

Characteristics of general practices associated with numbers of elective admissions

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ABSTRACT

Background In England both emergency (unplanned) and non-emergency (elective) hospital admissions have been increasing. Some elective admissions are potentially avoidable. Aim: to identify the characteristics of general practices and patients associated with elective admissions.

Methods A cross-sectional study, in Leicestershire, England, was conducted using admission data (2006–07 and 2007–08). Practice characteristics (list size, distance from principal hospital, quality and outcomes framework score and general practitioner (GP) patient access survey data) and patient characteristics (age, ethnicity and deprivation and gender) were used as predictors of elective hospital admissions in a negative binomial regression model.

Results Practices with a higher proportion of patients aged 65 years or greater and of white ethnicity had higher rates of elective hospital admissions. Practices with more male patients and with more patients reporting being able to consult a particular GP had fewer elective hospital admissions. For 2007–08 practices with a larger list size were associated with higher elective hospital admissions. Quality and outcomes framework performance did not predict admission numbers.

Conclusions As for unplanned admissions, elective admissions increase as being able to consult a particular GP declines. Interventions to improve continuity should be investigated. Practices face major problems in managing the increased need for planned care as the population ages.

Keywords health services, primary care

Introduction

Between 1999–2000 and 2009–2010 elective (non-emergency) hospital admissions of people in all age groups in England increased by 28% to 9.4 million.¹ Over the same period, there was an increase of 35% in emergency admissions¹ and there have been several initiatives to help curtail this trend.^{2–4} However, less attention has been given to controlling elective admission rates, although avoiding unnecessary elective hospital admissions would reduce costs and enable some patients to avoid care and procedures that are unlikely to be beneficial.

Health systems with strong primary care tend to deliver better health outcomes at lower cost,^{5,6} and in the UK initiatives to improve the strength of primary care in recent years have included a pay for performance scheme to promote the systematic management of chronic disease (the quality

and outcomes framework) and a scheme to measure and improve access. The quality and outcomes framework rewards general practitioners based on achievement of clinical and organizational performance together with other indicators.⁷ High achievement of clinical indicators has been shown to be associated with reduced hospital admission rates for chronic obstructive pulmonary disease⁸ but not with coronary heart disease and diabetes mellitus.^{2,9,10} The scheme to improve access to general practice was introduced from 2006 to 07. Originally a separate scheme, it has now

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been incorporated into the quality and outcomes framework and consists of a financial reward to practices determined by the results of regular surveys of patient experience of access to their practice.¹¹ Access can be defined in various ways,¹² but, in the survey, is restricted to the ability to contact the practice by telephone and get an appointment with a doctor. However, we have shown in previous studies that practices in which patients are more likely to report being able to consult their preferred general practitioner have lower rates of emergency hospital admission,¹³ and practices in which patients are more likely to report better telephone access have lower rates of attendance at hospital emergency departments.¹⁴

The National Health Service data model and dictionary defines an elective admission as one that has been arranged in advance.¹⁵ It is not an emergency admission, a maternity admission or a transfer from a hospital bed in another health-care provider. It includes the hospital episode statistics categories of admissions from waiting lists, booked and planned admissions (admission categories 11, 12 and 13 in the hospital episode statistics classification).¹⁶ Admissions in these categories often arise from a referral from general practice to a specialist. Demand management strategies for outpatient referrals have included referral centres that divert or reject inappropriate referrals from general practices, standard referral protocols with clear criteria for referral that must be met and the supervision of care for selected conditions such as varicose veins. There has been extensive research into general practitioner referral rates, including studies of methods to reduce referral rates.¹⁷ However, few studies have investigated the characteristics of general practices associated with elective hospital admission rates. Elective admission rates have been shown to vary widely between practices, but research into the characteristics of general practices explaining the variation were undertaken before the introduction of the quality and outcomes framework and access surveys that have provided more information about performance in general practice.¹⁸ Therefore, drawing on the theory that strong primary care alleviates demand for secondary care,^{5,6} we hypothesized that higher levels of access to primary care and better quality of care as measured by the quality and outcomes framework would be associated with fewer elective hospital admissions.

