The Quality and Outcomes Framework (QOF): does it reduce health inequalities?

Anna Dixon,1 Artak Khachatryan,2 Andrew Wallace,3 Stephen Peckham,4 Tammy Boyce5 and Stephen Gillam6

1 The King’s Fund
2 The King’s Fund
3 London School of Hygiene & Tropical Medicine
4 London School of Hygiene & Tropical Medicine
5 The King’s Fund
6 General practitioner/Consultant in Public Health, Institute of Public Health, University of Cambridge

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Glossary of terms/abbreviations

ACE - Angiotensin-converting enzyme (inhibitors)
ACS - Ambulatory care sensitive (hospital admissions)
APHO - Association of Public Health Observatories
APMS - Alternative Provider Medical Services (contract)
CHD - Coronary heart disease
CHF - Congestive heart failure
CI - Confidence Interval
COPD - Chronic obstructive pulmonary disease
DH - Department of Health
DPH - Director of Public Health
GMS - General Medical Services (contract)
HES - Hospital Episode Statistics
LES - Local Enhanced Services
NAO - National Audit Office
NICE - National Institute for Health and Clinical Excellence
Non SH - Non-Spearhead (PCT)
PBC - Practice-based commissioning
PCT - Primary care trust
PMS - Primary Medical Services (contract)
QOF - Quality and Outcomes Framework
SH - Spearhead (PCT)
SHA - Strategic health authority
WHO - World Health Organization
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**Executive summary**

**Background**

On coming to power in 1997, the Labour government committed to reducing health inequalities and gave significant policy attention to achieving this goal throughout its period in office. Despite significant improvements in the life expectancy of the most socially and economically deprived, the gap between the poorest and the richest has actually widened and the targets will not be met by the end of 2010. Policy documents have repeatedly identified primary care, and general practice in particular, as having an important contribution to make to reducing health inequalities. A new contract for general practice was introduced in 2004 in the UK which included a pay-for-performance element called the Quality and Outcomes Framework (QOF). This rewarded practices for meeting a range of quality targets, including improving the management of chronic diseases.

**Aims**

This research study set out to evaluate the impact of the Quality and Outcomes Framework (QOF) on the public health activities of general practices in deprived areas, and whether the QOF has contributed to reducing the gap in life expectancy as defined in national targets. The specific aims of this study were to:

- Assess practice performance on key public health and health gain indicators in England.
- Explore differences in practice performance on key public health and health gain indicators by characteristics of practices and their populations.
- Examine whether improvements in practice performance on the QOF are associated with other measures of health gain as measured through hospital admissions.
- Explore how general practitioners (GPs) and other practice staff in deprived practices respond to the incentives within QOF, and how they see their role in delivering public health and reducing health inequalities.
- Explore the influence of the primary care trust on the public health activities of practices in deprived areas.
- Identify the potential for the QOF to support the delivery of national health inequalities targets as measured by the gap in life expectancy between the fifth of areas with the worst health and deprivation indicators (so-called Spearhead areas) and the population as a whole.

Public health can encompass behaviour, health education, community development, empowerment, prevention and protection. However, public health activities undertaken by general practice generally include screening and clinical interventions aimed at preventing ill health, preventing recurrence of episodes of ill health, or ameliorating morbidity and mortality of those persons who already experience ill health.

### Methods

At the outset of the study, we undertook a literature review on the role of general practice in public health, pay-for-performance schemes and the impact of the QOF. The study combines quantitative analysis of routine data at national level with in-depth qualitative interviews at practice and primary care trust (PCT) level in four case study areas in England. There were two strands to the project.

The first strand involved quantitative analysis of the following secondary data: QOF data (2004/05 to 2007/08); Hospital Episode Statistics (HES) (2004/05 and 2005/06); General Medical Services (GMS) data set (2005 and 2006); Spearhead status of PCTs; GMS/Primary Medical Services (PMS) status of primary care practices; attribution data set; and estimated prevalence (models) published by the Association of Public Health Observatories (APHO).

We conducted descriptive analysis, correlations, univariate and multivariate analysis regression modelling in STATA. The primary outcome variables were mean QOF achievement on a subset of clinical indicators (26 in 2004/05 and 2005/06; 20 in 2006/07 and 2007/08) and standardised ambulatory care sensitive (ACS) admission rates. The main independent variables were practice-level deprivation, Spearhead status, and practice characteristics. We also analysed exception reporting, population achievement and differences between reported and estimated prevalence.

The second strand comprised interviews with PCT staff (N=11), primarily Directors of Public Health and Primary Care Commissioning, in four areas of England (three Spearhead and one non-Spearhead) and general practice staff in 11 deprived practices (N=33) selected on the basis of deprivation and performance in the first two years of QOF. The majority of interviews
comprised GPs and practice managers. Interviews were conducted during 2009 using a semi-structured interview schedule.

The aim of this strand of our research was to gain an in-depth understanding of how local staff working with and in general practice saw their role in reducing health inequalities and their perception of how the QOF was impacting on public health activities at a local level. The interviews were recorded and transcribed. Data were analysed thematically using a coding framework in NVIVO.

**Results**

A review of the literature concluded the following:

- GPs have an important public health role and contribute to improving population health.
- Pay-for-performance schemes are effective in changing physician behaviour, but may lead to some gaming.
- Pay-for-performance schemes can result in a focus on areas of activities within the scheme, sometimes at the expense of other activities.

**QOF achievement**

Based on our analysis of national data, we found that the least deprived practices outperformed the most deprived practices on those clinical indicators within QOF which, according to the evidence, contribute to health gain. On average, practices in Spearhead areas performed worse than practices in non-Spearhead areas; however, the differences were small.

Differences in QOF achievement between the most and least deprived practices have narrowed since QOF was implemented in 2004/05. Differences in performance between practices in Spearhead and non-Spearhead PCTs have also reduced, suggesting that the QOF may have provided incentives for poor-performing practices in deprived areas to improve.

Practices in non-Spearhead PCTs had a significantly higher number of GPs per practice, lower GP caseload, and a higher proportion of GPs who qualified in the UK in both years of the study – all factors associated with high levels of achievement. The weak explanatory power of the model suggests that there were other factors that we were unable to observe which may explain differences in performance.
Exception reporting

Although higher levels of exception reporting were significantly associated with higher levels of achievement, no associations were found between exception reporting and deprivation. Using “population achievement” as an outcome (that is, including exception reported cases in the denominator) instead of reported achievement did not have a substantial impact on observed associations with deprivation.

Prevalence

The gap between estimated and reported prevalence increased with deprivation and was greater in practices in Spearhead areas for coronary heart disease (CHD), chronic obstructive pulmonary disease (COPD) and stroke. However, the relationship was reversed for hypertension. Our findings suggest that for a number of conditions (CHD, COPD and stroke), despite incentives within the QOF to keep a register of these patients, deprived practices and areas are failing to identify all cases of disease within their practice populations.

For CHD, COPD and stroke, a larger GP caseload was associated with larger differences in prevalence, as was the proportion of GPs who did not qualify in the UK, and smaller practices. The opposite was true for hypertension.

We also found that practices which performed better on QOF also had more complete recording of disease prevalence after adjusting for other factors; better case identification is associated with higher performance. This suggests that practices are not gaming by failing to register patients.

Ambulatory care sensitive (ACS) admissions

Emergency hospital admissions for stroke and asthma were not significantly associated with mean reported QOF achievement for those conditions. Lower mean reported QOF achievement for CHD, hypertension, congestive heart failure (CHF), COPD and diabetes was significantly associated with higher ACS admissions for those conditions.

Correlation between ACS admissions and QOF achievement varied by area and practice deprivation, depending on the clinical condition studied. Emergency hospital admissions were strongly associated with area and practice deprivation after controlling for other factors.

PCT perspectives

Analysis of interviews with PCT commissioners and managers identified the following key findings:
• General practice was often viewed as a barrier to public health delivery because of practitioner intransigence or because of the pressures on resources generated by working with deprived populations.

• The QOF was viewed as delivering some improvements in general practice and being an effective incentive, but lacking an emphasis on prevention and open to gaming by some GPs.

• The limitations of the GMS contract were widely recognised by PCTs who were using Local Enhanced Services (LES) and other financial incentives to “plug the gap”.

• PCTs recognised the potential value of QOF data to support public health and to performance manage under-performing practices, but it was not being fully exploited.

• PCTs believed the GMS contract was discouraging GPs from taking a population health perspective, and entrenched a view that everything beyond the “core” of general practice has to be financially rewarded.

Practice perspectives
Analysis of interviews with practice staff in deprived practices identified the following key findings:

• Few GPs saw that they had a role in public health or reducing health inequalities, except in practices which had specifically been set up (usually under PMS contract) to address particular needs.

• There was little evidence of practices uncovering more undiagnosed disease because of the QOF. Passive, opportunistic case finding continues to be the dominant model within general practice.

• Practices have responded to the incentives on offer from the QOF by re-organising and systematising their approach to the management of chronic disease.

• The QOF has not encouraged significant primary prevention in general practice.

• There is some evidence that the challenges of serving populations with complex health and social needs are not adequately addressed by the QOF.

• Most believed exception reporting to be an important protection against non-attending patients.
Effective practice organisation is not the only determinant of high QOF achievement, but well-resourced practices, many of which had these systems in place pre-QOF, appeared to perform better on QOF.

Conclusions

While the gap in performance between the least and most deprived practices and between Spearhead and non-Spearhead areas has narrowed, it does not appear that this has translated into reduced health inequalities. The impact of the QOF on preventable admissions, for example, appears modest. The QOF acts as a barrier to PCTs commissioning primary care that is focused on the health needs of the local population, and does not provide appropriate incentives for practices serving populations with complex needs. More organised practices and those with more resources appear to achieve higher QOF scores. Overall, therefore, the QOF has had a limited impact on improving public health and reducing health inequalities.

The evidence from this research study suggests that it may prove challenging to shift the focus of general practice from providing medical services to taking responsibility for population health and reducing health inequalities. This will require changes to the current incentives. Practices serving deprived populations will need additional support if they are to address the health needs of their populations and prevent, as well as treat, ill health.
1 Introduction and background

1.1 Introduction

On coming to power in 1997, the Labour government committed to reducing health inequalities and gave significant policy attention to achieving this goal throughout its period in office. The Conservatives and Liberal Democrats have also expressed concern about the widening gap in life expectancy, and in 2010, both political parties prioritised reducing health inequalities in their election manifestos.

The World Health Organization (WHO) (2010) defines health inequalities as the “differences in health status or in the distribution of health determinants between different population groups”. Health inequalities can be measured by socio-economic status, age, gender or ethnic group. In the UK, policy and the majority of research has historically focused on socio-economic inequalities in health, although this emphasis has received criticism for failing to acknowledge other inequalities such as ethnicity. This report is primarily concerned with socio-economic inequalities in health, given that these were the focus of the targets set by the Labour government.

1.2 Policy background

In 1998, the Independent Inquiry into Inequalities in Health (Acheson 1998), chaired by former Chief Medical Officer Donald Acheson, was tasked with identifying priority areas for future policy development, concentrating on policies that were likely to develop beneficial, cost-effective and affordable interventions to reduce health inequalities. In relation to primary care, the Acheson Report drew attention to the “inverse care law”, where those communities most at risk of ill health have the worst provision and access to services. The report recommended that more needed to be done to improve access and provision of primary care services in deprived areas.

The White Paper that followed, Saving Lives: Our healthier nation (Department of Health (DH) 1999), put primary care at the heart of modernising the NHS and set targets to reduce mortality and morbidity in cancer and CHD, stroke, accidents and mental illness. However, Saving Lives did not specifically see primary care as having a role in reducing
health inequalities, instead putting the focus on a partnership between individuals, communities and government.

The Spending Review in 2000 committed the Department of Health to “narrow the health gap between socio-economic groups and between the most deprived areas and the rest of the country, in childhood and throughout life” (HM Treasury 2000). It did not specify how this would be measured until later, in 2002; to reduce inequalities in health outcomes by 10 percent as measured by infant mortality and life expectancy at birth by 2010. The NHS Plan in 2000 affirmed this commitment to introduce national targets for health inequalities for the first time (DH 2000). It specifically committed to increase and improve primary care in deprived areas as a means of reducing health inequalities, and called on primary care trusts (PCTs) to keep registers of those at the greatest risk from serious illness.

Recognising that tackling health inequalities could only be achieved with the commitment of other government departments, the Treasury set up a cross-cutting review. This highlighted the important contribution of the NHS in meeting the target and specifically highlighted the importance of smoking cessation, and the prevention and management of risk factors for CHD and cancer (HM Treasury/ DH 2002). Several subsequent reports set out the actions that government would take and monitored progress against them (DH 2003; DH 2005; DH 2006a; DH 2007; DH 2008a).

The Programme for Action (DH 2003) stressed the importance of primary care and public health interventions to reduce health inequalities, specifically managing risk factors for heart disease and cancer such as poor diet and obesity, physical inactivity and hypertension – especially targeting the over-50s. It called on PCTs and strategic health authorities (SHAs) to include health inequalities in their performance management systems.

