Variation in GP referral rates: what can we learn from the literature?

Catherine A O’Donnell


**Background.** Variations in referral rates exist, at GP and practice level. Although the National Institute for Clinical Excellence is to produce referral guidelines, it is unclear if this variation requires regulation. A critical review of the literature on variation in referral rates was undertaken to see if existing evidence could inform the debate.

**Objectives.** The aim of this study was to describe the variation in referral rates; to identify likely explanatory variables; and to describe the effect of GPs’ decision making on the referral process.

**Methods.** Six bibliographic databases, the Cochrane Library, the NHS Centre for Reviews and Dissemination, and the National Research Register were searched.

**Results.** Patient characteristics explain <40% of the observed variation; practice and GP characteristics <10%. The availability of specialist care does affect referral rates, but its influence on the observed variation of referral rates is not known. Intrinsic psychological variables are important. GPs who are less tolerant of uncertainty or who perceive serious disease to be a more frequent event may refer more patients. There is a lack of consensus about what constitutes an appropriate referral, and the use of guidelines has had only limited success in altering referral behaviour.

**Conclusions.** Variation in referral rates remains largely unexplained. Targeting high or low referrers through clinical guidelines may not be the issue. Rather, activity should concentrate on increasing the number of appropriate referrals, regardless of the referral rate. Pressure on GPs to review their referral behaviour through the use of guidelines may reduce their willingness to tolerate uncertainty and manage problems in primary care, resulting in an increase in referrals to secondary care. The use of referral rates to stimulate dialogue and joint working between primary and secondary care may be more appropriate.

**Keywords.** GPs, literature review, referral rates.

Introduction

Variation in referral rates between general practices and between individual GPs has long been the focus of attention for policy makers.1,2 The introduction to the 1989 White paper *Working for Patients* claimed that there was a 20-fold variation in GP referral rates to hospital.3 Variation is perceived to have financial implications. Crombie and Fleming estimated that for a practice population of ~2000 patients, the hospital expenditure (at 1981 prices) associated with the lowest and highest rates of referral were £40 000 and £408 000, a 10-fold difference.4 However, it is not GPs who take the decision to admit a patient, but hospital trainees or consultants.

Recent evidence has shown that admission rates, a suggested performance indicator for primary care, are explained largely by factors outside the control of GPs.5,6 However, GPs may be perceived to have more influence over the variation in referral rates. In England, the National Institute for Clinical Excellence (NICE) has announced that it will produce primary care referral guidelines to “… help GPs refer patients to specialists, more efficiently and effectively”.

Much work has been carried out in describing and analysing variation in referral rates. Can this evidence inform the current debate? A critical review of the literature on variation in GP referral rates was undertaken, with particular emphasis on the
epidemiology of these variations, likely explanatory variables and the effect of GPs’ decision making on the process of referral. Here I describe the findings of this review and the implications of existing research for current policy.

Methods

The following computerized bibliographic databases were searched (years covered by the database): Medline (1966–1999), Embase (1980–1999), Science Citation Index (1981–1999), Social Science Citation Index (1981–1999), International Bibliography of the Social Sciences (1980–1999) and CINAHL (1982–1999). Search terms included ‘general practice’, ‘general practitioner’, ‘referral’ and ‘variation’, and both English and non-English language papers were included. Searches were also carried out based on the names of grantholders in the list of current projects identified by Wilkin and Dornan in 1990, and the Cochrane Library, the NHS Centre for Reviews and Dissemination, and the National Research Register were searched.

A total of 1076 papers were identified and the titles and abstracts screened. Papers dealing with GP referral rates, variation in referral rates, possible explanations of those referrals and decision making in the context of referral were selected. Referral could be to any speciality, for an out-patient or in-patient appointment and for any reason. Papers dealing with referral letters and their contents were not selected as these were considered to be of limited relevance to the issue of variation in referral rates. This identified 293 papers. The abstracts were reviewed and duplicates excluded. This identified 91 relevant papers, which were reviewed by the author.

Variation in referral rates: a long history

Many studies have reported variation in referral rates (Table 1). Studies examining individual GP referral rates reported variation ranging from 2- to >20-fold,8–10 with greater variation in large studies. Studies reporting at a practice level found that referral rates generally varied by 3- or 4-fold.11,12 However, there are difficulties in comparing the data.

The number of referrals in many studies is relatively small and often compounded by the short period of data collection. Such studies are susceptible to the effect of random variation in the number of referrals due to chance.13–15 Moore and Roland re-examined the findings of Wilkin and Smith, showing a 24-fold difference in referral rates amongst 201 GPs, and demonstrated that chance accounted for at least 15% of the observed variation.13 In many studies, it is unclear what the referral is for or to which speciality. This can lead to difficulties ensuring that similar referrals are compared across studies.

