Understanding variation in rates of referral among general practitioners: are inappropriate referrals important and would guidelines help to reduce rates?

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Abstract

Objectives—To determine the extent to which variation in rates of referral among general practitioners may be explained by inappropriate referrals and to estimate the effect of implementing referral guidelines.

Setting—Practices within Cambridge Health Authority and Addenbrooke’s Hospital, Cambridge.

Main outcome measures—Data on practice referral rates from hospital computers, inappropriate referrals as judged by hospital consultants, and inappropriate referrals as judged against referral guidelines which had been developed locally between general practitioners and specialists. Effect of referral guidelines on referral patterns as judged by general practitioners using the guidelines in clinical practice.

Results—There was 2.5-fold variation in referral rates among general practices. According to the specialists, 9-6% (95% confidence interval 6-4% to 12-9%) of referrals by general practitioners and 8-9% (2-6% to 15-2%) of referrals from other specialists were judged possibly or definitely inappropriate. Against locally determined referral guidelines 15-9% of referrals by general practitioners were judged possibly inappropriate (11-8% to 20-0%). Elimination of all possibly inappropriate referrals could reduce variation in practice referral rates only from 2.5-fold to 2.1-fold. An estimate of the effect of using referral guidelines for 60 common conditions in routine general practice suggested that application of guidelines would have been unlikely to reduce rates of referral in hospital (95% confidence interval -4-5% to 8-6% of consultations resulting in referral).

Conclusion—The variation in referral rates among general practitioners in Cambridge could not be explained by inappropriate referrals. Application of referral guidelines would be unlikely to reduce the number of patients referred to hospital.

Introduction

There is wide and unexplained variation in the rates at which general practitioners refer patients to hospital. The variation itself has been taken to indicate that resources are being used inefficiently and that patients may be referred to hospital unnecessarily. If variation in rates was due in part to general practitioners referring patients unnecessarily then it should be possible to identify a substantial number of unnecessary referrals in any sample of referrals drawn from an area where there is appreciable variation in rates among general practitioners. Our main aim was to test this hypothesis.

In assessing the appropriateness of referrals it is important to appreciate that the perspectives of the specialist, the general practitioner, and the patient on appropriateness are probably different. From the medical perspective assessment of the appropriateness of referrals should entail at least the views of specialists and general practitioners, and several joint groups have been established to develop guidelines for referral. Such guidelines, however, may still fail to include the patient’s perspective as patients’ expectations of referral may differ from, objectives of doctors. These issues are discussed in more detail in two recent publications.

In this study we have been able to take advantage of a set of referral guidelines which had been developed locally between general practitioners and specialists in the study district. We used these guidelines as a measure of the appropriateness of referrals to assess the maximum contribution which referrals rated by doctors as possibly unnecessary could have made to variation in referral rates. We also applied the guidelines in routine surgeries to estimate the effect on rates of referral.

Method

The conclusions presented in this paper depend on the results of four independently collected sets of data: firstly, details of referrals from general practitioners to hospital collected from hospital computers; secondly, appropriateness of referrals as judged by the consultant who saw the patient; thirdly, appropriateness of referrals as judged by an independent general practitioner against a set of referral guidelines developed locally; and, fourthly, the effect of the referral guidelines on referral rates as judged by general practitioners who used the guidelines in their routine clinical practice.

The study was carried out in Cambridge Health Authority by using referral rates of general practitioners in the district and measuring doctors’ perceptions of appropriateness of referrals to Addenbrooke’s Hospital. This hospital is the only large hospital in Cambridge and is known from previous work to take most referrals from general practitioners in Cambridge. Patients seen in this hospital, however, include patients resident in other districts so the data on appropriateness includes some on patients referred from outside Cambridge district.

MEASUREMENT OF REFERRAL RATES

Data on rates of referral to hospital were collected from a regional database which had been established to collect data on patterns of outpatient referrals from hospital computers throughout East Anglia. Data had been collected from June 1990 for Cambridge Health Authority and the surrounding East Anglian districts. For the purpose of this study, data on referrals from May 1991 to April 1992 were used. Obstetric and psychiatric referrals were excluded.

Data from two additional sources were available to validate the data on the database—namely, information from the computers at the hospital that had been collected in 1989, and data from annual reports from general practice covering referrals between April 1990 and March 1991.