Following this, in 2004 the Department of Health supplemented the target with two more specific objectives:

- Starting with children under one year, by 2010 to reduce by at least 10 percent the gap in mortality between routine and manual groups and the population as a whole.\(^1\)

- Starting with local authorities, by 2010 to reduce by at least 10 percent the gap in life expectancy between the fifth of areas with

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\(^1\) The infant mortality target does not include infant deaths from two groups with high infant mortality rates – sole-registered births, and never worked and long-term unemployed. These groups account for more than one-fifth of all infant deaths; including these groups would have made the target much more difficult to meet (Bauld \textit{et al} 2008).
the worst health and deprivation indicators, known as the “Spearhead Group”, and the population as a whole.

There are also national inequalities targets relating to smoking, heart disease and cancer:

- To reduce adult (16+) smoking rates to 21 percent or less by 2010, with a reduction in prevalence among routine and manual groups to 26 percent or less.

- To reduce the mortality rate by 2010 for cancer by at least 20 percent in people under 75, with a reduction in the inequalities gap of at least 6 percent between the fifth of areas with the worst health and deprivation indicators (Spearhead areas) and the population as a whole.

- To reduce the mortality rate by 2010 for heart disease, stroke and related diseases by at least 40 percent in people under 75, with a 40 percent reduction in the inequalities gap between the fifth of areas with the worst health and deprivation indicators (Spearhead areas) and the population as a whole.

The government identified local authority areas in the bottom fifth nationally on a number of health and deprivation indicators, and designated them as Spearhead areas. There were 70 Spearhead local authorities in November 2004, which mapped onto 62 PCTs. Each Spearhead area is in the worst 20 percent in at least three out of the following five indicators:

- male life expectancy
- female life expectancy
- cancer mortality at ages under 75
- cardiovascular disease mortality at ages under 75
- Index of Multiple Deprivation score.

The public health White Paper in 2004, Choosing Health: Making healthy choices easier (DH 2004), signalled the government’s intention to give funding priority to areas of greatest need in order to address health inequalities. PCTs in Spearhead areas were offered extra finances (equivalent to an additional £2.33 per head compared with non-Spearhead PCTs between 2006 and 2008), although not all of the additional funding was allocated to reducing health inequalities, with some diverted to resolving the NHS deficit crisis in 2006/07 (Pears 2009). Many Spearhead PCTs have also not received their full target allocations under the resource allocation formula, meaning they have been underfunded relative to need (Pears 2009; NAO 2010).
In 2004, the government included health inequalities targets in the public service agreements for the Department of Health. These targets were also made a priority for the NHS by inclusion as a top priority in the *NHS Operating Framework for 2006/07* (Department of Health 2006b) and a mandatory indicator within Local Area Agreements from April 2007. However, in 2008/09, infant mortality was not included in the Tier 1 Vital Signs – national requirements, centrally monitored and performance managed by SHAs – and all-age, all-cause mortality was only included in Tier 2, making them priorities but not monitored centrally.

### 1.2.1 Progress

Significant progress has been made in improving life expectancy in absolute terms across all social groups. However, the target to reduce by at least 10 percent the gap in life expectancy in the Spearhead areas and the population as a whole will not be met. At the start of this research in 2007, it was estimated that just 11 percent of PCTs in Spearhead areas would meet their life expectancy target for men and women by 2010 (Department of Health 2006c). The national target aimed at a 10 percent minimum reduction in relative gap, from 2.57 percent in 1995/97 (baseline) to 2.32 percent in 2009/11 for males, and from 1.77 percent in 1995/97 to 1.59 percent in 2009/11 for females; but as Figure 1 shows, not only will the target not be met, but the health inequalities gap has widened. This has been confirmed by a recent report from the National Audit Office (NAO 2010).

![Figure 1. Relative gap in life expectancy between England and Spearhead group, males and females (1995/97 to 2007/09)](image-url)
Table 1.  Gap between infant mortality rate of routine/manual group and general population, three-year averages, 1997-1999 to 2006-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Relative gap (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-99</td>
<td>13</td>
</tr>
<tr>
<td>(baseline)</td>
<td></td>
</tr>
<tr>
<td>2002-04</td>
<td>19</td>
</tr>
<tr>
<td>2003-05</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: DH 2007, 2009a

*Differences in rates between England and Spearhead group as a percentage of the England rate*
The latest figures show that the national infant mortality target – a 10 percent minimum reduction in relative gap, from 13 percent in 1997/99 (baseline) to 12 percent in 2009/11 – will also not be met. Despite initial decreases in the infant mortality rate, the gap between the population as a whole and the routine and manual groups has not reduced since 2005, remaining at 16 percent (see Table 1).

### 1.2.2 Looking beyond 2010

The Marmot Review into Health Inequalities, *Fair Society, Healthy Lives* (The Marmot Review 2010), made one of the most overt references to primary care in health inequalities policy, recommending that primary care should play a more active role in empowering individuals and engaging communities. It also specifically addressed the role of the Quality and Outcomes Framework (QOF) and argued that the QOF has “the potential to be a powerful tool” to address prevention and could have a more significant role in reducing health inequalities, suggesting that:

- National Institute for Health and Clinical Excellence (NICE) reviews of both existing and potential new QOF indicators should include a formal and comprehensive assessment of their impact on health inequalities.

- More primary prevention-related indicators should be introduced in the QOF. (The QOF is only a part of more complex primary prevention activities within the general practice.)

- The provision to “exception report” patients should be retained.

- Annual reviews of maximum payment thresholds for the QOF, corresponding to the patterns of achievement, should be conducted.

- Possibility of “retirement” of highly achieved indicators but with continuous follow-up should be considered.

- Data on non-QOF conditions should be routinely monitored.

The Review also recommended that GPs are incentivised to provide 100 percent coverage, thus increasing the thresholds. The reasoning behind this recommendation is that thresholds permit GPs to receive maximum payments at the same time as not meeting the needs of the most difficult...
to reach by selective case finding or ignoring the needs of the most difficult to reach but often most deprived parts of their practice population.

While the QOF was not explicitly developed to address wider public health goals or health inequalities, there has been increasing policy interest in the QOF as a potential framework for achieving public health and health inequality goals. This policy emphasis appears to be continuing under the coalition government, where the focus of attention is currently on improving public health and developing the role of general practice. The coalition government has indicated that it will give GPs greater incentives to tackle public health problems and is reviewing the QOF to shift it from a focus on inputs and processes, and activity and ratios, to what is being achieved in terms of results and outcomes for patients. This research project and its findings are therefore of increasing importance in order to provide evidence to support the current development of policy and practice.

1.3 Research aims

The Labour government commissioned Derek Wanless to produce a number of reports, including one specifically on public health. Published in 2004, the Wanless report on public health recommended that the government should prioritise and adequately resource public health activities to improve population health over the long term (Wanless 2004). While the Wanless report highlighted the importance of public health, it also identified a number of problems that related to the delivery of public health services and some key research needs. Most public health research has focused on describing the state of health or assessing specific interventions rather than how they are delivered in practice (Peckham et al 2008).

In order to address this research gap, in 2007 the National Institute for Health Research (NIHR) Service Delivery and Organisation (SDO) programme issued a call for research (PHA202) that addressed service organisation and delivery issues in public health. This project is one of seven studies commissioned in that call. The research call requested proposals in four key areas of service delivery and organisation: incentives, performance and governance; workforce; evaluating models of public health delivery; and public and lay perspectives/engagement.

This project was developed in response to a request for research that examined how different incentives impact on the delivery and organisation of public health at a local level. Our particular interest was in the role of general practice, where the call for proposals had identified some key questions:

- How do the new arrangements for general practices affect public health service delivery and organisation?
• What impact will practice-based commissioning have on public health services?

• What is the role/impact of the new performance frameworks for general practice in shifting towards a public health approach?

• Is the QOF being used to increase public health activity?

As we have seen from the review of policy on health inequalities in this introduction, primary care has been repeatedly identified as having an important contribution to play in reducing health inequalities, and yet there has been little research on whether the QOF supports public health and health inequalities policies and targets.

The main focus of our research was income deprivation. We were driven by the government’s 2010 inequality targets and Spearhead initiative, which emphasised spatially determined health outcomes. Clearly, there are other important dimensions to health inequalities, including gender, age, ethnicity and sexuality. The vignettes in Appendix 1 were designed to illustrate the basic demographics of each case study PCT and GP practice. However, a full examination of all determinants of deprivation and inequality was beyond the scope and remit of this research.

In order to explore the role of primary care in reducing health inequalities, this research study set out to evaluate the impact of the General Medical Services (GMS) contract on general practice performance on key public health indicators, and to identify the potential for the QOF to support the delivery of national targets on public health and health inequalities by 2010. The specific aims of this study were:

• To assess practice performance on key public health and health gain indicators in England.

• To explore differences in practice performance on key public health and health gain indicators by characteristics of practices and their populations.

• To examine whether improvements in practice performance on the QOF are associated with other measures of health gain as measured through hospital admissions.

• To explore how GPs and other practice staff in deprived practices respond to the incentives within the QOF, and how they see their role in delivering public health and reducing health inequalities.

• To explore the influence of the primary care trust on the public health activities of practices in deprived areas.
• To identify the potential for the QOF to support the delivery of national health inequalities targets as measured by the gap in life expectancy between the fifth of areas with the worst health and deprivation indicators (so-called “Spearhead areas”) and the population as a whole.

Primary care is broader than general practice. Given our focus on the QOF, an incentive scheme for general practice, we limited the scope of our study to staff in general practice and did not include other primary care staff working outside general practice such as health visitors (see Section 3, “Methodology”, below). However, we were interested in the context in which general practice operates, and in particular, the role of the primary care trust.

Although there is no universally agreed definition (Baggott 2004; Hunter et al 2007), there is some consensus that public health refers to holistic strategies encompassing behaviour, health education, community development, empowerment, prevention and protection (Scriven 2005). It includes a set of established principles and strategies that enable individuals and communities to increase control over, and improve, their health.

Public health is used to refer to a wide range of activities which seek to prevent ill health and promote health and well-being. We did not seek to define public health for those we interviewed. Common public health activities undertaken by general practice include screening and clinical interventions aimed at preventing ill health, preventing the recurrence of episodes of ill health, or ameliorating morbidity and mortality of those persons who already experience ill health. However, given that the quantitative analysis focused on public health activities within QOF, the research primarily analyses secondary and tertiary prevention activities delivered within general practice.

In order to meet these aims, we developed a series of specific research questions which we sought to answer through both the qualitative (QUAL) and quantitative (QUANT) data:

1. Do GPs face incentives under QOF to undertake ill health prevention as well as disease management? QUAL
2. How does QOF performance on clinical indicators vary by area and practice deprivation? What improvements have been observed and how do the rates of improvement vary by area and practice deprivation? QUANT
3. Is performance on QOF associated with lower levels of ambulatory care sensitive admissions? QUANT
4. What practice characteristics were associated with performance on QOF? **QUANT**

5. What changes in the organisation of the practice were observed in deprived practices and how did this relate to performance? **QUAL**

6. Do GPs prioritise activities within QOF over other activities which might contribute to improved population health and reduce health inequalities? **QUAL**

7. Are GPs actively seeking to identify new people at risk who are not currently in contact with services (case finding)? **QUAL**

8. How does the gap between expected and registered prevalence rates vary by area and deprivation? **QUANT**

9. How do exception reporting rates vary by area and practice deprivation? **QUANT**

This report presents the findings of the research.

The report begins by summarising the literature on the role of general practice in addressing public health and health inequalities, what is known about the general effects of pay-for-performance schemes, and evidence on the QOF in particular. At the start of this research, the QOF was a relatively new performance framework and there was only a limited amount of research published on its impact. Over the past three years, the literature on the QOF has grown enormously, although most of the published literature examines clinical impacts for specific diseases and none of the published literature then had explored its relationship to inequality.

Following a description of the study methods in Chapter 3, Chapter 4 presents the findings of the quantitative analyses, examining differences in QOF achievement by deprivation. Using national-level data, we examined the extent to which there are inequalities in the performance of general practices on indicators that, according to the evidence, improve health. Chapter 5 then presents the findings from our qualitative data, examining the impact, influence and utility of the QOF alongside other elements of the GMS contract in tackling health inequalities. Through interviews with policy-makers, PCT stakeholders and general practice staff, we explored how health inequalities were conceived and addressed by commissioners and practitioners, and examined the precise contribution of the QOF to preventive public health practice and the reduction of inequalities. In Chapter 6, we synthesise our findings and present our key conclusions, and set out the implications for practice and policy, together with recommendations for further research.
While this study commenced before the Marmot Review began, the research addressed some of the key issues subsequently raised by the review. Emerging findings from this research fed into the Marmot Review and informed some of its recommendations. Following the publication of the Marmot Review, this research has particular relevance for policy and practice.
2 Literature review

2.1 General practice and public health

The development of public health policy and practice in the latter half of the twentieth century was marked by two major inter-related tensions: whether public health is a largely medical domain or a multidisciplinary one, especially given the wider determinants of health; and whether public health is a specialist or generalist activity (Hunter et al 2007). Primary care has been seen as a logical location for local public health action and its role was specifically identified in the Alma-Ata Declaration (WHO 1978). However, in many Western industrial countries, this link has not been so clearly identified and a more individualistic, medicalised system of primary medical care has developed. This is particularly true in the UK (Peckham and Exworthy 2003; Turton et al 2000).