Private referrals are often excluded, but can account for up to half of a practice’s referrals.15,16

The same denominator should be compared across studies.7,14,15,17 When comparing practices, list size is the most appropriate and rates can be standardized for age and sex. Practice list size is less appropriate when comparing individual GPs as list size is often a poor reflection of an individual GP’s workload. The actual number of consultations is more appropriate.14 However, standardizing the referral rate for age and sex is more difficult and requires additional data collection.

Many studies quote maximum and minimum referral rates. However, such data presentation reflects outliers and increases with sample size. A clearer picture is obtained by presenting referral rates by centiles or with 95% confidence intervals. In the third national morbidity survey, referral rates ranged from 6 to 55 per 1000 consultations.4 However, there was only a 2-fold difference in rates between the 20th and 80th centiles (23–41 per 1000 consultations). The use of confidence intervals allows a judgement to be made about the precision of the estimated referral rate: studies with a small number of referrals will have large confidence intervals; studies with larger numbers of referrals will have smaller confidence intervals.

Explanations for the variation in referral rates

Many studies have tried to identify factors explaining the variation in referral rates. These fall into four categories:

(i) patient characteristics;
(ii) practice characteristics;
(iii) GP characteristics; and
(iv) access to specialist care.

Patient characteristics

Age, sex and social class. Standardizing referral rates for the age and sex of those consulting reduced the observed variation by <10% (Table 2).8,14 Adjusting the referral rate for the patient’s social class, or social class, age and sex, also had little effect on the variation observed (Table 2). Comparing high and low referring GPs, Wilkin and Smith showed that these GPs saw similar proportions of patients in each age and sex category and in each social class.10 High referring GPs referred more patients within each group.

These studies defined social class at an individual level using the Registrar General’s Occupational Groups.18 More recent studies have used area-based measures such as the Jarman underprivileged area [UPA(8)] score19,20 or the Townsend score.21