Methods

The study included two primary care trusts, Leicester City and Leicestershire County and Rutland, which had 145 general practices serving a population of ~940 000 people. One large teaching hospital located on three sites in the city

provides almost all the in-hospital care, and also tertiary care for some conditions, including stroke and cardiovascular disease. Community hospitals, walk-in-centres and minor injuries units also serve the population. Leicester City has a young and diverse ethnic minority with relatively poor overall health and socioeconomic indicators compared with England as a whole, whilst the surrounding county has a greater proportion of socioeconomically advantaged people.¹⁹

Anonymized data on elective patient admissions (categories 11, 12 and 13 of the hospital episode statistics classification) to any hospital were provided by the primary care trusts corresponding to the period 1 April 2006 to 31 March 2008. We excluded obstetric-related admissions, leaving 102 760 admissions in 2006–07 and 110 830 in 2007–08, of patients registered with the included general practices. Admissions to any hospital were included, not merely those to the city teaching hospital. The primary care trusts provided details on general practice list sizes, the proportion of patients aged 65 years or greater, the proportion of patients by ethnic group per practice and the proportion of practice populations who were male. The mean cost of an admission to the city hospital given by the finance department of the hospital was £2641 in 2006–07 and £2892 in 2007–08 (personal communication).

We obtained quality and outcomes framework performance for the included practices from the data made publicly available.⁷ We included the total clinical points from the quality and outcomes framework as a measure of the quality of clinical care for chronic conditions, and total organizational points as a measure of organization, a domain that covers record keeping and safe prescribing. The patient access survey is nationally administered by Ipsos MORI. It includes samples of patients aged 18 years or over registered at each practice.¹¹ The 2006–2007 and 2007–2008 surveys were used in this study, and the four questions representing aspects of access were included (see **Box 1**). The questions covered opening hours, being able to get through on the telephone, being able to get an appointment fairly quickly and being able to get an appointment with a particular doctor. Consulting a particular doctor reflects not only access but also aspects of relational continuity, that is patient preference for consulting a doctor they have come to know and trust through a series of consultations over variable time periods.²⁰ The practice index of multiple deprivation (IMD 2007) was used to indicate the level of deprivation in practice populations²¹ and a route planner was used to estimate the distance of each practice from the central hospital.²² Practices with more patients with chronic conditions may be more likely to have higher planned admission

Box 1 Questions from the GP patient survey included in the analysis

1. In general, are you satisfied with how easy it is to get through to someone on the phone at your doctor's surgery? [response options *yes* or *no*.]
2. Think about the last time you tried to get an appointment with a doctor. Were you able to get the appointment on the same day or on the next 2 days the surgery was open? [response options *yes* or *no*.] (Question restricted to patients who had tried to get an appointment with a doctor in the last 6 months).
3. In the last 6 months, have you ever wanted to make an appointment with a particular doctor at your surgery? [if *yes*:] Last time you wanted to, were you able to make an appointment with a particular doctor—even if it meant waiting longer? [response options *yes* or *no*.]
4. Over the last 6 months or so, were you satisfied with the hours your GP surgery was open? [Response options *yes* or *no*.]

rates, and therefore in addition to including age and ethnicity, we included the proportion of people with a recorded diagnosis of coronary heart disease on practice quality and outcome framework registers. Levels of coronary heart disease recorded on general practice registers are close to those predicted from population estimates²³ and we have found them to be highly correlated with the numbers of patients with other chronic conditions on practice registers.

Statistical methods

Descriptive statistics on the numbers of admissions were produced for each year separately. The data were expected to be overdispersed counts, and therefore an appropriate analysis method was negative binomial regression, using the log of the practice list size as an offset to adjust for the fact that practice list sizes vary and therefore the number at risk also varies from practice to practice. The sample size was dictated by the number of practices within the two primary care trusts. The aim was to test the association between numbers of emergency admissions and clinical performance as represented by the quality and outcomes framework variables, and access variables (accounting for practice level response rate) using the 2007–08 admissions year, and applying the model developed to the data for 2006–07 as a test of validity. For the multivariable model we decided only to use a single access variable [% able to see a specific general practitioner (GP)] as this is a measure of access and has also been found to predict emergency admissions.^{2,13} Furthermore, all the access variables were correlated, meaning that there would be multicollinearity if we included

all of them. All predictors were entered into the model and kept in the model, regardless of statistical significance.

The distance of practices from the hospital, the deprivation score and the proportion of white individuals, were the same in both years, otherwise all variables were specific to each year. *P*-values <0.05 were considered statistically significant. Analyses were undertaken using SAS version 9.1.