Generally, the structures and cultures of primary care organisations reflect the dominant medical model, which inhibits the development of community perspectives on health (Taylor et al 1998; Turton et al 2000). Many professionals, then, confine their public health activity to a strictly clinical agenda. Those who do engage with the community on wider public health issues go beyond their formal role, although there is a tradition of public health within UK general practice, and of activist doctors addressing health inequalities in deprived communities (Taylor et al 1998; Abbott et al 2001; Gillam et al 2001; Tudor Hart 1971).

The structure of general practice in England should be conducive for general practitioners (GPs) and the wider primary health care team to engage in public health activities. Capitation payment systems are thought to provide a general incentive for health promotion and managing long-term care problems to minimise inappropriate use of primary care services – particularly when compared to fee-for-service payment systems (Barnum et al 1995; Zuvekas and Hill 2004). However, practice in the UK would appear to fall short of this aspiration (Coulter 2006; Ellins and Coulter 2005).

The policy objective to promote a public health approach in general practice is not new. Since the 1980s, there has been a growing interest in the role of primary care, and general practice in particular, in public health activities. The main focus of attention has been on increasing the incentives within the contracts for general practice.

The 1990 GP contract introduced the first payments for reaching cervical screening and immunisation targets. The 1990 contract also contained a
pay-for-performance element to encourage more preventive health promotion activity, whereby GPs were rewarded for every “health promotion” clinic provided. This proved successful in increasing the number of clinics, although inequities in provision were apparent in the first years of the contract, with clinics less likely to be provided in deprived areas or by single-handed practices (Gillam 1992).

It was reported that the 1990 contract helped increase GP involvement with preventive medicine from 5 percent to 25 percent, with GPs more active in enquiring about smoking, alcohol consumption and exercise than was found in earlier studies (McAvoy et al 1999). However, substantial differences existed between the proportion of GPs willing to counsel patients on lifestyle issues and the proportion who felt effective in changing behaviours. Eighty-three percent of respondents felt “prepared” or “very prepared” to counsel about alcohol consumption, whereas only 21 percent felt they were “effective” or “very effective” in helping patients reduce consumption (McAvoy et al 1999). One study found that GPs were more likely to focus their lifestyle advice on high-risk patients rather than adopt a population approach, and that GPs are more comfortable managing illness than promoting health. GPs view their role as mainly medical and doubt their effectiveness in a population approach, believing that social, economic and environmental approaches are more important determinants of population health. This research concluded that GPs need more than education and training in this area, but that they also need to be convinced that they could influence population health, and that giving lifestyle advice would not be detrimental to the doctor–patient relationship (Lawlor et al 2000).

The size and structure of incentives appears to have an important role in incentivising GP public health activity. For example, the effect of bonus payments for identifying patients with tobacco “use disorders” and the provision of cessation advice found that incentive payments were related to an increase in documentation of tobacco use but not increased provision of cessation advice. This illustrates the possibilities of gaming incentive schemes and the need to relate incentives carefully to a combination of process and outcome measures (Petersen et al 2006).

The development of primary care organisations in the 1990s shifted the focus towards population approaches, seemingly building on existing incentives for health promotion and education as well as secondary prevention already existing in UK general practice (Kai and Drinkwater 2003; Peckham 2003; Peckham and Exworthy 2003). However, none of these incentives succeeded in drawing GPs “beyond the surgery door”, and they still focus on what are essentially clinical activities (Gillam 1992; Gillam et al 2001). Generally, GPs focus prevention interventions on patients at high risk rather than taking a population approach or maximising opportunities for health promotion advice to all patients who
might benefit (Lawlor et al 2000). Incentives did not encourage effective public health intervention because to receive payment, GPs had to provide information about coronary heart disease (CHD) risk factors among their practice population, but not on the interventions carried out (Langham et al 1995). In other words, payments were not sufficiently linked to health promotion activity or to the outcomes of that activity.

Since 1990, the GP contract has included different approaches to payments for health promotion and prevention; however, these have tended to focus on clinical activities and have not promoted a population-oriented approach to primary care.

### 2.2 Pay-for-performance schemes

In the past decade, pay-for-performance schemes have become an increasingly popular method for seeking to deliver better-quality primary care. Typically, such schemes are designed to financially reward the achievement by physicians of specified performance targets, and represent an economic response to the entrenched problem of variable and sub-optimal provision found across developed health care systems (Doran 2008). Pay-for-performance schemes have also been developed in response to what are perceived as disincentives for quality practice in capitation schemes (Doran 2008).

There are difficulties in disentangling the benefits of pay-for-performance systems as they exist within a wider organisational and clinical framework and depend upon the agency, motivation and values of the practitioners that deliver services. Similarly, the motivation to improve service quality can be bound up with a GP's personal psychology (the desire to be a “good doctor” (Christianson et al 2008), the organisational behaviour of practices, or the existence of professional peer pressure. As such, the payment incentives sit alongside other factors which influence clinical practice. International evidence suggests that pay for performance is not a silver bullet for quality improvement; while it may be a precursor to quality improvement, it is probably not enough on its own to change physician behaviour (Rosenthal et al 2004).

However, a key concern that recurs in the literature is whether financial incentives generate dysfunctional physician behaviour (Gravelle et al 2008) or negatively affect motivation (McDonald et al 2007). Some commentators have argued that the use of incentives attached to fixed performance targets risks neglecting resources of emotion, morality and trust which are said to be a key part of a physician’s professional repertoire (Harrison and Smith 2004). Others have been more strident, declaring that “state-driven clinical priorities” risk the loss of GPs’ “professional identity and reputation” (Mangin and Toop 2007). GPs can be anxious that “biomedical” targets...
might undermine holistic continuity of care of the “whole person”, and might mitigate against developing relationships with patients as treatment is increasingly divided up by a larger team of health practitioners (e.g. Roland et al 2006). One qualitative study which looked at the effect of financial incentives on doctors in California found that some physicians felt pressurised by bonuses based on limiting referrals to secondary care and enhanced productivity. These types of payments increased “performance anxiety” on the part of doctors. This was in contrast to payments that were based more on quality of care and patient satisfaction, which were judged more conducive to a “satisfying practice environment” (Grumbach 1998).

The problems of financial incentives and pay-for-performance schemes are well documented. There is a danger that incentive payments skew activity towards high-reward, labour-intensive activities with relatively low health benefits, and that those areas not incentivised may be marginalised (Fleetcroft and Cookson 2006; NAO 2008; Roland 2008). This potential for gaming may create a conflict of interest for GPs between maximising revenue and good-quality care.

In contrast to capitation and salaried systems, which might lead GPs to under-treat, pay-for-performance might lead to over-treatment as GPs are encouraged to artificially induce demand to compensate for low workload (Gosden et al 2001). There are also risks associated with pay-for-performance, including the potential for physicians to “over-treat” patients to maximise payment (Christianson et al 2008). However, a study of performance-based contracting in the United States found that the attachment of incentives to improved performance was creating “adverse selection” whereby patients in the most severely ill group were less likely to be admitted to a substance abuse programme (Shen 2003).

Another potential problem created by pay for performance is that it could lead to the neglect of those non-incentivised areas of care which will continue to rely on the professionalism or moral motivation of GPs (Roland et al 2006; Steel et al 2007) – what Rosenthal et al (2004) call the problem of “multitasking”. They also argue that incentives may lead to a focus on individual measures for care management where a more integrated approach might be appropriate, particularly in areas of co-morbidity.

As it is “technically challenging” to connect performance targets with health gain, most pay-for-performance schemes adopt a pragmatic approach and focus on processes (such as measuring blood pressure) and intermediate outcomes (controlled blood pressure) for which there is either evidence or professional consensus and which can be easily measured and rewarded (Doran 2008). This “challenge” is because targets require evidence of clinical effectiveness and proof that they can be consistently and accurately measured. Such obstacles reduce the number of activities that can be
successfully incentivised and tend to skew targets towards those that involve recording, prescribing and advising for a relatively narrow range of chronic diseases such as diabetes and CHD. Therefore, treatment and secondary prevention are favoured over primary prevention and can lead to the marginalisation of conditions like depression.

There is evidence that pay-for-performance schemes can improve public health. They have led to increased rates of cervical cancer screening; however, mammography screening and haemoglobin A testing rates showed no improvement (Petersen et al 2006). Another study of an American Medicare programme in 1990 showed that financial incentives can have a modest, but positive effect on influenza immunisation rates (Kouides et al 1998) and cancer screening rates (Hillman et al 1998). Other studies have found weak evidence of a link between pay for performance and simple forms preventive care provision in the United States, and have noted that the financial rewards under discussion were perhaps too small (Town et al 2005). The size of incentive was also a factor noted by another American study, which found no positive correlation between receiving a bonus for high quality of care measures and the use of care management processes for patients with chronic illnesses. However, they did find significant associations between the use of care management and public recognition for scoring well on quality of care measures (Casalino et al 2007).

Despite some scepticism about the evidence base for the effectiveness of pay-for-performance schemes in improving quality (Rosenthal and Frank 2006), other systematic reviews (Chaix-Couturier et al 2000; Gosden et al 2001) have concluded that pay-for-performance contracts do affect physician behaviour and increase the number of primary care services provided, although often in complex ways. Incentives had a different impact on behaviour depending on the age and sex of physicians, previous experience of incentives, continuing education, payment methods, the type and severity of the condition being incentivised, the volume of activity, and the location and type of practice (Chaix-Couturier et al 2000). Nonetheless, they found that introducing pay for performance in areas such as night calls and elective gynaecological surgery produced an increase in physician output. Pay-for-performance systems do have some impact upon the behaviour of physicians and do increase activity rates in incentivised areas, although this is a contested finding (Christianson et al 2008). There is evidence that retiring indicators can lead to performance dropping off. In California, when doctors were incentivised, performance increased from 84.9 percent to 88.1 percent for diabetic retinopathy and from 77.4 percent to 78 percent for cervical cancer screening. Once the incentive was removed, after four years, performance declined to 81 percent and 74 percent respectively (Lester et al 2010).
Other evidence shows that financial incentives represent only one facet of GPs’ motivation to improve service quality, alongside personal motivation to improve patient care, professional autonomy, and pride and peer pressure (Spooner et al. 2001). When comparing pay for performance with salary payments, Chaix-Couturier et al. (2000) found that evidence shows salaried physicians refer their patients less frequently and had a lower level of activities than physicians on pay for performance. Similarly, Gosden et al. (2001) found that doctors under pay-for-performance schemes undertake more visits and conduct more investigations than those under capitation systems. In their discussion of the 1990 GP contract, in which GPs were remunerated via capitation as well as pay for performance, Moon and North (2000) cite evidence that pay for performance might be a more controllable source of income for practices than the less predictable demand for consultations, home visits and out-of-hours visits generated by larger, capitated list sizes.

Overall, while there is evidence that pay-for-performance systems can have a (positive) impact on physician behaviour, there are risks that such schemes target activities that are easily measured, make physicians focus on those activities that are rewarded to the neglect of others, and may in some contexts lead to over-treatment. It must also be remembered that they may have differential impacts depending on the physician, the practice environment and the other influences on their behaviour.

2.3 The Quality and Outcomes Framework

We now turn to the specific evidence relating to the QOF, which was implemented as part of the new GMS contract introduced in the UK in 2004. We begin by describing the key features of the contract.

2.3.1 The new GMS contract

Approximately two-thirds of practices have signed up to the new GMS contract, and although participation is voluntary, the vast majority participate in the QOF (99.6 percent). Around a third of practices have PMS contracts which are held locally by the PCT. Though initially it appeared that these practices might be allowed to negotiate their own pay-for-performance schemes, PMS practices are also subject to the QOF.

Practices receive funding under the GMS contract from four main sources other than the QOF:

- A “global sum” – core funding allocation meant to reflect the practice size and needs of the practice population.
• “Enhanced services” – funding for services that go beyond the “normal” activities of general practice (see below).

• “Out of hours” – funding for opting in to provide services outside contracted hours of work (i.e. evenings and weekends).

• Other funding for IT expenditure, seniority and a variety of other practice outgoings.

The enhanced services element of the contract is divided into:

• Directed Enhanced Services (DES). Services or activities provided by practices that have been negotiated nationally – for example, providing extended opening hours, improving treatment of heart failure. Practices are not contractually obliged to provide these services, but most do.

• National Enhanced Services (NES). Services that a PCT, using national specifications, can choose to commission from a practice – for example, minor injury services and enhanced care for the homeless.

