General practice size determines participation in optional activities: cross-sectional analysis of a national primary care system

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Background: There is widespread, unexplained variation in activity and outcome between general practices. Aim: To explore the relationship between practice size and participation in optional activities, including the Quality and Outcomes Framework (QOF). Design of study: Cross-sectional analyses of routinely available data on practice characteristics, QOF performance and optional activities including undergraduate teaching, postgraduate training, research, enhanced clinical data collection and service development. Setting: All 1031 general practices were located in mainland Scotland. Results: The most popular optional activity was undergraduate medical teaching, which involved 41% of all general practices. About a third of practices took part in postgraduate general practitioner training (29%), research (33%), enhanced clinical data collection through the Scottish Programme for Improving Clinical Effectiveness (31%) and the activities of the Scottish Primary Care Collaborative (33%). The most important driver of the number of activities undertaken by a practice is size with single handed, small and medium sized practices all undertaking a significantly lower number of activities than larger practices (P < 0.001). Deprivation had no overall effect, but was associated with lower rates of participation in postgraduate training. The average number of points achieved in the QOF ranged from 961 by the 18% of practices taking part in no optional activities, to 973 by 29% of practices taking part in one activity, 984 by 25% of practices taking part in two activities and 985 in 28% of practices taking part in three or more activities. Single handed practices in urban areas taking part in three or more additional activities had similar QOF point totals to larger practices taking part in three or more activities, and achieved 44 more QOF points than urban single-handed practices taking part in less than two additional activities. Conclusions: Practice size is strongly related to participation in optional activities. There is a small but significant relationship between the practice size and number of QOF points achieved by practices taking part in less than two additional activities. Participation in optional activities is a possible indicator of cultural and organisational factors within practices, which constrain the volume and quality of services, which they are able to provide.

Keywords: general practice; optional activities; size

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How this fits

- There are widespread unexplained variations in activity and outcome between general practices.
- Large numbers of practices take part in undergraduate teaching (41%), postgraduate training (29%), research (33%), enhanced clinical data collection (Scottish Programme for Improving Clinical Effectiveness (SPICE)) (31%) and the service development activities supported by the Scottish Primary Care Collaborative (SPCC) (33%).
- Practice size was the main determinant of optional participation; deprivation had no overall effect, but was associated with lower levels of participation in postgraduate training.
- About 18% of practices taking part in no optional activities achieved significantly fewer QOF points than the 53% of practices taking part in two or more activities ($P < 0.001$).
- Variation in the uptake of optional activities by general practices may indicate cultural and organisational factors within practices, which are also associated with the volume and quality of care.

Introduction

General practices are mostly consumed in dealing with the day-to-day demands of patients who require first or continuing contact with the National Health Service. In recent years, they have also been pre-occupied with meeting the incentivised targets of the new General Medical Services (GMS) contract. Most practices also take part in optional activities concerned with the future development of general practice and primary care, including education, research, enhanced information systems and health service initiatives. Previously, we have shown that participation in optional activities is socially patterned, with practices serving deprived areas being much less likely to take part in additional activities (Mackay et al., 2005). In this study, we investigate in more detail the nature, extent and correlates of such activity by general practices in Scotland.

Methods

Data on the number of practices in Scotland in 2005, and the age and gender of general practi-
version of the 2006 SIMD. The ranked list was then divided into ten groups of equal population size, from decile 1 (least deprived) to decile 10 (most deprived). On average, each decile comprises 531,000 people and is served by between 89 and 128 general practices. Practices, could in theory participate in up to six activities but as the number of practices doing so was small we used four or more activities as a cut-off point for the purposes of tabulation. However, for regression analysis the actual number of activities undertaken was used.

We used cross-tabulations to look separately at the associations between deprivation, rurality and practice size and the number and type of activities, restricting the analysis of practice size to urban practices (since practice size in such settings is a matter of choice). We used a binomial proportion test to examine differences in participation rates between the different groups of practices. Poisson regression analysis was used to identify the determinants of number of activities in relation to GP gender, practice size, QOF points achieved, deprivation, list size per GP and dispensing status (Table 5).

Results

The most popular optional activity was undergraduate medical teaching, which involved 42% of all general practices (Table 1). About a third of practices took part in postgraduate GP training (29%), research (33%), SPICE (31%) and the activities of the SPCC (33%). The RCGP Quality Practice Award was a minority activity, involving only 5% of practices.

Table 1 shows that the practices serving the most affluent tenth of the population are more likely to participate in postgraduate training and the QPA scheme than practices serving the most deprived tenth of the population. Conversely, practices serving the most deprived areas were more likely to take part in the service development activities of the Primary Care Collaborative.