The relationship between variation in GPs’ referral rates and the socio-economic profile of the whole practice population, rather than those who consult, was examined
<table>
<thead>
<tr>
<th>Reference</th>
<th>No. of GPs or practices</th>
<th>Type of referral</th>
<th>Length of data collection</th>
<th>No. of consultations</th>
<th>No. of referrals</th>
<th>Referral rate Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second National Morbidity Survey, 1970–71&lt;sup&gt;79&lt;/sup&gt;</td>
<td>60 practices</td>
<td>Out-patients and in-patients</td>
<td>2 years</td>
<td>–</td>
<td>–</td>
<td>36.0 per 1000 consultations p.a.</td>
<td>18.0–76.0</td>
</tr>
<tr>
<td>Morrell &lt;sup&gt;et al&lt;/sup&gt;. (1971)&lt;sup&gt;8&lt;/sup&gt;</td>
<td>3 GPs in a single practice</td>
<td>Out-patients, inc. specialty breakdown</td>
<td>1 year</td>
<td>21 098</td>
<td>529</td>
<td>25.1 per 1000 consultations p.a.</td>
<td>15.4–27.3</td>
</tr>
<tr>
<td>Third National Morbidity Survey, 1981–82&lt;sup&gt;80&lt;/sup&gt;</td>
<td>60 practices</td>
<td>Out-patients and in-patients</td>
<td>2 years</td>
<td>–</td>
<td>–</td>
<td>32.0 per 1000 consultations p.a.</td>
<td>6.0–55.0</td>
</tr>
<tr>
<td>Cummins &lt;sup&gt;et al&lt;/sup&gt;. (1981)&lt;sup&gt;9&lt;/sup&gt;</td>
<td>4 GPs in a single practice</td>
<td>Out-patients</td>
<td>5 years</td>
<td>65 538</td>
<td>3545</td>
<td>54.1 per 1000 consultations p.a.</td>
<td>42.5–66.7</td>
</tr>
<tr>
<td>Dowie (1983)&lt;sup&gt;59&lt;/sup&gt;</td>
<td>65 GPs</td>
<td>Out-patients</td>
<td>3 months</td>
<td>–</td>
<td>370</td>
<td>3.5 per 1000 population&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0–15.0</td>
</tr>
<tr>
<td>Crombie (1984)&lt;sup&gt;81&lt;/sup&gt;</td>
<td>39 practices</td>
<td>Out-patients and in-patients</td>
<td>1 year</td>
<td>–</td>
<td>–</td>
<td>33 per 1000 consultations p.a.&lt;sup&gt;a&lt;/sup&gt;</td>
<td>19.0–64.0</td>
</tr>
<tr>
<td>Gillam (1985)&lt;sup&gt;16&lt;/sup&gt;</td>
<td>18 GPs</td>
<td>Out-patients and domiciliary visits</td>
<td>3 months</td>
<td>27 847 patients</td>
<td>898</td>
<td>31.4 per 1000 consultations</td>
<td>17.8–62.9</td>
</tr>
<tr>
<td>Hartley &lt;sup&gt;et al&lt;/sup&gt;. (1987)&lt;sup&gt;52&lt;/sup&gt;</td>
<td>21 GPs</td>
<td>Out-patients</td>
<td>1 year</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.02–0.08 per patient p.a.</td>
</tr>
<tr>
<td>Jones (1987)&lt;sup&gt;32&lt;/sup&gt;</td>
<td>451 practices</td>
<td>Out-patients, including non-GP referrals</td>
<td>6 weeks</td>
<td>N/A</td>
<td>–</td>
<td>200 per 1000 practice population p.a.</td>
<td>137–226</td>
</tr>
<tr>
<td>Wilkin and Smith (1987)&lt;sup&gt;10&lt;/sup&gt;</td>
<td>201 GPs</td>
<td>Out-patients and in-patients</td>
<td>20 days</td>
<td>89 030</td>
<td>5467</td>
<td>66 per 1000 consultations</td>
<td>0–240</td>
</tr>
<tr>
<td>Armstrong &lt;sup&gt;et al&lt;/sup&gt;. (1988)&lt;sup&gt;83&lt;/sup&gt;</td>
<td>122 GPs</td>
<td>Out-patients</td>
<td>5 days</td>
<td>17 445 patients</td>
<td>967</td>
<td>55.4 per 1000 patients</td>
<td>–</td>
</tr>
<tr>
<td>Christensen &lt;sup&gt;et al&lt;/sup&gt;. (1989)&lt;sup&gt;30&lt;/sup&gt;</td>
<td>141 GPs</td>
<td>Out-patients and in-patients, inc. specialty breakdown</td>
<td>1 year</td>
<td>525 554 patients</td>
<td>17 586</td>
<td>70 per 1000 patients p.a.&lt;sup&gt;a&lt;/sup&gt;</td>
<td>52.0–89.0&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Noone &lt;sup&gt;et al&lt;/sup&gt;. (1989)</td>
<td>25 practices (8 in Milton Keynes; 17 in rest of Oxford region)</td>
<td>Out-patients, inc. specialty breakdown</td>
<td>11 weeks in 1983, 11 weeks in 1984</td>
<td>–</td>
<td>4663</td>
<td>Milton Keynes: 101.8&lt;sup&gt;c&lt;/sup&gt; Oxford: 100.6&lt;sup&gt;d&lt;/sup&gt; Milton Keynes: 114.0&lt;sup&gt;c&lt;/sup&gt; Oxford: 104.3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>84.0–181.0 69.0–164.0 67.0–159.0 51.0–151.0</td>
</tr>
<tr>
<td>Kerssens and Groenewegen (1990)&lt;sup&gt;28&lt;/sup&gt;</td>
<td>45 GPs</td>
<td>Referrals to physiotherapy</td>
<td>1 year</td>
<td>–</td>
<td>6397</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Madeley &lt;sup&gt;et al&lt;/sup&gt;. (1990)&lt;sup&gt;29&lt;/sup&gt;</td>
<td>34 practices</td>
<td>Out-patients, inc. specialty breakdown</td>
<td>3 months</td>
<td>–</td>
<td>3534</td>
<td>96.0 per 1000 patients p.a.</td>
<td>28.0–176.0</td>
</tr>
<tr>
<td>Rashid and Jagger (1990)&lt;sup&gt;30&lt;/sup&gt;</td>
<td>6 practices</td>
<td>Emergencies, out-patients and in-patients</td>
<td>1 month</td>
<td>3875 patients</td>
<td>216</td>
<td>55.7 per 1000 patients</td>
<td>23.0–105.0</td>
</tr>
<tr>
<td>Roland &lt;sup&gt;et al&lt;/sup&gt;. (1990)&lt;sup&gt;14&lt;/sup&gt;</td>
<td>9 GPs in a single practice</td>
<td>Out-patients and in-patients</td>
<td>6 months</td>
<td>10 553</td>
<td>554</td>
<td>52.9 per 1000 consultations</td>
<td>26.0–95.0</td>
</tr>
<tr>
<td>Reynolds &lt;sup&gt;et al&lt;/sup&gt;. (1991)&lt;sup&gt;40&lt;/sup&gt;</td>
<td>6 GPs in a single practice</td>
<td>Out-patients</td>
<td>9 months</td>
<td>21 784</td>
<td>612</td>
<td>28.0 per 1000 consultations</td>
<td>16.0–39.0</td>
</tr>
<tr>
<td>Calman &lt;sup&gt;et al&lt;/sup&gt;. (1992)&lt;sup&gt;44&lt;/sup&gt;</td>
<td>6 family physicians and 2 family nurse practitioners</td>
<td>Specialists</td>
<td>19 months</td>
<td>35 218</td>
<td>868</td>
<td>24.6 per 1000 consultations</td>
<td>–</td>
</tr>
<tr>
<td>Coulter and Bradlow (1993)&lt;sup&gt;15&lt;/sup&gt;</td>
<td>16 practices (10 fund-holding; 6 non-fundholding)</td>
<td>Out-patients</td>
<td>6 months in both phase 1 and phase 2</td>
<td>–</td>
<td>28 371 over both phases</td>
<td>Fundholders: 107.3 and 111.4 per 1000 population p.a. Non-fundholders: 95.0 and 112.0 per 1000 population p.a.</td>
<td>–</td>
</tr>
</tbody>
</table>
**Table 1**  
Continued

