higher admission rates.

Strengths and weaknesses of study

Production of comparative information on primary care groups is not straightforward because of the way in which these groups have been configured. Primary

Table 3 Practice characteristics and association with hospital admission rates (correlations ≥0.25 significant at P<0.05)

	Summary values		Correlation with admissions			
Practice characteristic	**Mean (SD)**	**Range**	**Total**	**Emergency**	**Asthma**	**Diabetes**
% of female general practice principals	37.6 (7.8)	19-53	–0.41	–0.31	–0.25	–0.28
Average No of patients per principal	2156 (1280)	1815-2456	0.01	–0.14	0.02	0.08
% of general practitioners who were approved trainers	10.6 (6.5)	0-27	–0.25	–0.18	–0.26	–0.27
% of general practitoners who were course organisers	1.2 (1.8)	0-7	–0.21	–0.23	–0.15	–0.24
% of practices with registered diabetes disease management programme	90.7 (5.9)	74-100	–0.07	–0.15	–0.04	–0.17
% of practices with registered asthma disease management programme	90.9 (6.1)	74-100	–0.13	–0.14	–0.03	–0.15
% of patients whose general practitioner offered child health surveillance	89.1 (8.4)	68-100	0.07	–0.06	0.11	–0.18
% of patients whose general practitioner offered minor surgery services	64.8 (15.8)	29-96	–0.21	–0.31	–0.01	–0.26

What is already known on this topic

Primary care groups in England are taking on increasing responsibility for monitoring the health of their population, commissioning health services, and meeting government targets

Producing comparative information on primary care groups is difficult because of their dual responsibility for patients living in their area and patients registered with their constituent general practices irrespective of where they live

What this study adds

Methods for producing comparative data on general practices can be adapted to produce similar data on primary care groups

Primary care groups have very different patient and general practice characteristics

Admission rates for primary care are strongly associated with measures of chronic illness and deprivation

Differences in the patient and practice characteristics of primary care groups need to be taken into account when measuring their performance

care groups have a responsibility for both the population of their area and for the patients on the lists of their constituent general practices. We have shown that it is possible to produce information on the population and practice characteristics of primary care groups by adapting methods that have been used previously to produce similar information on general practices.

We used benefit derived variables, which offer two advantages over census derived variables. Firstly, many benefits require an assessment of the patient, and sometimes a medical report from the patient's general practitioner, before they are paid to the claimant. They are therefore likely to be a better measure of chronic illness than the self reported measures derived from the 1991 census. Secondly, the ward level information on benefits published by the Department of Social Security is updated regularly, whereas the census is carried out only every 10 years.

The population of London is diverse in its socioeconomic characteristics and includes some of the most deprived and most affluent areas in the United Kingdom. Although this socioeconomic diversity combined with the variation in the characteristics of the general practices in London made it a good location for this study, the lack of any information on primary groups in rural areas is a limitation.

Comparison with other studies

Because primary care groups are relatively new organisations, little information exists on differences in admission rates. However, we can compare our study with similar studies that have used general practice as the unit of analysis. Reid et al examined the variation in admission rates among 120 general practices in south London and found that chronic illness and deprivation were the most important predictors of admission rates.[18] Griffiths et al examined the variation in admission rates for asthma among 124 practices in east London.[19] Although they found that deprivation was associated with higher admission rates in the univariate analysis, in the multifactorial analysis general practice variables were the main predictors of admission rates.

Implications for clinicians and policymakers

We have shown that population factors have a major impact on hospital admission rates in primary care group populations. Recent events in the NHS such as the prosecution of Dr Shipman for serial murder of his patients, proposals to increase the monitoring of general practices, and the greater use of targets to reward good performance will result in performance indicators being produced for general practices and primary care groups.[12] The prevalence of chronic illness, whether assessed using 1991 census data or by benefits data, is strongly associated with admission rates and should be taken into account when measuring the performance of primary care groups. Our study also shows that there may be advantages in using benefits data to profile the characteristics of primary care groups rather than census derived variables.

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