The 528 practices serving the more affluent half of the population were more likely than the 503 practices serving the more deprived half to take part in postgraduate training (35% versus 22%, P < 0.001), undergraduate teaching (44% versus 41%, not significant (ns)) and SPICE (33% versus...
28%, ns), but less likely to take part in research (30% versus 36%, ns) and the activities of the SPCC (30% versus 37%, \( P = 0.03 \)). QPA was a minority activity (5%) in all areas (Table 1).

Practices serving populations across the socio-economic spectrum achieved very similar levels of points in the QOF, for both clinical and non-clinical domains, with less than 1% variation between the average levels achieved by practices serving deciles of deprivation (Table 1).

On average, the 268 most rural practices were more likely than the 753 other practices to take part in SPICE (34% versus 30%, ns), but less likely to take part in research (18% versus 39%, \( P < 0.001 \)), postgraduate training (22% versus 31%, \( P = 0.004 \)), undergraduate teaching (38% versus 43%, ns) and QPA (2% versus 6%, \( P = 0.01 \)) (Table 2). Participation in SPCC activities was similar in both types of area (32% versus 34%, ns).

Single-handed practices, comprising 12% of all practices in urban areas, were least likely to take part in every optional activity (Table 2). Within the 658 group practices in urban areas, there was a strong association between increasing practice size and participation in postgraduate training, undergraduate teaching and QPA, but no association between practice size and participation in SPICE, research or SPCC programmes (Table 2). Single-handed and small practices also achieved fewer QOF points.

The proportion of practices taking part in two or more optional activities increased from 24% of single-handed practices, to 45% of small practices, 64% of medium-sized practices and 78% of large practices. Conversely, the proportion of practices taking part in no activities increased from 6% of large practices to 10% of medium practices, 20% of small practices and 39% of single-handed practices (Table 2).

The average number of points achieved in the QOF ranged from 960.6 by the 18% of practices taking part in no optional activities, to 972.7 by 29% of practices taking part in one activity \((P = 0.02\) compared with no optional activities\), 983.7 by 25% of practices taking part in two activities \((P < 0.001\) compared with one activity\) and 984.7 in 28% of practices taking part in three or more activities \((P = 0.63\) compared with two activities\). Although, the lowest average scores (<960) were achieved by the most deprived practices.
practices taking part in no optional activities, there was no association in any of the other activity groupings between the number of points achieved and the socio-economic status of practice populations (Figure 1).

Table 4 shows the pairwise correlation coefficients between number of activities undertaken and deprivation, QOF points achieved, practice size, proportion of female GPs and age of GPs in a practice. There is a negative relationship between deprivation and number of activities undertaken but this association is not significant. QOF points achieved is positively and significantly associated with the number of activities undertaken as is large practice size. Single-handed and small practices undertake a significantly lower number of activities.

Controlling for all these factors simultaneously, Table 5 shows that the most important driver of the number of activities undertaken by a practice is size with single handed, small and medium sized practices all undertaking a significantly lower number of activities than larger practices \((P \leq 0.003)\), and achieving fewer QOF points. Deprivation appears to have no effect; nor does the proportion of female GPs and dispensing status.

### Discussion

In an earlier study, we reported lower levels of participation in optional activities by general practices serving deprived areas, based on (i) analyses of participation in postgraduate training and personal medical services and (ii) RCGP quality initiatives, practice accreditation and the SPICE. The current analysis includes new information concerning undergraduate teaching, research in primary care, participation in the SPCC and performance in the QOF of the new GMS contract, and is the first to investigate the association between participation in optional activities and achievement in national quality performance targets.

The strength of the study is that it is based on 1031 general practices in Scotland, comprising a complete national primary care system, and brings together a novel collection of data on practices’ optional activities. For practical reasons, these data were collected at different times over a 4 year period. It is important to note that data on the number of WTE GP per practice ceased to be collected at a national level after the introduction of the new GMS contract in 2004. Analysis of more recent data is desirable but not currently possible.
Although some practices may be involved in other types of optional activity, we believe that the collated data set provides robust and comprehensive evidence of the nature and extent of most of the optional activity undertaken by practices in Scotland during this period. If the recording period had extended after 2007, the figures for participation in research and the SPCC would have been higher, as both schemes have recently expanded.

With this larger and later data set, a different picture emerges from our original study, in which deprivation has a less clear effect. Careful interpretation is needed, however, because of the heterogeneity of practice circumstances and the different nature of optional activities, including what they require of a practice, what practices gain by taking part, financial considerations and the types of support provided for participating practices (Box 1 for description of optional activities).