<table>
<thead>
<tr>
<th>Reference</th>
<th>No. of GPs or practices</th>
<th>Type of referral</th>
<th>Length of data collection</th>
<th>No. of consultations</th>
<th>No. of referrals</th>
<th>Referral rate</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evans (1993)&lt;sup&gt;63&lt;/sup&gt;</td>
<td>19 GPs</td>
<td>Out-patients</td>
<td>1 year</td>
<td>112 413</td>
<td>5028</td>
<td>44.7 per 1000 consultations p.a.</td>
<td>17.4–71.0</td>
</tr>
<tr>
<td>Fertig <em>et al.</em> (1993)&lt;sup&gt;48&lt;/sup&gt;</td>
<td>31 practices</td>
<td>Out-patients</td>
<td>1 year</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>84.0–208.0 per 1000 patients p.a.</td>
</tr>
<tr>
<td>Verhaak (1993)&lt;sup&gt;31&lt;/sup&gt;</td>
<td>127 GPs</td>
<td>Out-patients and in-patients—mental health problems only</td>
<td>3 months</td>
<td>19 286 illness episodes</td>
<td>1106</td>
<td>57.4 per 1000 illness episodes</td>
<td>–</td>
</tr>
<tr>
<td>Haikio <em>et al.</em> (1995)&lt;sup&gt;85&lt;/sup&gt;</td>
<td>29 GPs</td>
<td>Out-patients and in-patients</td>
<td>1 month</td>
<td>–</td>
<td>359</td>
<td>45.0 per 1000 consultations</td>
<td>16.0–100.0</td>
</tr>
<tr>
<td>Hungin <em>et al.</em> (1995)&lt;sup&gt;96&lt;/sup&gt;</td>
<td>128 GPs</td>
<td>Open access gastroscopy</td>
<td>1 year</td>
<td>987 880</td>
<td>1210</td>
<td>1.0 per 1000 consultations p.a.</td>
<td>0.7–1.3</td>
</tr>
<tr>
<td>Surender <em>et al.</em> (1995)&lt;sup&gt;36&lt;/sup&gt;</td>
<td>16 practices</td>
<td>Out-patients</td>
<td>4 months</td>
<td>–</td>
<td>10 311</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Vehvilainen <em>et al.</em> (1996)&lt;sup&gt;38&lt;/sup&gt;</td>
<td>851 GPs in 93 centres</td>
<td>Secondary care health</td>
<td>7 days</td>
<td>59 065</td>
<td>2921</td>
<td>49.7 per 1000 consultations</td>
<td>–</td>
</tr>
<tr>
<td>Delnoij and Spreeuwenberg (1997)&lt;sup&gt;27&lt;/sup&gt;</td>
<td>161 GPs in 102 practices</td>
<td>Out-patients and in-patients</td>
<td>3 months</td>
<td>387 250</td>
<td>4803</td>
<td>49.6 per 1000 consultations p.a.</td>
<td>–</td>
</tr>
<tr>
<td>Hippisley-Cox <em>et al.</em> (1997)&lt;sup&gt;22&lt;/sup&gt;</td>
<td>183 practices</td>
<td>Medical and surgical referrals</td>
<td>1 year</td>
<td>–</td>
<td>–</td>
<td>215.4 per 1000 patients p.a.</td>
<td>83.5–533.0</td>
</tr>
<tr>
<td>Roland <em>et al.</em> (1997)&lt;sup&gt;33&lt;/sup&gt;</td>
<td>109 GPs</td>
<td>NHS referrals</td>
<td>15 months</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>61.0–344.0 per 1000 patients p.a.</td>
</tr>
<tr>
<td>Sturdy <em>et al.</em> (1997)&lt;sup&gt;25&lt;/sup&gt;</td>
<td>164 practices</td>
<td>Paediatric referrals</td>
<td>1 year</td>
<td>–</td>
<td>23 467</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>van Suijlekom-Smit <em>et al.</em> (1997)&lt;sup&gt;87&lt;/sup&gt;</td>
<td>161 GPs in 103 practices</td>
<td>Paediatric referrals</td>
<td>1 year</td>
<td>63 753 children</td>
<td>2526</td>
<td>159.0 per 1000 children p.a.</td>
<td>–</td>
</tr>
</tbody>
</table>

<sup>a</sup> Median value; <sup>b</sup> lower and upper quartiles; <sup>c</sup> per 1000 population per annum; <sup>d</sup> lower and upper quintiles.