• Local Enhanced Services (LES). Locally developed services designed to meet local health need. These are commissioned by PCTs, and fees are locally negotiated (Gregory 2009).

Under the QOF, GPs are financially rewarded for meeting a range of quality targets in four main areas:

• improving the management of chronic diseases such as asthma and diabetes (clinical)

• improving how practices are organised (organisational)

• enabling patients to feed back their views of the surgery

• offering “additional” services such as maternity and child health.

Practices are awarded “points” for delivering against each indicator. Many of the measures are “process” measures, requiring that GPs keep a record of data such as smoking status, cholesterol, blood pressure and body mass index for patients in the relevant disease areas. However, there are also a number of treatment and outcome indicators, such as treatment of chronic heart disease with beta blockers, or achieving low levels of cholesterol or blood pressure. The outcome measures have been classified as process outcome measures (what is actually done in giving and receiving care) and intermediate outcome measures (changes in health status that affect subsequent health outcomes). We include both in our definition of clinical indicators (see Chapter 3).
In the 2009/10 contract, there were a maximum of 1,000 points available across the four domains: clinical (697 points); organisational (167.5 points); patient experience (91.5 points); and additional services (44 points) (British Medical Association (BMA) and NHS Employers 2009). For each indicator, there is a lower threshold which has to be reached in order to get any points; more points are available for meeting higher levels up to a maximum threshold. Practices can exempt patients from inclusion in the QOF, so-called “exception reporting”, for a range of documented reasons.

Box 1 Reasons for exception reporting patients under QOF

A. Patients who have been recorded as refusing to attend review who have been invited on at least three occasions during the preceding twelve months.

B. Patients for whom it is not appropriate to review the chronic disease parameters due to particular circumstances, for example, terminal illness, extreme frailty.

C. Patients newly diagnosed within the practice or who have recently registered with the practice, who should have measurements made within three months and delivery of clinical standards within nine months, for example, blood pressure or cholesterol measurements within target levels.

D. Patients who are on maximum tolerated doses of medication whose levels remain sub-optimal.

E. Patients for whom prescribing a medication is not clinically appropriate, for example, those who have an allergy, another contraindication or have experienced an adverse reaction.

F. Where a patient has not tolerated medication.

G. Where a patient does not agree to investigation or treatment (informed dissent), and this has been recorded in their medical records.

H. Where the patient has a supervening condition which makes treatment of their condition inappropriate, for example, cholesterol reduction where the patient has liver disease.

I. Where an investigative service or secondary care service is unavailable.

Source: (BMA and NHS Employers 2009)
(see Box 1). The scheme is monitored by PCTs who will seek to identify inappropriate exclusions, and penalties are in place for gaming.

The average practice, containing four GPs, stood to gain around £130,000 per year in 2005/06 if it achieved all indicators to the maximum extent. As a result of the QOF, GP practice partners have seen their incomes rise, on average, from £72,000 in 2002/03 to £113,000 in 2005/06 (NAO 2008). More than 20 percent of a GP’s annual income is now related to the quality of care they provide (Roland et al 2006) and payments account for around one-third of average practice earnings (NAO 2008). The Department of Health had estimated that practices would achieve an average of 75 percent of the maximum “points” available under the QOF in its first year (NAO 2008). In fact, in the first year, practices achieved 91.3 percent (rising to 96.8 percent by 2007/08) (The Information Centre 2008). In short, GPs delivered more than was expected, and the scheme was therefore more expensive to run – in 2005/06, the cost was estimated at £1.15 billion.

A number of reasons have been cited for the high levels of achievement in the first years of the QOF. First, the targets may have been set too low – consequently, payment thresholds were raised in 2006 (Doran et al 2006). Second, improvements in care were happening already in certain areas (Campbell et al 2005), possibly due to the introduction of auditing and service quality improvement initiatives (Doran et al 2006). Third, investments in the necessary infrastructure were in place already. For example, since 1990, GPs had started using electronic records and begun employing nurses to improve the care of chronic illness. This may have enabled practices to adapt quickly to the demands of the QOF (Roland 2007).

### 2.3.2 Evidence of the impact of the QOF

**Clinical activities**

In general, the evidence is equivocal as to whether the QOF is influencing improvements in clinical care. Time series analysis of selected clinical indicators suggests that improvements may have predated the introduction of the QOF in April 2004 (The Information Centre 2007). Analysis of the first two years of the QOF suggested an increase in pre-target improvements in the quality of care for asthma and diabetes, but not heart disease (Campbell et al 2007). However, more recent analysis suggests that improvements have slowed (Campbell et al 2009). For heart disease, the rate of improvement dropped below the improvement rates for both the pre-introduction period (P = 0.02) and the introduction period (P = 0.001), and the overall quality score in 2007 was similar to that in 2005. Diabetes continued to improve, but at a rate observed before the QOF was

A systematic review of the literature indicates a modest improvement in diabetes care since the introduction of the QOF (Khunti et al 2007). For those conditions covered by the QOF, there is evidence of excessive or inappropriate prescriptions or referrals (Alabbadi et al 2010; MacBride-Stewart et al 2008; Phillips et al 2009).

The QOF has increased the support available to smokers with diabetes in primary care. Service quality was not found to vary according to age, sex, ethnicity or social class, and smoking prevalence was also found to have decreased over this time period. However, the authors are cautious in attributing the decrease in prevalence to the QOF, and note the possibility that other quality improvement schemes and/or cultural changes in tobacco use may have been factors (Millett et al 2007).

Outcomes

The evidence of a relationship between incentive payments and likely health gain appears to be mixed (Strong et al 2006; Maynard 2008). There is some work that shows that meeting certain QOF indicators has improved health outcomes (McElduff et al 2004) while other work suggests that across eight key clinical indicators (the “McColl interventions”) in the QOF, including ACE inhibitors in heart failure, flu vaccines for over 65s and screening and treatment of hypertension, there is no causal relationship (Fleetcroft and Cookson 2005).

Studies that have linked QOF data with hospital admission figures suggest that while higher clinical QOF scores are generally associated with lower hospital admission rates, the strength and significance of associations varied geographically and by clinical condition assessed. Deprivation was shown to be more strongly correlated with admission rates than the QOF (Bottle et al 2008; Downing et al 2007).

In a study of 147 practices in the UK, diabetes care was found to be steadily improving, but it was not possible to associate this with the QOF. Other initiatives such as the implementation of guidelines and the National Service Framework may also have contributed to improvements (Calvert et al 2009). The study found that the QOF register failed to capture two-thirds of patients with type I diabetes and one-third of patients with type II diabetes, indicating a significant proportion of unmet need. Outcomes were better for those on the QOF register, and improvements for those on the register attenuated after the introduction of the QOF, indicating that once
the maximum threshold was reached, further improvements were not made.

**Health inequalities**

There is conflicting evidence that the QOF is exacerbating or addressing health inequalities (e.g. Fleetcroft and Cookson 2006; McClean *et al* 2006; Sigfried *et al* 2006).

Early analysis of the QOF found that variation in performance among practices was small and declining (Doran *et al* 2006). A few studies have specifically looked at the extent to which the variation in performance differs significantly by deprivation (Ashworth *et al* 2007; Doran *et al* 2008a; Ashworth *et al* 2008). Ashworth and Armstrong (2006) examined the relationship between QOF achievement, social deprivation and practice characteristics, using the first year of QOF data for England. In a regression model, type of practices (i.e. whether they were training practices or group practices) and social deprivation explained only around 14.6 percent of the variation in QOF scores.

In a descriptive study of general practices within one English PCT, a weak negative (not statistically significant) correlation was found between overall QOF scores and deprivation scores (Sahota *et al* 2008). Wang (2006) found that size of practice was an influence on the association between deprivation and performance, with smaller practices performing less well in relation to organisational indicators but performing as well for clinical ones. A study of general practices in England suggests that area deprivation may not be as important a factor in predicting reported achievement as the practice performance in previous years (Doran *et al* 2008a).

The quality of chronic disease management for at least some conditions (CHD, diabetes, hypertension – in terms of hypertension and cholesterol targets) in England was shown to be broadly equitable between socio-economic groups before the QOF introduction, and remained so after its introduction (Crawley *et al* 2009; Campbell *et al* 2003). National studies using England and Scotland data examined the associations between quality in care for cardiovascular disease, as measured by QOF achievement, and general practice caseload, practice size, and area-based deprivation (Saxena *et al* 2007). They assessed practice achievement against 26 QOF indicators relating to cardiovascular disease, including indicators in the clinical domains of CHD, left ventricular dysfunction, and stroke. Statistically significant associations were found only for indicators requiring referral for further investigation (p<0.01).

In a study of achievement of metabolic targets following the introduction of QOF, Gulliford *et al* (2007) concluded that while financial incentives may contribute to the improvement of services and clinical outcomes, there still
remains a deprivation gap in achievement of targets (around 3 percent lower achievement in the most deprived areas).

**Practice organisation**

While evidence on the impact of the QOF on outcomes is weak, there is stronger evidence to suggest that it has had an impact on practice organisation. The QOF is a practice-based system of incentives, with all staff in the practice contributing to its QOF score. However, earnings from the QOF are awarded to GP partners who are not obliged to share the rewards with salaried staff (usually salaried GPs, administrative staff and nursing staff).

The Audit Commission has found that in the light of the QOF, the total number of consultations being carried out in practices has increased, but the number by each GP has reduced, with practice nurses carrying out more routine work. GPs, therefore, are undertaking more complex cases, and consultation length has increased. GPs are working an average of seven hours per week less (NAO 2008). Indeed, there is evidence that some GPs expect that the QOF will lead to a professional shift away from “generalism” to “specialisation”, with nurses doing more routine treatment and chronic disease management (Roland et al 2006).

It has been suggested that the group assessment nature of the QOF raises the possibility of “free riding”, with some staff not contributing as much as others (Doran 2008). This has led to the appointment, in some practices, of a QOF “lead” who has responsibility for policing staff performance. A recent small-scale, ethnographic study showed how doctors and nurses believe that the QOF has led to some shifts in internal practice hierarchies, with nurses being more likely to be responsible for completing templates and other reporting protocols. The authors also note that the surveillance of clinical templates has led to a division between “chasers” and “chased” within practices (McDonald et al 2007). But other research has found that the QOF, as an externally imposed system of incentives, did not damage the internal motivation of GPs (McDonald et al 2007). They attributed this to the fact that the indicators within the QOF aligned with what GPs themselves considered good clinical care objectives.

However, recent qualitative work (Whalley et al 2008) done with GPs after 18 months of the QOF suggests they feel that professional autonomy has decreased and workload increased, but job satisfaction continues to improve and job pressure decrease under the QOF. GPs also report that they feel the QOF has improved quality of care beyond what they feared.

**Gaming**

Roland et al (2006) found evidence of concern among GPs that un-incentivised areas like acute care, preventive care, care for specific groups
like children or older people, and patients with multiple co-morbidities would suffer as GPs chased targets. Indeed, a recent study found that while quality of care for QOF-incentivised conditions improved substantially between 2003 and 2005, there was little or no improvement in non-incentivised quality indicators (Steel et al 2007). Roland (2007) argues that this could be interpreted as a positive, in that GPs appear to be maintaining standards of care in these areas in spite of the lack of incentives and the time required to focus on QOF targets.

There is mixed evidence of gaming. In a Scottish study, Gravelle et al (2008) found that lower rates of achievement in the first year were associated with higher exception reporting in the following year. They also found that there were differences between those who were above and below the upper threshold, suggesting that exception reporting had been used to get over the threshold. They also found that differences between true and reported prevalence varied by practice characteristics as well as patient characteristics.

In England, Doran et al (2008b) found that, in general, exception reporting rates were low (median 5.3 percent in 2005/06). The pattern of exception reporting also suggests that it is being used to exclude people on clinical grounds in line with the rules. For example, rates were lower for the offer of treatment (1.4 percent) and highest for providing treatment (12.6 percent). They were also low for reviewing people with chronic disease (median 2.5 percent) but higher for attaining outcomes for these patients, e.g. target level of blood pressure (7.1 percent). In general, practices produced higher quality than required to maximise the financial rewards. They estimate the cost of exception reporting to be approximately 1.5 percent of the total cost of the scheme (Doran et al 2008b).

2.4 Conclusion

Drawing on this review of the literature, we were able to set out some general assumptions that informed the remainder of our research study:

- GPs have an important public health role and contribute to improving population health.
- Pay-for-performance schemes are effective in changing physician behaviour, but may lead to some gaming.
- Pay-for-performance schemes can result in a focus on areas of activities within the scheme, sometimes at the expense of other activities.

From this brief review of the literature, we conclude that while the structure of general practice in England is conducive to a population approach to
public health, the focus of public health activities is mainly clinical. Previous contracts have sought to incentivise public health activities, but these have mainly focused on secondary prevention activities and some health promotion.