### Table 3

<table>
<thead>
<tr>
<th>Practice size by practice size in urban general practices taking part in three or more and less than two optional activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total QOF Points</strong></td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td>Single</td>
</tr>
<tr>
<td>Small</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Large</td>
</tr>
</tbody>
</table>

QOF = Quality and Outcomes Framework

**Table 4** Correlation coefficients between number of practice activities and practice characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice deprivation score</td>
<td>-0.07</td>
</tr>
<tr>
<td>(1031)</td>
<td></td>
</tr>
<tr>
<td>Clinical QOF points</td>
<td>0.17**</td>
</tr>
<tr>
<td>(1010)</td>
<td></td>
</tr>
<tr>
<td>Non-clinical QOF Points</td>
<td>0.21**</td>
</tr>
<tr>
<td>(1010)</td>
<td></td>
</tr>
<tr>
<td>Single handed</td>
<td>-0.16**</td>
</tr>
<tr>
<td>(1023)</td>
<td></td>
</tr>
<tr>
<td>Small practice</td>
<td>-0.21**</td>
</tr>
<tr>
<td>(1031)</td>
<td></td>
</tr>
<tr>
<td>Medium sized practice</td>
<td>0.003</td>
</tr>
<tr>
<td>(1031)</td>
<td></td>
</tr>
<tr>
<td>Large sized practice</td>
<td>0.26**</td>
</tr>
<tr>
<td>(1031)</td>
<td></td>
</tr>
<tr>
<td>Proportion of female GPs</td>
<td>0.08</td>
</tr>
<tr>
<td>(1020)</td>
<td></td>
</tr>
<tr>
<td>Dispensing practice</td>
<td>-0.05</td>
</tr>
<tr>
<td>(1031)</td>
<td></td>
</tr>
<tr>
<td>Urban practice</td>
<td>0.04</td>
</tr>
<tr>
<td>(1021)</td>
<td></td>
</tr>
<tr>
<td>List per GP</td>
<td>-0.09</td>
</tr>
<tr>
<td>(1020)</td>
<td></td>
</tr>
</tbody>
</table>

QOF = Quality and Outcomes Framework; GP = general practitioners.

P < 0.05, **P < 0.001

Number of practices in each analysis is shown under coefficients.
The epidemiology of voluntary participation

The most popular optional activity is undergraduate teaching, which is generally considered to be professionally rewarding, collegiate and enjoyable, and which has expanded considerably in the last decade, as teaching involving GP and general practices has taken up an increasing proportion of new undergraduate curricula and NHS funding (service increment for teaching, SIFT and additional cost of teaching, ACT) has been provided to meet service costs. In general, undergraduate teaching is spread evenly between affluent and deprived and between rural and urban areas.

The lower rates of participation in optional activities by rural practices, for all activities except involvement in the SPICE programme, could be an effect of distance from co-ordinating centres, but may also be due to the effect of practice size. In the regression analysis of factors affecting participation, including practice size, we restricted analyses to non-rural practices, in which the size of the practice is a matter of choice and is not determined by physical constraints of geography and demography.

The dominant effect of practice size, and the disappearance in the regression analysis of the apparent effects of deprivation, dispensing status female GPs is perhaps not surprising, given the greater ability of larger practices to provide lead GPs for different activities and to accommodate additional activity within the work of larger and better resourced organisations.

The absence of an overall effect of deprivation on participation in optional activities in this analysis, compared with our earlier publication, is most likely because of the different activities included in the two analyses. Postgraduate training remains less prevalent in deprived areas (although steps have been taken to address this more recently). The high prevalence of participation in research and in the activities of the SPCC by practices based in deprived areas may be due to their proximity to strong local centres co-ordinating such activity in the Glasgow area, where severe deprivation in Scotland is concentrated.

Optional activities and variations in the quality of care

Although the differences in the number of QOF points achieved by non-participating and participating practices are not large in absolute terms (24.1 points between practices taking part in no activities compared with those taking part in three or more), they are large in relation to the generally small range of variation in QOF points achieved by practices in Scotland as a whole (inter-quartile range: 26.6 points). The main finding is that non-participating practices tend to be smaller and achieved the fewest QOF points irrespective of the socio-economic status of the population served.