**Table 2**  
Effect of standardizing for age and sex, or age, sex and social class of those consulting on variation in referral rates

<table>
<thead>
<tr>
<th>Reference</th>
<th>Adjustment</th>
<th>Range (no. of referrals per 1000 consultations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morrell <em>et al.</em> (1971)&lt;sup&gt;8&lt;/sup&gt;</td>
<td>Rates unadjusted</td>
<td>15.4–27.3</td>
</tr>
<tr>
<td></td>
<td>Rates adjusted for age and sex</td>
<td>16.0–26.2</td>
</tr>
<tr>
<td></td>
<td>Rates adjusted for social class</td>
<td>15.2–27.1</td>
</tr>
<tr>
<td>Cummins <em>et al.</em> (1981)&lt;sup&gt;9&lt;/sup&gt;</td>
<td>Rates unadjusted</td>
<td>43.0–67.0</td>
</tr>
<tr>
<td></td>
<td>Rates adjusted for age, sex and social class</td>
<td>43.0–64.0</td>
</tr>
<tr>
<td>Roland <em>et al.</em> (1990)&lt;sup&gt;14&lt;/sup&gt;</td>
<td>Rates unadjusted</td>
<td>26.9–95.5</td>
</tr>
<tr>
<td></td>
<td>Rates adjusted for age and sex</td>
<td>25.9–82.3</td>
</tr>
<tr>
<td>Fleming <em>et al.</em> (1991)&lt;sup&gt;68&lt;/sup&gt;</td>
<td>Rates unadjusted</td>
<td>73.0–245.0</td>
</tr>
<tr>
<td></td>
<td>Rates adjusted for age, sex and social class</td>
<td>58.0–191.0</td>
</tr>
</tbody>
</table>
using the Jarman score. Practices with high Jarman scores had high total referral rates. Overall referral rates were subdivided into medical and surgical referral rates and analysed by linear regression. The Jarman score explained 23% of the variation in total referral rates, 32% of the variation in medical referral rates, but only 2.3% of the variation in surgical referral rates. Multivariate analysis was used to examine the contribution of a number of variables, including Jarman score, age and sex of the practice population, fundholding status and number of partners, on the observed variation. This model explained 29% of the variation in total referral rates, with the Jarman score the strongest predictor of referral rates compared with the other variables used in the model.

This study highlights the usefulness of more sophisticated statistical techniques which allow the contribution of different variables to variation in referral rates to be assessed. However, it was criticized for using the Jarman [UPA(8)] score. Although often used as a proxy measure for deprivation, the Jarman [UPA(8)] score was constructed to measure GP workload. Thus, a score indicating high GP workload could be expected to be associated with higher rates of referral. Re-analysis of their data using the Townsend score plus the variables described above still explained 27% of the variation in total referral rates. In a study of paediatric referral rates, Sturdy et al. also found weak but significant associations between the referral rate and the Jarman [UPA(8)] score, lower social class and overcrowding.

Thus, the role of social class in the variation of referral rates is not clear-cut. It depends not only on the measure used to quantify deprivation, but also on whether the measure is based on the patients actually consulting a GP or on the practice population as a whole.

Case mix. In Morrell’s study, adjusting for diagnostic case mix reduced the range in referral rates from 15.4–27.3 per 1000 consultations to 16.5–25.3, a reduction of ~14%. A Dutch study of referrals to specialists in internal medicine found that 45% of the variation in new referrals was explained by patient morbidity. However, Wilkin and Smith again showed that the case mix of high and low referring GPs was similar, with high referrers referring a greater percentage of patients across all diagnostic categories. Similar results were reported by Kerssens and Groenewegen in their study of >6000 GP referrals of physiotherapy.

Practice characteristics
Practice size. There is conflicting evidence about the relationship between practice size and variation in referral rates. When high and low referring GPs were compared, there were no significant differences in list size or number of partners. Madeley et al. found no difference in referral rates between single-handed GPs and those in partnerships in Lincolnshire. However, analysis using multivariate techniques found a significant association between single-handed practices and high referral rates in Nottinghamshire. A study in Denmark found no association between referral rates and the number of GPs in the practice, but did find a significant association between referral rate and practice size, with referral rates falling slightly as the practice size increased. Conversely, in The Netherlands, referrals were found to increase as GP list size increased, or as the number of GPs in the practice increased.