Evidence from other pay-for-performance schemes suggests that:

- Physicians do respond to incentives, including incentives for primary and secondary prevention activities. However, GP behaviour is not solely driven by financial incentives. Research highlights the importance of other factors such as professional pride, peer pressure and the desire to improve patient care.
- Incentives tend to focus on the activities that are easily measured.
- Physicians focus on activities with incentives at the expense of other activities and a more holistic approach to care.
- Incentives may lead to over-treatment or risk selection and can lead to gaming.
- Incentives may have unintended consequences on practitioner behaviour and lead to goal displacement and a focus on rule-following rather than patient care.

There has been a lot of research on the QOF since this research study began. This suggests that the QOF has had an impact on clinical activities, but that this was short-lived and limited to those activities which were rewarded within the QOF. Rates of improvement in these activities had already improved prior to the introduction of the QOF, and rates of achievement were high and above those expected. There has been less research on the impact of the QOF on outcomes, and that which exists has found mixed results. Most studies have not found systematic differences by deprivation, suggesting that performance, as measured by the QOF, is broadly equitable.

It does appear that the QOF has led to changes in practice organisation, including changes in skill mix, and the development of new roles. In general, GPs feel positive about the QOF and the impact it is having on quality of care. There is mixed evidence of gaming, but some evidence of over-treatment.

Since its introduction, there has been an increasing interest in the impact of the QOF on reducing inequalities. Although the QOF was not specifically designed to reduce health inequalities, this review of the literature at least points to the potential of the QOF to be used to incentivise clinical activities which improve health. There is also evidence that the QOF has the potential to contribute to reductions in health inequalities.
It has been estimated that 60 percent of the difference in mortality between deprived and affluent areas is due to conditions which are addressed in the QOF (Health Select Committee 2009). The Department of Health calculated, for example, that doubling the capacity of smoking cessation interventions, targeted prevention of cardiovascular disease by increasing coverage of anti-hypertensives and statins, and improving the detection of cancer would allow Spearhead PCTs to meet their 2010 targets (DH 2006a). Improved detection, management and monitoring of CHD, stroke and hypertension were, and continue to be, central QOF indicators.

The review also highlights that the impact of pay-for-performance schemes can vary depending on the practice context. In this study, we are interested in how the QOF has impacted on the activities of practices serving deprived populations, and whether practices located in areas which are particularly focused on reducing health inequalities (in Spearhead PCTs) have responded differently. In the next section, we describe our research methodology.
3 Methodology

The study combines quantitative analysis of routine data at national level with in-depth qualitative interviews at practice and PCT level in four case study areas in England. There were two strands to the project.

The first strand involved quantitative analysis of the following secondary data: QOF data (2004/05 to 2007/08); HES (2004/05 and 2005/06); GMS data set (2005 and 2006); Spearhead status of PCTs; GMS/PMS status of primary care practices; attribution data set; and estimated prevalence (models) published by the Association of Public Health Observatories (APHO).

We conducted descriptive analysis, correlations, univariate and multivariate analysis regression modelling in STATA. The primary outcome variables were mean QOF achievement on a subset of clinical indicators (26 in 2004/05 and 2005/06; 20 in 2006/07 and 2007/08) and standardised ambulatory care sensitive (ACS) admission rates. The main independent variables were practice-level deprivation, Spearhead status, and practice characteristics. We also analysed exception reporting, population achievement and differences between reported and estimated prevalence.

The second strand comprised interviews with PCT staff (N=11) in four areas of England (three Spearhead and one non-Spearhead), and general practice staff in 11 deprived practices (N=33) selected on the basis of deprivation and performance in the first two years of the QOF. Interviews were conducted during 2009 using a semi-structured interview schedule. The aim of this strand of our research was to gain an in-depth understanding of how local staff working with and in general practice saw their role in reducing health inequalities and their perception of how the QOF was impacting on public health activities at a local level. The interviews were recorded and transcribed. Data were analysed thematically using a coding framework in NVIVO.

At the outset of the study, we undertook a literature review on the role of general practice in public health, pay-for-performance schemes, and the impact of the QOF (see Chapter 2). In this chapter, we present more detail on site selection, and the methods employed for the quantitative and qualitative analysis.
3.1 Site selection

The selection of four PCTs was based on analysis of national-level data. The sites selected included general practices that:

- **Served deprived populations.** Deprivation scores for each practice were obtained from an attribution data set which used the Indices of Multiple Deprivation (IMD 2004) to assign each practice a level of deprivation based on the postcodes of the practice population. The attribution data set is an anonymised, non-disclosive data set (more detail on the methods used for constructing the variables in the attribution data set can be found in Resource Allocation Team 2008). Practices were then divided into quintiles of deprivation using the income domain only. Practices from the fifth (lowest) income quintile were selected.

- **Varied in performance on the QOF.** Performance was measured using 65 clinical indicators within the 11 clinical domains in the first two years of the QOF (2004/05 and 2005/06). Performance was measured as the percentage of the eligible patients (excluding patients on the register who were exception reported) for whom each indicator was achieved. A mean achievement score across all domains was calculated for each practice. Practices were divided into tertiles based on performance in each year (poor <81.9 percent, medium 81.9–88.5 percent, and high >88.5 percent in 2004/05; and poor <88.2 percent, medium 88.2–91.4 percent, and high >91.4 percent in 2005/06). We included practices which had consistently high performance (high–high), those which had consistently poor performance (poor–poor), and some which had improved significantly (poor–high). Given the general lack of variation in performance, we decided to exclude practices who were in the middle tertile (medium) in either year.

- **Included both Spearhead and non-Spearhead PCTs.** Each practice was assigned Spearhead status based on its corresponding PCT. We planned to include practices from two Spearhead PCTs and two non-Spearhead PCTs; however, most non-Spearhead PCTs had only a few deprived practices in one or more categories. We decided to select practices from three Spearhead PCTs and one non-Spearhead PCT in order to ensure that we had more practices from which to recruit – two PCTs in London (A (the non-Spearhead) and B), one in the Midlands (C) and one in north-west England (D). Given the research focus on deprivation, our practice sample meant there was little variation in the socio-economic composition of practice.
populations; however, PCTs A, B and C contained a significant ethnic mix, while D had pockets of rural practices which we thought would provide a useful contrast with the other urban settings.

The case study sites are described in vignettes (see Appendix 1). Information from the qualitative and quantitative analysis is used to describe each practice.

3.2 Ethics

The project was submitted to the NHS Research Ethics Committee (REC) in July 2008 and obtained ethics approval in August 2008. The project was exempted from site-specific assessment, although Research and Development approval was needed as per NHS research governance arrangements. This was applied for and granted in each of the four case study areas. Ethics approval was also sought and granted by the London School of Hygiene & Tropical Medicine in October 2008.

3.3 Quantitative analysis

The main aim of quantitative analysis was to study the variation in QOF achievement across general practices in England by practice-level deprivation and Spearhead status. We also explored the relationship between achievement and practice characteristics, exception reporting, prevalence estimates and standardised emergency hospital admission rates for specific conditions targeted with the QOF.

We used only the income domain of the IMD 2004 as our measure of deprivation, and divided practices into quintiles for the purposes of the analysis. The income domain is the most comparable one to the Carstairs index, and according to the Office for National Statistics (ONS), "in general, the same pattern of health inequalities exist using either the Townsend Index or the Index of Multiple Deprivation" (Hoare 2003). The inclusion of the health domain from IMD 2004 may lead to the possibility of “mathematical coupling”, where the relationship between IMD 2004 and other markers of health is predicated by "measures of health being on both sides of correlation equation” (Adams and White 2006). The overall IMD 2004 score was highly correlated with the income domain score (97 percent).

3.3.1 Analysis of the QOF

This analysis examined the extent to which practices in Spearhead and non-Spearhead PCTs and serving affluent and deprived practice populations differed in their achievement on key clinical indicators in the first four years of the QOF (2004/05–2007/08). Data from the QOF for more than 8,000
primary care practices in England (N=8339 for 2004/05 to 2005/06, N=8261 for 2006/07 to 2007/08) were analysed. Three hundred and forty-three practices for 2004/05 to 2005/06 (4 percent of the total) and 168 practices for 2006/07 to 2007/08 (2 percent) with a list size of less than 1,000 patients were excluded on the basis that they were likely to be newly formed or about to be closed.

Initially, only the first two years of data were included (2004/05 and 2005/06) as changes in the 2006/07 QOF indicators prevented direct comparison over the third and subsequent years. The main outcome variable was the unweighted mean reported achievement for a subset of 26 QOF clinical indicators. This selection was made based on evidence for health gain (Fleetcroft and Cookson 2006), conditions and targets identified within the Health Inequalities Intervention Tool, and clinical validity. Indicators which simply involve record keeping or diagnosis were excluded. We did not use QOF indicators on ‘additional services’ such as cervical screening and child surveillance as they were not available or routinely monitored for all practices. For a full set of the clinical indicators analysed, see Appendix 2.

We identified 19 clinical indicators (out of 26 employed in this study) that remained unchanged or were only slightly amended over the first four years of the QOF (see Appendix 2). All six separate condition-specific smoking-related indicators from 2004/05 to 2005/06 were merged into a single indicator since 2006/07. We excluded the smoking indicator when analysing trends in performance across four years (2004/05 to 2007/08). However, for other 2006/07 to 2007/08 analyses (by deprivation and Spearhead status), we considered all 20 clinical QOF indicators (including the combined smoking-related indicator).

Reported achievement was calculated as the number of patients for which the indicator was achieved (numerator) divided by the total number of recorded patients for that particular indicator, less those exception reported (denominator). Differences in mean reported achievement were analysed using Analysis of Variance (ANOVA), for all practices and after stratification by Spearhead status and by IMD 2004 income quintile.

Multivariate regression models were employed to analyse the extent to which socio-economic status of the practice population is associated with achievement on the QOF indicators. A number of models were constructed in which the dependent variables were either performance on the QOF indicators in a given year or improvement (difference) in performance between years.

The analyses were adjusted for a range of practice and population characteristics (potential confounders):
• GP caseload (number of patients / FTEs (full-time equivalents))
• number of GPs per practice
• the country of qualification of GPs (UK/non-UK)
• the type of contract held by the practice (PMS/GMS)
• the age distribution per practice (≤ 14 years old and ≥ 65 years old).

Standard significance levels (p=0.05) were assumed and 95 percent confidence intervals are reported wherever possible. Overall goodness-of-fit of the model was judged based on R-squared statistics which are reported in the text. Statistical analyses were conducted using STATA/IC 10.0.

3.3.2 Analysis of exception reporting

We estimated the rate of exception reporting across general practices in England, including by deprivation and Spearhead status. We examined exception reporting in order to ensure that any variation in performance could not be explained by reporting behaviour.

The data on exception reporting became available from 2005/06 onwards. No data on exception reporting were collected for 2004/05. We were able to calculate exception reporting rates and population achievement for only 16 indicators out of the subset of 26 indicators we selected for our study (20 for 2006/07 to 2007/08) because the remaining indicators relate to a subset of the registered population (e.g. a specific age group, or specific sub-condition for which data on recorded prevalence were not available) (see Appendix 2). We estimated exception reporting (and population achievement) for:

• each indicator separately
• a clinical domain
• across all 16 clinical indicators.

In order to ensure that any variation in performance could not be explained by reporting behaviour, the analysis was repeated using population achievement (i.e. including exception reported cases in denominator).

3.3.3 Analysis of prevalence

In order to understand whether practices varied in the extent to which they identify cases with relevant clinical conditions, and whether the under-identification was associated with the achievement on QOF indicators, we analysed differences between recorded and estimated prevalence.
We used the estimated (modelled) prevalence from the APHO to calculate the difference between QOF recorded prevalence of selected clinical conditions and estimated prevalence. Estimated practice-level prevalence figures were available for four clinical conditions (CHD, hypertension, stroke and COPD).

The main data source that APHO based its prevalence modelling on was the Health Survey for England. The confounders used were age, gender, ethnicity, area-based deprivation score IMD 2004, smoking status, and known risk factors for specific conditions. The Health Survey for England data set has a hierarchical structure. The APHO used its area-level variables to adjust for clustering of households in a multinomial logistic regression. Detailed methodology is available elsewhere (APHO 2009).

Descriptive statistics, correlations, univariate and multivariate regression analyses were employed to test the associations of difference between estimated and recorded prevalence, and practice-level deprivation, Spearhead status of PCTs and QOF achievement.

3.3.4 Analysis of Hospital Episode Statistics (HES)

In order to examine whether prevention and better management of disease in primary care results in reduced hospital admissions for ACS conditions, we examined the relationship between QOF achievement in specific clinical domains and hospital admission rates for selected conditions. We examined differences in these relationships by practice deprivation and Spearhead status of PCTs.

HES data for two years were analysed: 2004/05 and 2005/06. Data were checked for consistency and plausibility. Hospital admissions for the following seven clinical conditions were considered:

- coronary heart disease (CHD)
- asthma
- hypertension
- chronic obstructive pulmonary disease (COPD)
- congestive heart failure (CHF)
- diabetes complications
- stroke.