Results

There was an increase in the numbers of planned admissions between the two years (Table 1). Most practices achieved a high level of performance in the quality and outcomes framework clinical and organizational domains in both years, and satisfaction with access was also relatively high, although in some practices only just over half of respondents reported being able to get an appointment with a particular GP.

Table 2 presents the results of the negative binomial regression models. For 2006–07 the proportion of patients aged 65 years or older and being white ethnic origin were associated with increased elective admissions. However, practices with a higher male population and those in which more patients were able to see a specific general practitioner were associated with lower numbers of elective admissions. The findings were similar for the year 2007–08, although in this year higher practice list size was associated with fewer elective hospital admissions. There were no significant associations with the quality and outcomes framework scores, the other three patient access questions, deprivation scores and distance from the hospital.

Discussion

Main finding of this study

Higher clinical and organizational performance as described by the quality and outcomes framework indicators was not associated with reduced elective admissions but, was with greater access, specifically more patients being able to get an appointment with a particular doctor was associated with fewer elective admissions. A 1% increase in the proportion of patients able to see a particular doctor was associated with a reduction of 7.6 elective admissions per year in the average-sized practice for 2006–07 and 3.1 elective admissions for 2007–08. Therefore, for a practice of mean size (see Table 1), an increase of 1% in the proportion of patients able to see a specific GP would be associated with a decrease in costs by £20071.6 from its original value of £1537062 for the year 2006–07. For 2007–08, the reduction would be ~£8965.2 from its original value of £18 30 636.

Table 1 Median values for characteristics of practices and patients

Variable	2006–07 Median (IQR)	2007–08 Median (IQR)
Practice characteristics		
Distance of practice to hospital (miles)	4.3 (2.3–11.2)	4.3 (2.3–11.2)
List size	5903 (3112–9696)	6317 (3339–9702)
Patient characteristics		
Deprivation score (IMD score)	16 (10–32)	16 (10–32)
% of practice male	50 (49–51)	50 (49–51)
% of practice aged ≥ 65 years	15 (12–18)	15 (12–18)
% of practice with white ethnicity	91 (71–98)	91 (71–98)
Coronary heart disease prevalence (%)	3.4 (2.9–3.8)	3.3 (2.9–3.7)
Quality and outcomes framework		
Clinical points	647 (630–654)	651 (637–654)
Organizational points	175 (165–178)	176 (167–179)
GP patient survey		
Practice survey response (%)	51 (43–57)	47 (39–52)
% Able to get appointment 48 h in advance	89 (82–94)	89 (83–94)
% Able to see specific GP	71 (52–85)	88 (79–92)
% Satisfied with opening hours	84 (74–88)	81 (76–85)
% Satisfied with phone access	87 (75–95)	87 (78–94)
Number of planned hospital admissions per practice	582 (298–1066)	633 (303–1103)

$n = 145$. IQR, inter-quartile range.

What is already known on this topic

Older people are more likely to be admitted to hospital.² In our study, the proportion of the practice population aged 65 years or over was the strongest predictor of elective admissions. An increase of 1% of the practice aged ≥ 65 would be associated with an increase in costs of £60478.9 for 2006–07 and of £44247 for 2007–08 for the average-size practice. Ways to manage a greater number of older people in the community rather than through hospital admission will be needed in order to contain the rise in health service costs. Improved continuity in primary care may have a part to play. Relational continuity is defined as an ongoing therapeutic relationship between a patient and one or more providers,²⁰ and this is reflected in patient preference for consulting a particular doctor. The question in the access survey does not encapsulate all the features of relational continuity, but being able to consult a particular doctor is a necessary prerequisite to establishing and then maintaining an ongoing therapeutic relationship. The finding of an association between continuity of care and planned admission rates reflects similar association with respect to emergency admission.¹³ A potential explanation is that continuity potentiates trust in the doctor,²⁴ which in turn may

improve concordance and management in complex chronic conditions that are more common in older people. Relational continuity may also facilitate consistent clinical management.