Geographical location. Distance of the practice to hospital may influence referral rates. A study in Wales found that higher referral rates were associated with shorter distances from the practice to the out-patient clinic. A study of referral patterns in 56 practices in Lincolnshire found that GPs classified as rural GPs had significantly lower referral rates than urban GPs. However, this may reflect other differences between urban and rural practices. In an urban area, 22% of practices with high referral rates were within 1 mile of a district general hospital, but 37% of those with low rates were equally close to a hospital.

Fundholding. The effect of fundholding on referral rates is unclear. Descriptive studies comparing referral rates before and after fundholding found little difference 1 year on, with referral rates increasing for both fundholders and a control group of non-fundholders. However, 2 years later, fundholders’ referral rates were lower than the comparator non-fundholders [115.4 per 1000 patients per year (113.6–117.0) versus 120.3 (118.0–122.0)]. Hippisley-Cox also found that referral rates were lower for fundholders than for non-fundholders. Fundholding explained ~5% of the observed variation and continued to be associated with variation in multivariate analysis. However, the association was relatively weak compared with the effects of number of partners and deprivation score. The mechanisms used by fundholders to control their referral rates are unclear, but may include educational activities, guidelines and closer collaboration with consultant colleagues.

GP characteristics
No relationship was found between referral rates and age of GP, years of experience or membership of the RCGP in some UK studies. In Finland, Vehvilainen and colleagues reported higher referral rates in young, relatively inexperienced GPs. One small UK study demonstrated that GP trainees referred more patients for emergency admission compared with their trainers. However, it was unclear in both of these studies if less experienced GPs were more willing to refer, or if they saw patients in greater need of referral.

It has been suggested that GPs with an interest or training in a particular speciality may have a higher referral rate in that speciality, perhaps due to differences in case
Variation in GP referral rates: is it a problem?

As no one variable or group of variables appears to be a strong predictor of variation, it raises the question of whether such variation is indeed a problem. To judge this, information is required on two related issues:

(i) the appropriateness of referrals; and
(ii) the outcome of referrals.

Appropriateness

Policy makers tend to regard high levels of referral as inefficient, and there is a feeling that many of these referrals are inappropriate. However, little is known about what is ‘appropriate’. It is not even clear that ‘the norm’ is appropriate. The reason for a referral to out-patients generally falls into one of three categories:

- investigation and/or diagnosis
- treatment
- advice and reassurance for the patient and/or GP.

Judging appropriateness needs to take account of the different objectives for each of these categories. Coulter suggests that an appropriate referral must also be necessary for the individual patient, timely in the course of the disease, effective in achieving its objectives and cost effective. Therefore, judging the appropriateness of a referral decision is complex.

Most studies judging appropriateness involved the referring GP and/or specialist in reviewing a series of referrals. In some, hospital consultants were critical of GPs’ referral behaviour. In one study, 55% of hospital consultants across a range of specialities felt that the GP could have done more before referring the patient. Other studies suggest that GPs do refer appropriately. In post-referral discussions between GPs and consultants, specialists felt that most of the cases referred had been appropriate for hospital management. In Cambridge, consultants reviewed 521 GP referrals. Overall, only 9.6% were judged to be inappropriate. In the same study, GPs reviewed 308 cases for which referral guidelines were available and judged 15.9% to be inappropriate. GPs also reviewed referrals in Elwyn and Stotts's study and found 34.0% to be inappropriate. Of these, most were felt to be due to a lack of resources (e.g. no access to a community psychiatric nurse), lack of knowledge, or required specialist skills and procedures. Using subsequent hospital admission as a proxy for appropriateness, Moss et al. demonstrated that 91.0% of urgent referrals to general surgery were admitted. This may be related to the speciality as Coulter has shown that referral rates to out-patient clinics and subsequent admission are higher for general surgery than for any other speciality.

The contribution of inappropriate referrals to the variation in referral rates has been examined. A Dutch study demonstrated that 57% of referrals from high referring GPs and 55% from average referring GPs had clear medical indications for the referral. However, these results must be viewed with caution as there were only two GPs in each group. Using subsequent admission as a proxy for appropriateness, Coulter demonstrated that practices with higher referral rates also had higher admission rates, casting doubt on the idea that high referring practices were referring patients inappropriately.

In Fertig’s study, elimination of all referrals judged inappropriate would have reduced the variation in practice referral rates from 2.5- to 2.1-fold. Indeed, the strict application of referral guidelines would have increased the absolute number of patients referred.