This selection was based on the list of ambulatory sensitive conditions employed in NHS and other settings in England (Purdy et al 2009). We used their respective ICD-10 codes and matched them with relevant QOF
clinical conditions. Both crude and age/sex standardised rates of admission were calculated, including total, elective and emergency admissions (only standardised rates for emergency admissions are presented here).

A direct method of standardisation was employed with the England population as reference (national data taken from the GMS 2005 data set). Admission was defined as the first episode for elective or emergency admission not resulting from a transfer from another hospital and excluding re-admissions within 30 days of discharge. Rates are presented as admissions per 1,000 people. HES and QOF data were linked by primary care practice code, available in both data sets.

Cross-sectional analyses, descriptive statistics (means, correlations) and regression models (multiple regression, univariate) were employed to determine whether there was an association between QOF achievement and ACS hospital admissions. The relationships between hospital admissions and practice-level deprivation (IMD 2004 income quintile), and hospital admissions and Spearhead status of PCTs were also examined. The main comparisons were made between the QOF achievement for 2004/05 and hospital admissions for 2005/06 to allow for a one-year time lag.

In a multiple regression analysis, we considered an age/sex standardised hospital admission rate for each of the seven conditions as an outcome (dependent variable), and mean reported QOF achievement for those relevant clinical indicators as an explanatory (independent) variable and adjusted for practice-level indicators.

### 3.4 Qualitative analysis

Interviews were conducted in 11 practices and four PCTs in England. Our initial objective was to recruit one practice from each of our three performance categories (poor–poor, poor–high and high–high) in each PCT.

Recruitment involved contacting each PCT, informing them of our research plans and requesting interviews with the Director of Public Health, Professional Executive Committee Chair and Director of Primary Care. This approach was taken so we could understand the local health policy context in which practices were operating and also to use interviews to help gain access to practices.

In September 2008, we had drawn up a list of practices (see Section 3.1, “Site selection”) and sent letters of approach to practice managers and / or GP partners. Practices were informed about the nature and scope of the study. This was followed up with phone calls made within two weeks of the letter being sent. This approach had limited success and only resulted in four practices being recruited by April 2009.
It was decided halfway through the qualitative fieldwork phase to use more assertive and innovative methods of recruiting and incentivising practices to participate, including the use of financial payments. We had entered the study into the Primary Care Research Network Portfolio, making it eligible for the payment of service support costs to participating practices, and decided to ask local research networks to consider appropriate levels of payment to practices in April 2009. As a result of this method, from May 2009, seven practices were recruited, each receiving a maximum payment of between £200 and £250 if they could supply four to six interview participants.

Having used various methods of approach, including using PCT contacts, financial incentives and letter drops, a lack of interest from our remaining sample practices combined with project time limitations meant that we decided to halt recruitment in November 2009 after 14 months. This meant we were one practice short of our target. We informed the SDO of our difficulties in recruiting GP interviews and the changes to our methodology throughout this process.

In addition to these planned interviews, we also interviewed a number of individuals from the Department of Health, NHS Employers and the BMA who had significant roles in the negotiation of the 2004 GMS contract and the subsequent development of the QOF. These interviews provided useful insights into the policy context and were used to inform our interpretation of the analysis.

3.4.1 Sampling

Across the four PCT sites, 11 key PCT personnel were interviewed, one less than originally planned (see Table 2).

<table>
<thead>
<tr>
<th>PCT A</th>
<th>PCT B</th>
<th>PCT C</th>
<th>PCT D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of Public Health</td>
<td>Director of Public Health</td>
<td>Local Authority Director of Public Health</td>
<td>Director of Public Health</td>
</tr>
<tr>
<td>Director of Primary Care Commissioning</td>
<td>Director of Primary Care Commissioning</td>
<td>Director of Performance and Governance</td>
<td>PEC Chair</td>
</tr>
<tr>
<td>IT Manager</td>
<td>Director of Primary Care Contracting</td>
<td>PEC Chair</td>
<td></td>
</tr>
</tbody>
</table>

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Across the four study sites, 11 practices were recruited with a range of performance on QOF in the first two years (see Table 3).

Table 3. Sample of practices by performance category on the QOF

<table>
<thead>
<tr>
<th>Performance category</th>
<th>PCT A</th>
<th>PCT B</th>
<th>PCT C</th>
<th>PCT D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor–poor</td>
<td>2 practices</td>
<td>1 practice</td>
<td>-</td>
<td>1 practice</td>
</tr>
<tr>
<td>Poor–high</td>
<td>-</td>
<td>1 practice</td>
<td>-</td>
<td>1 practice</td>
</tr>
<tr>
<td>High–high</td>
<td>1 practice</td>
<td>1 practice</td>
<td>2 practices</td>
<td>1 practice</td>
</tr>
</tbody>
</table>

Table 3 shows that in PCTs B and D, we attained the requisite spread of practices. However, in PCT A we were only able to recruit two practices from the poor–poor category. In this case, this was because there were only four practices in our sample of poor–high and none felt able to participate in the project. In this instance, we opted to select an extra practice from one of the other categories. In PCT C, although there was a substantial pool of practices in both poor–poor and poor–high categories, recruitment proved challenging and we failed to get a practice from either category.

At the outset of the project, we proposed that six individuals would be interviewed within each practice, resulting in an overall sample of 72 respondents. This sample would include not only GPs, but practice managers, nurses and other clinical staff. However, once in the field, it became apparent that in most practices this was neither practical nor feasible. In some cases, GPs and managers were reluctant to provide access to other staff, while in other practices staff numbers were small, making extensive interviewing redundant. From our 11 practices, 33 individuals were interviewed (see Table 4).

Table 4 indicates that the bulk of our interviews took place with GPs and practice managers. This reflected not only problems of gaining access to other members of the practice team, but also the impact of the QOF on practice organisation and behaviour. It was clear from pilot interviews and early field interviews that GPs, managers, nurses and, in some cases, IT personnel were seen to be the key players. Given our focus on the QOF (as opposed to public health delivery across primary care per se), the failure to recruit more nurses, healthcare assistants and other staff – while unfortunate – is not expected to have had a significant impact on the integrity or validity of the study. Nonetheless, it remains a limitation of the qualitative research that we were unable to interview a broader sample of
practice staff, and it is possible that the data generated demonstrate some bias towards a GP and practice manager perspective.

The research team developed the topic guide to be used in interviews with PCT personnel (see Appendix 3 for interview schedule). For practice interviews, we devised a more structured topic guide that went through several iterations before being piloted in the GP practice of one of our Research Group members (see Appendix 4 for interview schedule). Interviews tended to be relatively structured but with space for interviewees to express their views and experiences where relevant. Interviews lasted an average of 40 minutes. Participants were asked to think about how the practice pursued public health activities and who was involved in those activities. They were also asked to comment on the impact of the QOF on the practice generally and on its engagement with public health activity.

Table 4. GP practice staff interviewed

<table>
<thead>
<tr>
<th>Performance category</th>
<th>PCT A</th>
<th>PCT B</th>
<th>PCT C</th>
<th>PCT D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor–poor</td>
<td>GP partner, GP locum, practice manager, practice nurse</td>
<td>GP partner, practice manager</td>
<td>N/A</td>
<td>GP partner</td>
</tr>
<tr>
<td>Poor–poor</td>
<td>GP partner, business development manager</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Poor–high</td>
<td>N/A</td>
<td>GP partner, GP registrar, practice manager, practice nurse, practice administrator</td>
<td>N/A</td>
<td>GP partner, salaried GP, practice manager, QOF administrator</td>
</tr>
<tr>
<td>High–high</td>
<td>GP partner x 2, practice manager, GMS contract manager</td>
<td>GP partner, practice manager, data quality performance manager</td>
<td>GP partner, salaried GP, practice manager, practice nurse</td>
<td>GP partner, nurse manager, assistant practice manager</td>
</tr>
<tr>
<td>High–high</td>
<td>N/A</td>
<td>N/A</td>
<td>GP partner, practice</td>
<td>N/A</td>
</tr>
</tbody>
</table>
3.4.2 Interview analysis

All interviews were transcribed verbatim and imported into the NVIVO software programme. The analysis was separated into two stages.

The first stage was a descriptive analysis extracting information about the practices. These data were used to construct practice profiles covering their history, organisation, staff mix, clinical priorities and local policy context.

The second stage used a combination of theory-driven and grounded approaches (Strauss 1987) to construct a coding framework. Key themes were identified from four main sources:

- theoretical hypotheses
- emerging findings from our quantitative analysis
- major themes from our literature review
- interviews.

The coding framework for PCT and practice interviews was refined during an inter-coder reliability process involving four members of the research team. Four transcripts from one GP practice and two from one PCT were coded independently by each team member using the framework. Discussions between the relevant individuals took place via meetings, email and telephone to explore the utility of the framework and refine codes. Consistency of coding was also achieved through this process. One researcher then coded the remaining transcripts using this revised coding framework in NVIVO.

Data analysis focused on key codes or themes that emerged as most relevant to the questions under examination in this study. For PCT interviews, analysis focused particularly on codes related to levers and incentives for public health commissioning; the efficacy of the QOF as a public health incentive; and views on the public health role and performance of general practice. For practice interviews, analysis focused on the following codes:

- views on the QOF’s role in addressing health inequalities and the needs of deprived populations
- the impact of the QOF on the management of chronic disease
- the role of the QOF in primary prevention and case finding
- the impact of the QOF on the culture and organisation of practices.
Key quotes were extracted to illustrate the arguments made or the points under discussion. Given the nature of our sample, we did not attempt, nor would it have been possible, to quantify the strength or generalisability of these views.

Emerging findings were shared and discussed with the Advisory Group (see Appendix 5) as well as at a seminar to which research participants and national stakeholders were invited, including representatives from the BMA, NHS Employers, the British Heart Foundation and academics with an interest in QOF. These discussions were used to inform the development of recommendations for research and the implications for policy and practice.
4 Findings from analysis of national data

4.1 Introduction

The analysis of national data was primarily used to answer the following research questions set out in our original proposal:

1. How much variation is there in general practice performance on public health and health gain indicators in the QOF within England? How much variation is there in performance improvement among practices in England on the same measures?

2. What factors are associated with performance and performance improvement? In particular, how strong is the association between the socio-economic status of the practice population and performance after controlling for other characteristics of practices and their populations?

3. Is performance and improvement on QOF measures of health gain associated with improvements in health outcomes (as measured by proxy measures such as use of hospital services for ambulatory sensitive conditions)?

As detailed in Section 3, “Methodology”, our analysis focused on a subset of indicators within the QOF which the evidence suggests contribute to health gain. Our main interest was in socio-economic inequalities, for which we used Spearhead status as a proxy for area deprivation and IMD 2004 income as a measure of deprivation attributed to practices based on the postcode of their registered population.

In the remainder of this chapter, we set out our findings as follows. We begin with our analysis of QOF achievement and improvements in QOF achievement by area and practice deprivation. We looked at data cross-sectionally and over time and used four years worth of data, from 2004/05 to 2007/08. We were interested in whether practices serving low-income populations perform worse as measured by QOF achievement on clinical indicators, and whether practices serving more deprived populations are improving more quickly or more slowly than practices serving less deprived populations. Overall, we aimed to assess whether differences in performance between practices serving more deprived populations and those serving less deprived populations are narrowing.

The next section presents our analysis of practice and population characteristics and their relationship to QOF achievement. We were
interested to establish the relative contribution of social and demographic characteristics of the practice population and other characteristics of the practice known to affect performance (including the ratio of GPs to patients, country of qualification of GPs, and the type of contract held by the practice) to QOF achievement.

Given concerns about gaming, we examined the levels of exception reporting by area and practice deprivation. We then re-analysed the data, adjusting for the level of exception reporting in order to understand the extent to which variations in performance (or lack of them) might be explained by reporting behaviour.

In order to determine whether patients in deprived areas are less likely to be included on chronic disease registers, the prevalence of the relevant chronic diseases as reported by practices in QOF was compared against modelled prevalence estimates obtained from APHO. We used these rather than mortality rates at PCT level in order to be able to undertake the analysis at practice level. We examined whether the "gap" between reported and estimated prevalence varied by area and practice deprivation. Larger “gaps” may indicate a lack of active outreach and identification.

Finally, we present analysis of the relationship between QOF achievement and rates of emergency admissions for seven ambulatory care sensitive conditions: stroke, CHD, hypertension, CHF, diabetes, COPD and asthma. This part of the analysis was designed to assess whether performance/improvements in QOF are associated with improvements in the health of the practice population. Given the focus on inequalities, we were particularly interested in how these differed by area and practice deprivation. We hypothesised that some practices, despite high levels of performance on QOF, may lack systems for proactive outreach, identification and appropriate management of people at risk of ill health or with chronic conditions at risk of deterioration. We had hoped in our original proposal to obtain data relating to other aspects of practice performance, but due to difficulties obtaining data, we limited ourselves to the use of HES.