Although there are likely to be a great many different local explanations why practices do and do not take part in specific optional activities, and

Table 5  Poisson regression analysis of number activities on practice characteristics

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>P &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deprivation score</td>
<td>0.002</td>
<td>0.44</td>
</tr>
<tr>
<td>Single handed</td>
<td>−0.68</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Small practice</td>
<td>−0.47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medium sized practice</td>
<td>−0.19</td>
<td>0.003</td>
</tr>
<tr>
<td>Proportion of female GPs</td>
<td>0.18</td>
<td>0.08</td>
</tr>
<tr>
<td>Dispensing</td>
<td>−0.19</td>
<td>0.06</td>
</tr>
<tr>
<td>Urban practice</td>
<td>−0.15</td>
<td>0.06</td>
</tr>
<tr>
<td>List size per GP</td>
<td>0.03</td>
<td>0.59</td>
</tr>
<tr>
<td>Clinical QOF points achieved</td>
<td>0.003</td>
<td>0.008</td>
</tr>
<tr>
<td>Non-clinical QOF points achieved</td>
<td>0.01</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>constant</td>
<td>−4.15</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

χ² 196.5
Pr (χ²)<0.001
Sample size 998

QOF = Quality and Outcomes Framework; GP = general practitioners.
Deprivation is based on the Scottish Index of Multiple Deprivation 2006.

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Box 1 Optional activities

Undergraduate teaching
Practitioners may opt for a variety of formats of practice or campus-based undergraduate medical teaching, for which they receive training, support and re-imbursement of time spent away from clinical care. Teaching is co-ordinated by five University departments of general practice. Although, practices are re-imbursed for the cost of a tutor's time away from service work, the rates are not lucrative. Participation generally requires the support of all partners in the practice, and is substantially less common in single-handed practices.

Postgraduate training
Accredited practices receive a registrar for practice-based postgraduate training, for which trainers receive regular training and support, a training fee of about £5000 and regular clinical contributions to the practice by the registrar. Training is co-ordinated by five regional postgraduate deaneries. Postgraduate training involves a substantially greater commitment than undergraduate teaching, including space for general practitioner registrars to see patients and trainer’s time providing supervision and support. Practices are inspected regularly to meet the requirements of a suitable training environment.

Scottish Programme for Improving Clinical Effectiveness (SPICE)
Participation in the SPICE scheme, established by RCGP Scotland, is open to all general practices in Scotland using GPASS (http://www.gpass.scot.nhs.uk/index.php?option=com_frontpage&Itemid=1) as the software for their practice information system (about 80% of practices in 2006). Beginning in 1999, SPICE provided practices with software to record clinical data for 18 quality indicators, preceding and covering a wider clinical range than the QOF. Practice data are collated centrally by the Primary Care Clinical Informatics Unit at Aberdeen University using an electronic questionnaire and returned to the practice in summary form (www.spice.scot.nhs.uk).

Scottish Primary Care Research Network (SPCRN)
The SPCRN provides practices with the opportunity to take part in a variety of high-quality research studies, with principal investigators from general practice and many other disciplines. Practices may volunteer to take part in research studies co-ordinated by the SPCRN, including external help in identifying suitable patients and re-imbursement of staff time spent in helping the research. Initial involvement is co-ordinated by four regional Scottish Primary Care Research Network offices based in University centres (www.sspc.ac.uk/spcrn/).

Scottish Primary Care Collaborative (SPCC)
The SPCC is similar to the Primary Care Collaborative in England (www.improvementfoundation.org) and invites practices to work in small, locally supported groups on service developments in primary care. Practices are supported by a project manager and a small budget. Participation is co-ordinated by the national SPCC office (http://www.scotland.gov.uk/Topics/Health/NHS-Scotland/Delivery-Improvement/183. By 2006, three waves of activity had been established, focusing on advanced access and the management of diabetes and coronary heart disease.

RCGP Quality Practice Award (QPA)
The QPA is for well-developed general practices and strives to be the gold standard for practice achievement, covering both organisational and clinical areas and involving the whole practice team. www.rcgp.org.uk/councils_faculties/rcgp_scotland/products_services/qpa.aspx
achieve different levels of QOF points, the overall
observation, that a fifth of practices take part in no
optional activities, while over a half take part in two
or more, with a significant difference in QOF points
achieved by these two groups of practices, seems
worthy of further investigation as a possible indi-
cator of cultural and organisational factors within
practices that constrain the volume and quality of
the services which they are able to provide.

Our findings relating practice size, optional
activities and achievement in the QOF are based on
urban practices (excluding Scotland’s distinctive
element of having many small practices in remote
and rural locations) and may be relevant to urban
general practice in other countries. A distinctive
feature of general practice in Scotland that it does
not have the large, commercially driven types of
practice which have been encouraged by Govern-
ment policy in England, and whose commitment to
optional activities is not known.

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Competing Interests

None.

Ethical Approval

Ethical approval was not required for this study.

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