SELECTION OF SAMPLE OF Referrals

One hundred new referrals were selected from each of the following six specialties: chest medicine, orthopaedics, rheumatology, otorhinolaryngology, gynaecology, dermatology, urology, ophthalmology, gynaecology.
results

variation in practice referral rates

Data were collected for 31 practices. All practices referred more than three quarters of their patients to Addenbrooke's Hospital, and for the 31 practices together 95% of referrals were to this hospital. There was a 2-5-fold variation between practices in their rates of referral to hospital, from 84 to 208 referrals per 1000 patients per year (table I). When earlier data from the hospital computers were used the variation was also estimated at 2-5 fold; when data from annual reports from general practice were used, variation was estimated at fourfold. We were therefore confident in concluding that there was at least a 2-5-fold variation in referral rates between practices in the district.

appropriateness of referrals

Of the 600 referrals selected for study, 521 were referred by general practitioners, the remainder being referred by hospital doctors. Table II shows the consultants' perception of the appropriateness of the 600 referrals studied. Similar judgments about appropriateness were made on referrals initiated by general practitioners and those initiated by specialists. Overall, the specialist judged the referral to be appropriate in 543 cases (90.4% of referrals, 95% confidence interval 87.1% to 93.6%). The percentage regarded as appropriate was over 90% of all specialties, with the exception of orthopaedics, in which only 67% of referrals were regarded as definitely appropriate.

Guidelines were available for 308 of the original sample of referrals from general practitioners. Table III shows the extent to which these were judged to follow the guidelines. Overall, the general practitioners judged to have managed the case as suggested in the guidelines in 259 cases (84.1% of referrals, 80.0% to 88.2%).

Table III—Numbers and percentages of referrals judged not to conform to predetermined guidelines

<table>
<thead>
<tr>
<th>Specialty</th>
<th>No of referrals</th>
<th>No judged not to conform to management suggested in referral guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatology</td>
<td>61</td>
<td>4</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>46</td>
<td>14</td>
</tr>
<tr>
<td>Otorhinolaryngology</td>
<td>74</td>
<td>4</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>56</td>
<td>14</td>
</tr>
<tr>
<td>Chest medicine</td>
<td>39</td>
<td>4</td>
</tr>
<tr>
<td>Gynaecology</td>
<td>32</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>308</strong></td>
<td><strong>49 (15.9%)</strong></td>
</tr>
</tbody>
</table>

calculation of maximum effect of inappropriate referrals on variation in referral rates

This section presents a theoretical calculation on the extent to which inappropriate referral could explain the variation in referral rates that exists between practices in the district. The data presented above suggest that between 10% and 15% of referrals could be regarded as possibly inappropriate by one of the two sets of criteria that were used. The question we considered is: "If 15% fewer patients were referred to hospital, by how much could this reduce the overall variation in referral rates?"

We would expect from previously published work that inappropriate referrals arise from practices with either high or low rates of referral. To estimate the maximum possible contribution of inappropriate referral to variation in rates of referral, however, we made the theoretical assumption that all inappropriate referrals arise in practices with high rates of referral. We then calculated the variation in referral rates which would remain if referrals from high referring practices were assumed to be reduced by the number of "possibly inappropriate" referrals.

We therefore took the data on referrals from...
practices shown in table I and made the assumption that the total number of referrals was to be reduced by 15% (5100 referrals over one year). We then took the practices with the top 25% of referral rates and calculated a reduction in their referral rates in proportion to their list sizes which would result in an overall reduction of 5100 patients referred. This calculation reduced the overall variation in practice referral rates from 2-5-fold (mean rate 145 referrals/1000 patients/year, range 84-208) to 2-1-fold (mean rate 123 referrals/1000 patients/year, range 84-174).

USE OF GUIDELINES IN GENERAL PRACTICES: POSSIBLE EFFECT ON RATES OF REFERRAL

General practitioners collected data on 5254 consultations. Of these, 662 consultations were for conditions in the clinical topics for which the general practitioners had been asked to collect data, and there was a referral guideline for 247 of these patients. Fifty three patients were already under the care of a hospital, and these were excluded from the study. Of the remaining 194 patients, 22 were referred to hospital. In these cases the general practitioners made a judgment in two cases that they would not have referred the patient to hospital had they followed the guideline strictly. In the remaining 172 cases which were not referred, the general practitioners judged that they would have referred the patient to hospital in six cases had the guidelines been followed strictly. The net effect of strict adherence to the guidelines would have been to increase the number of patients referred from 22 to 26, an increase of 2-1% in the percentage of consultations resulting in referral from 11-3% to 13-4% (95% confidence interval of difference 4-5% to 8-6%; not significant).