4.2 Variations in QOF performance

4.2.1 QOF achievement on clinical indicators

Mean reported QOF achievement on 26 clinical indicators selected for use in this study in 2004/05 was 81.0 percent (95 percent CI 80.9–81.2; median 82.6) across all practices, increasing in 2005/06 to 85.3 percent (95 percent CI 85.1–85.4; median 86.0).
Nineteen clinical indicators (out of 26 employed in this study) remained unchanged or were only slightly amended over the first four years of the QOF implementation. Therefore, for trend analysis over the four years of QOF implementation (2004/05 to 2007/08), we compared achievement for these 19 clinical indicators only. Figure 2 shows that while for 2004/05, mean reported QOF achievement across practices in England was only 78.6 percent (95 percent CI 78.5–78.8), it increased to 83.2 percent (95 percent CI 83.0–83.3) in 2005/06 and 86.3 percent (95 percent CI 86.2–86.4) in 2006/07, and then remained broadly unchanged in the subsequent, 2007/08 (86.4 percent; 95 percent CI 86.3–86.5).

Overall, levels of achievement on these clinical indicators were high in year 1 of QOF, with the average practice achieving the indicators for more than three-quarters of registered patients (after exception reporting). Improvements were greatest in the early years, with the rate of improvement flattening off between years 3 and 4.

Figure 2. Mean reported QOF achievement on 19 clinical indicators across general practices in England, 2004/05 to 2007/08

Note: the scale on the y-axis starts at 74 percent

4.2.2 Differences in achievement by area and practice deprivation

We were particularly interested in examining variations in performance by area and practice deprivation.

The distribution of practices in the sample by Spearhead status and income quintile is shown in Table 5. Thirty-six percent of practices were located in
Spearhead PCTs. Nine percent of those practices (259) had practice populations drawn from the most affluent areas (subsequently referred to as least deprived practices), and 38 percent of Spearhead practices (1,116) had populations drawn from the most deprived areas (subsequently referred to as most deprived practices). Within non-Spearhead areas, 26 percent were least deprived practices (1,411) but despite being classified as a non-deprived area, 10 percent of practices were most deprived practices (518).

Differences in reported achievement between practices in Spearhead and non-Spearhead PCTs were small but statistically significant, with practices in non-Spearhead PCTs slightly outperforming practices in Spearhead PCTs (Table 5). Over 2004/05 and 2005/06, practices in Spearhead PCTs improved more than non-Spearhead PCTs. This change was small but statistically significant, and was replicated among both the most and the least deprived practices.

Table 5. Mean reported achievement (%) on selected clinical indicators by income quintile and Spearhead status, 2004/05 and 2005/06, and change between two years

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2004/05</th>
<th>2005/06</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of practices</td>
<td>Mean %</td>
<td>95% CI</td>
</tr>
<tr>
<td>All practices</td>
<td>P&lt;0.001</td>
<td>P&lt;0.001</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>Yes</td>
<td>2970</td>
<td>80.18</td>
</tr>
<tr>
<td>No</td>
<td>5350</td>
<td>81.53</td>
<td>81.32-81.73</td>
</tr>
<tr>
<td>Income quintile</td>
<td>P&lt;0.001</td>
<td>P&lt;0.001</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>1670</td>
<td>81.88</td>
<td>81.53-82.22</td>
</tr>
<tr>
<td>2</td>
<td>1659</td>
<td>81.40</td>
<td>81.02-81.77</td>
</tr>
<tr>
<td>3</td>
<td>1660</td>
<td>81.26</td>
<td>80.90-81.63</td>
</tr>
<tr>
<td>4</td>
<td>1655</td>
<td>80.73</td>
<td>80.32-81.13</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>1634</td>
<td>80.06</td>
<td>79.64-80.49</td>
</tr>
<tr>
<td>Practices in Spearhead PCTs by IMD 2004 income quintile</td>
<td>P=0.055</td>
<td>P=0.006</td>
<td>P=0.81</td>
</tr>
<tr>
<td>Income quintile</td>
<td>1 (least deprived)</td>
<td>259</td>
<td>79.81</td>
</tr>
<tr>
<td>Income quintile</td>
<td>P&lt;0.001</td>
<td>P=0.003</td>
<td>P=0.02</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>1411</td>
<td>82.26</td>
<td>81.92-82.60</td>
</tr>
<tr>
<td>2</td>
<td>1340</td>
<td>81.52</td>
<td>81.11-81.94</td>
</tr>
<tr>
<td>3</td>
<td>1159</td>
<td>81.39</td>
<td>80.95-81.82</td>
</tr>
<tr>
<td>4</td>
<td>898</td>
<td>81.13</td>
<td>80.56-81.70</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>518</td>
<td>80.62</td>
<td>79.91-81.34</td>
</tr>
</tbody>
</table>

**Figure 3. Mean reported QOF achievement by Spearhead status and income quintile**

Note: the scale on the y-axis starts at 70 percent
However, after stratifying the analysis by Spearhead status, differences by income quintile in mean reported achievement and change in achievement became non-significant within Spearheads at baseline (2004/05). Income quintile in non-Spearhead practices remained significant, with the least deprived practices slightly outperforming the most deprived practices (82.26 percent vs. 80.62 percent).

We also compared the differences in mean reported achievement between Spearhead and non-Spearhead PCTs among the most and the least deprived practices only. There was no difference between the most deprived practices by Spearhead status. The difference became statistically significant when comparing means for the least deprived practices between non-Spearhead and Spearhead PCTs: 82.3 percent (81.9–82.6) vs. 79.8 percent (78.5–81.0) in 2004/05 (t-statistic = 5.07; p<0.001); 85.8 percent (85.5–86.0) vs. 84.4 percent (83.5–85.3) in 2005/06 (t-statistic = 3.75; p<0.001). In particular, least deprived practices within non-Spearhead areas significantly outperformed those in Spearhead areas (see Table 5 and Figure 3).

4.2.3 Discussion

Consistent with other research, we found that the least deprived practices outperform the most deprived practices on the clinical indicators within QOF that evidence suggests contribute to health gain. On average, practices in Spearhead areas performed worse than practices in non-Spearhead areas, suggesting that differences in the performance of general practice may still be contributing to area-based inequalities; however, the differences were small.

Differences in QOF achievement between the most and least deprived practices have narrowed since the QOF was implemented in 2004/05. Differences in performance between practices in Spearhead and non-Spearhead PCTs have also reduced, suggesting that the QOF may have provided incentives for poor-performing practices in deprived areas to improve. The differences in year 1 were small, and so it is unlikely that the narrowing of the gap between areas will have contributed much to reductions in health inequalities between areas.

The lack of difference between the most deprived practices in Spearhead and non-Spearhead PCTs suggests that efforts to improve the quality of primary care as part of area-based initiatives to tackle inequalities have not yet had an observable impact on the performance of deprived practices. The observed differences between Spearhead and non-Spearhead practices result from differences in the performance of the least deprived practices. It appears that practices that serve wealthier populations but which are
surrounded by deprivation perform worse. In the next section, we examine which practice characteristics are associated with QOF achievement and how these vary by area and practice deprivation in order to try and explain this difference.

**Key findings**

- Over the first three years of QOF implementation (2004/05 to 2006/07), there was an upward trend in mean reported QOF achievement on clinical indicators across practices in England. The level of achievement was then stabilised and remained unchanged from 2006/07 to 2007/08.

- Over 2004/05 and 2005/06, practices in Spearhead areas and the most deprived practices achieved less but improved more on QOF indicators than those in non-Spearhead areas and the least deprived.

- For the most deprived practices, there were no differences in QOF achievement by Spearhead status. However, the least deprived practices performed significantly worse in Spearhead than in non-Spearhead areas, with performance similar to the most deprived in Spearhead areas.

- In the subsequent two years, 2006/07 and 2007/08, there were no significant differences in QOF achievement by deprivation or Spearhead status.

### 4.3 Practice characteristics

#### 4.3.1 Regression analyses

We used a series of multiple regression models to understand what practice characteristics were associated with QOF achievement and whether the observed associations between area and practice deprivation and achievement (set out above) held after controlling for these factors. While there was a moderate correlation between number of GPs per practice and GP caseload (42 percent in 2004/05 and 57 percent in 2005/06), we chose to keep both items in the model.

In a multiple regression model of baseline performance (2004/05), mean reported achievement was significantly associated with GP education in the UK, GP caseload and the contract status of primary care practices (Table 6). The results for 2005/06 were broadly similar and are not presented here. Relationships were in the expected direction but the coefficients in
most cases are small. Table 6 shows that having a higher proportion of GPs in the practice that had their GP education in the UK, not being a PMS practice, and having a smaller caseload of patients per GP are significantly associated with higher QOF achievement.

Table 6. Relationship between mean reported QOF achievement on selected clinical indicators and practice-level indicators, 2004/05

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area deprivation (IMD 2004 income quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td>-</td>
<td>0.0289a</td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.356</td>
<td>0.183</td>
<td>-0.880 0.167</td>
</tr>
<tr>
<td>quintile 3</td>
<td>-0.228</td>
<td>0.398</td>
<td>-0.757 0.301</td>
</tr>
<tr>
<td>quintile 4</td>
<td>-0.550</td>
<td>0.045</td>
<td>-1.089 -0.012</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>-0.902</td>
<td>0.002</td>
<td>-1.472 -0.332</td>
</tr>
<tr>
<td>Spearhead status of PCTs</td>
<td>-0.378</td>
<td>0.055</td>
<td>-0.764 0.008</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>0.029</td>
<td>&lt;0.001</td>
<td>0.024 0.034</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.0003</td>
<td>0.005</td>
<td>-0.001 1</td>
</tr>
<tr>
<td>Proportion of older age group (≥ 65 years old)</td>
<td>0.005</td>
<td>0.757</td>
<td>-0.029 0.040</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>-0.642</td>
<td>&lt;0.001</td>
<td>-0.996 -0.289</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>0.056*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>0.580</td>
<td>0.017</td>
<td>0.105 1.056</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>0.441</td>
<td>0.118</td>
<td>-0.112 0.995</td>
</tr>
</tbody>
</table>

*aoverall p-value

Similar associations were found with change in mean reported achievement between 2004/05 and 2005/06, but instead of GP caseload, the number of GPs per practice was significant (Table 7). However, the direction of association was negative, meaning that larger practices were associated with lower levels of improvement. These practices had a higher level of performance at baseline and therefore less room for improvement, so this is perhaps not surprising. These practices may have already had better systems and processes in place to manage patients with chronic illness and to measure and record activities. As we will see later, the findings of our qualitative research suggest that practice organisation is a key factor in explaining levels of performance on the QOF.
Deprivation (IMD 2004 income quintile) remained significantly associated with mean reported achievement at baseline in 2004/05 (Table 6) and 2005/06, but was not associated with change over time (Table 7). Spearhead status of PCTs was not significantly associated with mean reported achievement (2005/06) or was only of borderline significance (2004/05) after adjusting for practice-level factors (Table 6 and 7). This confirms the earlier finding that over and above the levels of deprivation to be found in Spearhead areas, the impact of area-based initiatives to reduce health inequalities through changes in general practice have not impacted on QOF performance.

Table 7. Relationship between difference in mean reported QOF achievement on selected clinical indicators between 2004/05 and 2005/06 and practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area deprivation (IMD 2004 income quintile)</td>
<td>-</td>
<td>0.142a</td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td>-</td>
<td>0.123</td>
<td>0.877</td>
</tr>
<tr>
<td>quintile 2</td>
<td>0.500</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.283</td>
<td>0.144</td>
<td>-0.097 - 0.700</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.311</td>
<td>0.116</td>
<td>-0.077 - 0.700</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.283</td>
<td>0.176</td>
<td>-0.127 - 0.694</td>
</tr>
<tr>
<td>Spearhead status of PCTs</td>
<td>0.280</td>
<td>0.048</td>
<td>0.002 - 0.559</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.012</td>
<td>&lt;0.001</td>
<td>-0.016 - 0.009</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>0.0002</td>
<td>0.115</td>
<td>0.0000 - 0.0000</td>
</tr>
<tr>
<td>Proportion of older age group (≥ 65 years old)</td>
<td>0.009</td>
<td>0.493</td>
<td>0.016 - 0.034</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.475</td>
<td>&lt;0.001</td>
<td>0.223 - 0.727</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>-</td>
<td>&lt;0.001a</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.749</td>
<td>&lt;0.001</td>
<td>-1.130 - 0.368</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-1.230</td>
<td>&lt;0.001</td>
<td>-1.666 - 0.795</td>
</tr>
</tbody>
</table>

*aoverall p-value

A modified analysis in 2005/06 found that the previous year’s performance was strongly associated with mean reported achievement, as well as change over time, consistent with the finding of previous research that there is a strong correlation between years (Doran et al 2008a).
The final multiple regression models explained only between 1 percent (2005/06, 2007/08), 2 percent (2006/07) and 4 percent (2004/05) of the variance in reported achievement. However, after adjusting for previous year’s performance in the model for 2005/06, the R-squared statistic of the model increased dramatically to approximately 49–52 percent. This indicates that, while there were statistically significant associations between some of the examined practice-level characteristics and mean reported achievement, other unobserved factors (e.g. related to practice or population characteristics) may play a much greater role in explaining what little variation in QOF achievement exists between practices. Without identification of these factors, QOF achievement is not well described by current models, and appears to be largely randomly distributed.