Higher admission rates have been reported in ethnic minority populations,^{2,6,25} in contrast to the finding in our study in which higher proportions of white people in practice populations were associated with increased elective admissions. This finding may indicate barriers to access for the South Asian population of Leicester independent of levels of deprivation or a characteristic of the local population that enables avoidance of admission. We have found in other work that the local South Asian population has a strong culture of family support that may play a part in keeping patients at home.²⁶ Practices with a higher proportion of male patients were associated with fewer hospital admissions, a finding that reflects national data on hospital admission rates.²⁷ There is some evidence that for some conditions, increasing deprivation is associated with fewer referrals,²⁸ although in our study deprivation did not predict the numbers of elective admissions. Since we investigated the total numbers of admissions rather than admissions for selected clinical conditions, the possible effect of

Table 2 Multivariate analysis of variables explaining planned admission rates (145 practices)

Variable	IRR (95% CI)	% change in number of admission with 1% change in variable (%)	Change in planned admissions count for average size practice for 1 unit change in predictor	P-value
2006–07				
% of practice aged ≥65 years	1.03 (1.01, 1.05)	3	22.9	0.0003
% of practice with white ethnicity	1.01 (1.0, 1.01)	1	7.6	<0.0001
% of practice male	0.98 (0.96, 1.01)	–2	–15.3	0.08
% Able to see specific GP	0.99 (0.98, 0.999)	–1	–7.6	0.005
% response rate to access survey	1.01 (1.0, 1.02)	1	7.6	0.04
List size	0.99999 (0.999, 1.0)	–0.0001	–0.00076	0.08
Deprivation score	1.003 (0.99, 1.01)	0.3	2.3	0.14
Distance of practice to hospital	0.99 (0.98, 1.01)	–1	–7.6	0.19
Coronary heart disease prevalence	1.03 (0.95, 1.11)	3	22.9	0.51
QOF clinical points	1.001 (0.99, 1.01)	0.1	0.76	0.29
QOF organizational points	0.999 (0.99, 1.01)	–0.1	–0.76	0.38
2007–08				
% of practice aged ≥65 years	1.02 (1.003, 1.04)	2	15.3	0.02
% of practice with white ethnicity	1.004 (1.002, 1.007)	0.4	3.1	<0.0001
% of practice male	0.97 (0.95, 0.99)	–3	–22.9	0.01
% Able to see specific GP	0.996 (0.992, 0.999)	–0.4	–3.1	0.008
% response rate to access survey	1.01 (1.003, 1.02)	1	7.6	0.005
List size	0.99999 (0.9998, 1.0)	–0.0001	–0.00076	0.03
Deprivation score	1.001 (0.99, 1.01)	0.1	0.76	0.59
Distance of practice to hospital	0.99 (0.99, 1.01)	–1	–7.6	0.32
Coronary heart disease prevalence	1.07 (1.0, 1.15)	7	53	0.049
QOF clinical points	0.999 (0.99, 1.001)	–0.1	–0.76	0.42
QOF organizational points	0.999 (0.99, 1.001)	–0.1	–0.76	0.65

IRR, incident rate ratio.

In 2007–08 the mean planned admission count was 764. A 2% increase in admissions would thus entail an extra 15.3 admissions.

deprivation in a sub-group of conditions may not have been detected.

Quality of care as represented in the total clinical and organizational domains of the quality and outcomes framework was not associated with elective hospital admissions. This may partly be explained by the generally high level of achievement in the quality and outcomes framework of the included practices. The clinical and organizational domains incorporate a large number of separate indicators and it is possible that some of the component indicators do affect admission rates. There may well be associations between specific aspects of clinical care and admission for specific conditions.

What this study adds

This study highlights the role of relational continuity in the management of patients with conditions that carry a risk of

hospital admission. Falling levels of continuity appear to increase expenditure on hospital care, not only in terms of emergency admissions but also in elective admissions. The weight of evidence indicating an association between continuity and admission rates^{2,13} is sufficient to justify the avoidance of initiatives in primary care that reduce continuity and of evaluations of interventions to improve continuity.

Limitations

There are some limitations to this study. It was restricted to one population in the East Midlands, and was limited to two years only. Local factors, for example the culture of the local population, may explain some of the findings. We were unable to include information on admissions to private hospitals, but since the use of private hospitals is relatively limited but greater among less-deprived populations, and the finding that deprivation did not predict planned admission

rates, the omission of private admissions is unlikely to have influenced our findings. The access survey had a low response rate, reaching a median of 50% for the practices in the study, and the survey questions may not fully represent patient experience of access, although a study of the survey used in 2009 provides some reassurance about the survey's reliability.²⁹ Furthermore, we have not investigated some factors that may influence admissions rates, including the role of outpatient referral and the impact of supply of hospital specialists.

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