Discussion

The three sources of data on referrals used in this study confirm what has been shown in many other locations—namely, that there is substantial variation between general practices in the rates of referral to hospital. Although each source of data may have included inaccuracies, for the purpose of the argument presented in this paper it is sufficient to establish that general practitioners in Cambridge vary in their referral patterns. In previous studies it has not been possible to explain more than a small proportion of the variation on the basis of characteristics of doctors, their patients, or their practices, and it has been suggested that doctors may have individual referral thresholds. Recent research suggests that the referral behaviour of doctors may be related to their particular clinical skills, willingness to take risks, response to pressure from patients, work satisfaction, and the context in which the referral decisions are made. Our purpose was to determine the extent to which variation in rates of referral could be explained on the basis of inappropriate referral as perceived by specialists or in relation to guidelines derived by groups of doctors. We made no attempt to measure the patients' views on the referrals.

Overall, nearly 10% of referrals from general practitioners were rated as possibly or definitely inappropriate by the specialist who saw the patient. A higher proportion was rated inappropriate in orthopaedics, with 18% of referrals from general practitioners or specialists in this study. Previous work suggests that they would have judged a smaller proportion of referrals unnecessary than did specialists. We therefore regard 10% and 15% as a reasonable estimate of the percentage of possibly inappropriate referrals in this sample. Indeed this estimate is much higher than the 4% of patients judged by specialists to have been referred unnecessarily or referred to the wrong clinic in a recent national survey by Cartwright and Windsor. Our calculations on the effect of these possibly inappropriate referrals on the variation in referral patterns show that in the theoretical setting in which all 15% of inappropriate referrals came from the practices with the highest 25% of referral rates, elimination of these referrals would have reduced the variation in referral rates only from 2-5-fold to 2-1-fold, leaving the greater part of the variation unexplained. We therefore conclude that within this authority a small proportion of the variation in the rates of referral by general practitioners can be explained by inappropriate referrals.

When patients who may have been inappropriately referred to hospital are taken into account, however, it is important to consider those who may have not been referred—that is, those who were not referred to hospital even though they could have benefited from referral. We estimated the effect of guidelines on referral patterns on the basis of the subjective judgment of general practitioners by using the guidelines in the course of routine consultations. These data suggest that strict application of the referral guidelines would have been unlikely to change rates of referral significantly.

Non-compliance with guidelines argues against careful review of the quality of care provided by general practitioners or against the value of using management guidelines as an aid to clinical decision making. Indeed we believe that the development of such guidelines can be valuable, as shown in a recent study on the use of infertility guidelines by general practitioners in the Grampian region. Our results, however, suggest that concentrating on inappropriate referrals may be an ineffective way of trying to understand variation in referral patterns. We are aware of health authorities who have sought to introduce referral guidelines with the explicit intent to reduce numbers of patients referred. Our results suggest that unwitting attempts to impose referral guidelines are unlikely to reduce the numbers of patients referred to hospital.

This study was supported with a grant from East Anglian Regional Health Authority. We thank the consultants and general practitioners in Cambridge who collaborated with this project.

Practice implications

- There is a wide and unexplained variation in general practitioners’ rates of referral
- This study investigated whether this variation is due to inappropriate referral according to specialists and to guidelines developed locally between general practitioners and specialists
- Elimination of all possibly inappropriate referrals reduced the variation in practice referral rates from 2-5-fold to 2-1-fold
- Unnecessary referral does not seem to explain the wide variation in rates of referral to hospital among general practitioners
- Referral guidelines could help to improve the quality of referrals but may not reduce the number of patients referred


**Correction**

**General practice fundholding: observations on prescribing patterns and costs using the defined daily dose method**

An editorial error occurred in this paper by M Maxwell and colleagues (4 November, pp 1190-4). The third table in appendix I should not have included the column showing the total defined daily doses (ddds) for all prescriptions. The correct table is shown below.

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**Table:**

<table>
<thead>
<tr>
<th>Drug prescribed</th>
<th>Quantity × dose + ddd</th>
<th>No of ddd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cimetidine 200 mg</td>
<td>(240 × 20) = 4800/8000</td>
<td>60</td>
</tr>
<tr>
<td>Cimetidine 400 mg</td>
<td>(600 × 400) = 240000/8000</td>
<td>300</td>
</tr>
<tr>
<td>Ranitidine 150 mg</td>
<td>(280 × 150) = 42000/300</td>
<td>140</td>
</tr>
<tr>
<td>Ranitidine 300 mg</td>
<td>(180 × 300) = 54000/300</td>
<td>180</td>
</tr>
<tr>
<td>Omeprazole 20 mg</td>
<td>(540 × 20) = 10800/20</td>
<td>540</td>
</tr>
</tbody>
</table>

Total: 1220 ddds of ulcer healing drugs.

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