However, referral rates themselves tell us nothing about the appropriateness of those referrals. Average referrers may refer as inappropriately as high or low referrers. Wilkin and colleagues suggested that, in theory, all consultations with a GP can be classified in terms of the benefit or disbenefit which would be derived from a referral to hospital, with the benefits of referral outweighing the benefits of continuing GP care in only the minority of consultations. What is required is to reduce inappropriate referrals, where there is no benefit, and increase appropriate referrals, where there is benefit. Simply changing the referral rate itself will not alter the balance between appropriate and inappropriate, merely pick up more or less of each group. Thus, whether a GP is a high, average or low referrer is less important than the percentage of appropriate referrals made. However, to judge whether or not a referral is appropriate requires data on outcomes.
Outcomes
Few studies have examined long-term clinical outcomes following referral.56–58 Coulter followed-up referrals for menstrual problems and for back pain 5 years after the original, index referral.56,57 Investigations and/or treatment had been carried out for the majority of patients. Of those referred, menstrual symptoms had resolved in 86% of patients and back pain in 67%. Although menstrual problems had resolved spontaneously in 4% of these women, the most effective way of dealing with their symptoms was through active treatment (drugs + procedure: symptoms resolved for 20%; hysterectomy ± other treatment: symptoms resolved for 42%). General practice consultation rates were also examined over the 5-year period for these patients. Consultation rates for both menstrual problems and back pain fell after referral, although there was an increase in consultations for other reasons. However, as the consultation rate for the index problem fell by such a large extent, the overall consultation rate also decreased.

In Sullivan’s study, patients were asked whether their symptoms had improved 2 years after an initial referral to either a rheumatology, vascular surgery or dermatology clinic: 8% felt their condition had been cured; 38% that it had improved; and 46% that it was unchanged.58 However, there was no clinical verification as to whether the conditions had improved.

It is difficult to make any judgements about the appropriateness and outcome of referral when a key group of patients is missed, i.e. patients with similar symptoms and conditions who were not referred. The importance of including this group of patients in studies of referral outcome has been discussed.59 This is an important issue, particularly as it has been suggested that the main problem with variation in referral rates may not be one of over-referral, but of under-referral. Indeed, it has been suggested that the real cost to the health service may lie, not with the small number of patients who are referred unnecessarily, but with those patients who are referred late or not at all.43, 44 One study has examined whether patients who present late with cancer are from low referring practices.60 They found no association between late presentation with bowel or breast cancer and either low or high referral rates.

The literature shows that it is difficult to assess appropriateness with regard to referrals. Most studies rely on the view of the specialist as to what is and is not appropriate, and this view often is in disagreement with the GP and with the patient. A lack of data on outcomes also makes it difficult to judge appropriateness. Studies are required which take account of both the GPs’ and patients’ views and which attempt to identify and track patients who are not referred to determine if they have the same, or different, outcomes. Until such studies are carried out, great care must be taken in passing judgement on practices which are high or low referrers compared with a numerical norm. This is well summarized by Mooney and Andersen61 who wrote:

“The philosophy of ’cosiness’—all getting together around some common mean or standard and not being an antisocial outlier—can only be seen as virtuous if the point on the scale around which cosiness occurs has some rationale. The challenge here is not variation per se: it is trying to discover where cosiness should occur, and the extent to which it is a virtue.”

The referral decision-making process
Cummins et al. were the first to suggest that individual GPs might have a unique ‘referral threshold’ combining all those characteristics which might have a bearing on a referral decision: training, experience, tolerance of uncertainty, sense of autonomy and personal enthusiasms.9 The first major study of the GP decision-making process was that of Dowie, who suggested that a substantial part of the reason for variation in referral rates lay in GPs’ cognitive processes. This included confidence in their clinical judgement; awareness of the chances of life-threatening events occurring; their current medical knowledge; and the need to sustain the esteem of consultant colleagues.59

Wilkin and Smith, while supporting the model developed by Dowie, suggested that it had some limitations. In particular, it concentrated on decisions to refer for a diagnostic uncertainty, but not for decisions to refer for treatment or advice. In addition, the model was developed using referrals for acute and more serious conditions, not with the chronic or non-serious conditions which GPs often refer.1 They argued that, for many referrals, diagnosis was not the only or most important issue and suggested an alternative model for the referral decision which tried to include all possible reasons for wanting to refer, including the need for treatment, advice or management.

These models developed a theoretical framework highlighting the complexity of each referral decision taken by a GP. A number of studies have tried since to determine what factors influence the actual referral decisions taken by GPs.62–69 These have identified four broad groups of factors that GPs felt influenced their decision to refer:

- **GP-associated factors**, including personality, knowledge and interests; relationship with patients and colleagues; personal knowledge of consultants; tolerance of uncertainty.
- **Patient-associated factors**, including sociodemographic characteristics; expectations; needs and values; pressure for referral; preferences.
- **Case-specific factors**, including the type of condition; perceived seriousness.
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- **Structural factors**, including waiting lists; practice organization; proximity to hospital.

Few studies have compared the decision-making process of high and low referring GPs. Evans suggested that high referring GPs were more likely to respond to a patient’s request for a referral. This is consistent with Armstrong’s work in which GPs with high referral rates reported significantly greater perceived pressure from patients to refer. In Bailey’s work, an analytical framework was used to examine the decisions made by six high and six low referring GPs. While there was no single factor common to either high or low referrers, GPs with high referral rates were less tolerant of uncertainty in their decision making. GPs with high referral rates to physiotherapists were more likely to evaluate their patients’ complaints as purely or mainly somatic.

Dowie suggested that a GP’s awareness of the chance of life-threatening events occurring was important. One study has measured GPs’ perceptions of the incidence of serious disease in their practice and found a significant, negative association with referral rates. GPs who perceived serious disease to be an infrequent event referred fewer patients to hospital.

Thus, referral decision making is a complicated process, with no right or wrong approach. Relationships with patients, response to patient pressure and tolerance of uncertainty are clearly important factors in determining if a referral decision is made. However, the difficulty in collecting data where a referral was considered, but not made, again makes it difficult to judge the appropriateness of the referrals which are made.

**Can referral behaviour be modified?**

Given the lack of consensus regarding what an appropriate referral is and the lack of a clear link between referrals and quality of care, the question could easily be “Should referral behaviour be modified?”

A small number of studies have attempted to influence referral behaviour, generally by audit and the production of locally agreed guidelines. An evaluation of the feedback of practice referral rates, together with information on local norms, found that GPs were extremely sceptical of such information. A lack of confidence in the accuracy of the data and the lack of consensus on a link between quality of care and referral rates led to the information being disregarded. This response may vary according to the way in which the process is conducted, as in other areas review of data on referral rates was more acceptable.

Improved communication with consultant colleagues was highlighted as an important area. One initiative to address this issue was the development of a service called ‘Boneline’ in which orthopaedic consultants made themselves available for telephone consultations with GPs at specified times. Uptake of the service was poor, although GPs using the service reported that they definitely had avoided referral in 22% of cases. However, there was no difference in the mean number of requests for out-patient appointments before and after the service was initiated.

Locally developed guidelines often are suggested as the way to alter referral patterns. However, there is no clear evidence to suggest that guidelines are effective in modifying referral behaviour. Indeed, work by Fertig et al. showed that strict adherence to referral guidelines resulted in an increase in the absolute number of referrals and that the elimination of all inappropriate referrals led to only a marginal reduction in the observed variation.

**Conclusions**

GP-initiated referrals are only one part of the process of care which may, or may not, lead to hospital admission. Variation in referral rates exists, as in most areas of clinical activity. The gatekeeper role of the GP is generally held to be highly efficient in comparison with other national systems, and there is a danger that, in focusing on variations within one part of the system, the benefits of the whole system will be overlooked.

Variation remains largely unexplained, with patient, practice and GP characteristics explaining no more than half of the observed variation. Intrinsic psychological variables, such as a GP’s willingness to take risks, their tolerance of uncertainty or their perception of the frequency with which serious disease occurs, are also important. The role of secondary care in this equation is even less well known. Hospital supply factors such as the number of consultants available locally appear to influence the referral rate, but the role of these factors in influencing variation in referral rates is unknown.

There is a lack of consensus about what an appropriate referral is and little evidence about long-term outcomes for patients following referral. In addition, there is no information on the ‘near-referrals’, i.e. those patients whom a GP considered referring, but did not. Given this situation, it is difficult to be sure that those practices which sit around the ‘average’ referral rate are delivering the most appropriate care, far less being concerned about those who are above or below the ‘average’. It may be that under-referral is a greater problem than over-referral, although there is little evidence to support or refute this argument.

In conclusion, it is clear that variation does exist and that a large proportion of it cannot be explained easily. However, until the underlying issues are better understood, the use of referral rates to measure GP performance will be misguided. Pressure on GPs to review their referral behaviour and the use of referral guidelines may reduce their willingness to tolerate uncertainty and manage
problems in primary care, resulting in an increase in the number of referrals to secondary care. Instead, referral rates may be better used as a catalyst to stimulate dialogue and joint working between primary and secondary care colleagues. Such an approach may not reduce the number of referrals per se, but could result in more appropriate use of secondary care facilities and improved outcomes for patients.

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