It should be noted that there is very little variation in achievement levels on QOF, with large numbers of practices having high levels of achievement. Our outcome measure itself is a mean of a number of indicators and therefore further reduces the level of variation observed between practices. While looking at individual indicators enables us to see much greater levels of variation in performance between practices, our intention was to look at overall performance on clinical indicators. In general, the relationship with deprivation observed using our aggregated measure of achievement holds for individual indicators.

Having established which factors are most closely associated with QOF achievement, we now return to the question of why the least deprived practices in Spearhead PCTs perform significantly worse than their counterparts in non-Spearhead PCTs. Table 8 shows the distribution of practice characteristics within Spearhead and non-Spearhead PCTs. Practices in non-Spearhead PCTs had a significantly higher number of GPs per practice, lower GP caseload, lower proportion of PMS contracts, and a higher proportion of GPs who qualified in the UK in both years of the study – all factors associated with high levels of achievement. We can see that the least deprived practices in Spearhead PCTs have many features in common with other more deprived practices in Spearhead areas. In fact, there were no significant differences between the most and least deprived practices within Spearhead PCTs. However, these practices differ substantially from their counterparts in non-Spearhead areas. For example, they have a lower proportion of GPs who qualified in the UK and a higher proportion of PMS contracts than similar practices in non-Spearhead areas (e.g. 60 percent vs. 82 percent and 42 percent vs. 28 percent respectively, for 2004/05), smaller practices (2.88 GPs per practice vs. 4.41) and larger caseloads (2,196 patients per full-time equivalent vs. 2,053). In contrast, the practices in the most deprived areas of non-Spearhead PCTs bear a close resemblance to those in Spearhead PCTs.
### Table 8. Mean estimates (95% CI) of practice-level indicators by Spearhead status among the most and the least deprived practices, 2004/05 and 2005/06

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2004/05</th>
<th></th>
<th>2005/06</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP caseload (number of patients/FTEs)</td>
<td>Least deprived</td>
<td>Most deprived</td>
<td>All practices</td>
<td>Least deprived</td>
</tr>
<tr>
<td></td>
<td>Least deprived</td>
<td>Most deprived</td>
<td>All practices</td>
<td>Least deprived</td>
</tr>
<tr>
<td></td>
<td>2196 (2106-2286)</td>
<td>2320 (2266-2374)</td>
<td>2271 (2239-2303)</td>
<td>2053 (2020-2085)</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>2.88 (2.62-3.14)</td>
<td>2.76 (2.64-2.87)</td>
<td>2.97 (2.89-3.05)</td>
<td>4.41 (4.28-4.54)</td>
</tr>
<tr>
<td>GP education in the UK, %</td>
<td>59.89 (54.47-65.30)</td>
<td>55.29 (52.72-87.86)</td>
<td>58.57 (57.01-60.14)</td>
<td>82.04 (80.45-83.63)</td>
</tr>
<tr>
<td>PMS practices, % proportion</td>
<td>42.13</td>
<td>36.28</td>
<td>38.89</td>
<td>28.40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2005/06</th>
<th></th>
<th>2005/06</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP caseload (number of patients/FTEs)</td>
<td>Least deprived</td>
<td>Most deprived</td>
<td>All practices</td>
<td>Least deprived</td>
</tr>
<tr>
<td></td>
<td>Least deprived</td>
<td>Most deprived</td>
<td>All practices</td>
<td>Least deprived</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>3.55 (3.17-3.93)</td>
<td>3.43 (3.27-3.60)</td>
<td>3.68 (3.57-3.78)</td>
<td>5.41 (5.24-5.58)</td>
</tr>
<tr>
<td>GP education in the UK, %</td>
<td>55.27 (49.91-60.64)</td>
<td>51.60 (49.14-54.07)</td>
<td>54.28 (52.77-55.80)</td>
<td>77.37 (75.74-79.00)</td>
</tr>
<tr>
<td>PMS practices, % proportion</td>
<td>38.96</td>
<td>32.57</td>
<td>36.18</td>
<td>32.45</td>
</tr>
</tbody>
</table>

### Key findings

- Having a higher proportion of GPs in the practice who qualified in the UK, not being a PMS practice, and having a smaller caseload of patients per GP are significantly associated with higher QOF achievement in years 1 and 2.

- Similarly, having a higher proportion of GPs in the practice who qualified in the UK and not being a PMS practice were significantly associated with improvements in QOF achievement between years 1 and 2, but larger practices were associated with lower levels of improvement.

- Higher levels of deprivation were significantly associated with lower levels of achievement in years 1 and 2, but were not associated with
improvements. The association with Spearhead status was only of borderline significance in the first year of QOF and for the improvements between years 1 and 2.

- Practice characteristics had a very limited effect in explaining the variations in QOF achievement between practices.

### 4.3.2 Discussion

Using the limited set of practice variables we had, we found a number of factors that were significantly associated with higher achievement. While it is easier to understand why a practice with a smaller caseload of patients might find it easier to attain higher levels of achievement, it is perhaps more difficult to explain why practices with a higher proportion of GPs who qualified in the UK did better. The fact that PMS practices performed worse on QOF could be explained by the stronger financial incentives that partners or principals in GMS practices have.

Practices in non-Spearhead PCTs had a significantly higher number of GPs per practice, lower GP caseload, and a higher proportion of GPs who qualified in the UK in both years of the study – all factors associated with high levels of achievement. The fact that the characteristics associated with lower performance are to be found more often among deprived practices and practices in deprived areas suggests that these factors may, in part, account for the differences observed. If inequalities in quality of primary care are to be reduced, it may require investment in additional GPs to manage the patient caseload, creating larger practices, and additional training and development support for GPs who did not qualify in the UK.

The weak explanatory power of the model suggests that there were other factors that we were unable to observe which may explain differences in performance. Among those factors could be organisational aspects (e.g. computerisation of practice, IT specialists, facilities), use of nurses, and other aspects of clinical practice of GPs. More research is needed to understand what is really driving variations in practice performance.

Findings elsewhere in this study suggest that deprived practices and low performers struggle to attract and retain staff because of the poor standard of facilities, the lack of resources and the demands due to the needs of the population they serve. It may be that the least deprived practices in Spearhead areas struggle with similar challenges to those faced by deprived practices elsewhere.
### 4.4 Exception reporting

Exception reporting has been justified as part of pay-for-performance schemes when goals are set at or near 100 percent of patients, in order to safeguard against inappropriate treatment, to mitigate the risk that practices shun “difficult patients”, and to acknowledge doctors’ professional judgement in clinical matters. However, there is also a danger that exception reporting can be used to game the scheme, and may result in difficult patients simply being excluded. If gaming through use of exception reporting was higher in more deprived areas and practices, this could have a negative impact on reducing health inequalities.

A number of other research studies have specifically considered the extent of gaming by analysing rates of exception reporting, and have found mixed evidence (Doran et al 2008b). We were interested in the impact of any differential use of exception reporting and its impact on levels of achievement by area and practice deprivation.

In this section, we first present analysis of levels of exception reporting by area and practice deprivation. We used these data to re-analyse QOF achievement in order to understand the extent to which variations in performance (see Sections 4.2 and 4.3 above) might be explained by reporting behaviour rather than differences in actual activity. The adjusted measure of achievement (i.e. including exception reported cases in the denominator) is called “population achievement”.

The overall proportion of exception reported patients in 2005/06 varied from 0 percent to 83.2 percent across practices (mean 10.2 percent, 95 percent CI 10.1–10.3; median 9.7 percent). The range of variation narrowed in the subsequent two years (0.4 percent to 49.4 percent in 2006/07 and 0 percent to 33.0 percent in 2007/08). However, the mean rate of exception reported patients increased from 2005/06 to 2006/07, and then decreased in 2007/08 but remained higher than in 2005/06 (see Figure 4).

In 2005/06, only 192 practices (2.3 percent) exception reported more than 20 percent of patients. However, this number increased to 395 practices in 2006/07 and 251 practices in 2007/08. A higher proportion of those practices were located in Spearhead and more deprived areas. Within Spearhead areas, there was a gradient by deprivation: the most deprived areas had a higher proportion of practices with more than 20 percent of exception reported patients. Within non-Spearhead areas, no gradient was observed in 2005/06 and reversed trend was observed in 2006/07 to
2007/08: the most deprived areas had a lower proportion of practices with more than 20 percent of exception reported patients.

Out of the 16 QOF indicators considered, the following three indicators had more than 20 percent exception reported patients for more than 20 percent of practices (for full descriptions of indicators, see Appendix 2): CHD10 (2005/06 to 2007/08), HF3 (former LVD3, 2006/07 to 2007/08), Stroke8 (2005/06). The first two indicators are “treatment” indicators involving the prescribing of drugs (ACE inhibitors, A2 antagonists or beta blockers) where it is likely that high levels of exception reporting are clinically justified due to contraindications or side effects. There were no differences in proportion of high levels (more than 20 percent) of exception reporting for CHD10 by Spearhead or deprivation across all three years. In 2006/07 and 2007/08, high levels of exception reporting for HF3 were more frequent in non-Spearhead areas. Across all three years, high levels of exception reporting for Stroke8 were observed more frequently in non-Spearhead and least deprived (more affluent) practices.

The proportion of exception reported patients did not differ by Spearhead status or deprivation, and there were no significant correlations between them (Figures 5 and 6, Table 9).

Figure 4. Proportion of exception reported patients across practices in England, 2005/06 to 2007/08 A (trend) B (interquartile range)
Figure 5. Exception reporting across practices in England (2005/06) by income quintile

Figure 6. Exception reporting across practices in England (2005/06) by Spearhead status
Table 9. Proportion of exception reported patients (2005/06 to 2007/08) by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Rate of exception reporting, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005/06</td>
</tr>
<tr>
<td>non-spearhead</td>
<td></td>
</tr>
<tr>
<td>spearhead</td>
<td></td>
</tr>
</tbody>
</table>
Mean | 95% CI | Mean | 95% CI | Mean | 95% CI
--- | --- | --- | --- | --- | ---
Spearhead | Yes | 10.3 | 10.1-10.4 | 13.3 | 13.2-13.5 | 12.7 | 12.6-12.8
No | 10.2 | 10.1-10.3 | 13.3 | 13.2-13.4 | 12.8 | 12.7-12.9
Income quintile
1 (least deprived) | 10.1 | 9.9-10.3 | 13.2 | 13.1-13.4 | 12.8 | 12.6-12.9
2 | 10.4 | 10.2-10.6 | 13.4 | 13.3-13.6 | 12.8 | 12.7-13.0
3 | 10.2 | 10.0-10.4 | 13.2 | 13.0-13.4 | 12.7 | 12.5-12.9
4 | 10.1 | 9.9-10.3 | 13.2 | 13.1-13.4 | 12.7 | 12.6-12.9
5 (most deprived) | 10.3 | 10.1-10.6 | 13.3 | 13.1-13.5 | 12.8 | 12.6-12.9

Given the lack of systematic difference in exception reporting rates by area and practice deprivation, we did not expect to find much difference in our results by using population achievement rather than reported achievement. However, we re-ran the earlier bivariate and multivariate analysis to examine whether adjustment for the proportion of exception reported patients had an impact on the observed relationships between area and practice deprivation and QOF achievement.

The relationships were similar to those found using reported QOF achievement. Population achievement was significantly higher in non-Spearhead areas and the least deprived practices. However, the differences between Spearhead and non-Spearhead areas were tiny (less than 1 percentage point), and even between the most and least deprived were less than 2 percentage points. Differences narrowed further in 2006/07 but remained significant. No significant differences were observed in 2007/08 (see Table 10).

In multiple regression models, using “population achievement” as an outcome (Table 11) instead of reported achievement did not have a substantial effect on observed associations between QOF achievement and IMD 2004 income quintile or Spearhead status: the direction and significance of associations remained similar. It did have an impact on some other practice-level characteristics. Associations between QOF achievement and “proportion of older age group” (2005/06, 2007/08) became significant, while “number of GPs per practice” (2005/06) was no longer significantly associated with QOF achievement when we used “population achievement”.

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Project 08/1716/207
Table 10. Population achievement (2005/06 to 2007/08) by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Population achievement, %</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2005/06</td>
<td>2006/07</td>
<td>2007/08</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean 95% CI</td>
<td>Mean 95% CI</td>
<td>Mean 95% CI</td>
<td></td>
</tr>
<tr>
<td>Spearhead</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>73.02</td>
<td>72.81-73.24</td>
<td>73.32</td>
<td>73.13-73.51</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>73.80</td>
<td>73.66-73.94</td>
<td>73.75</td>
<td>73.63-73.88</td>
</tr>
<tr>
<td>Income quintile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td></td>
<td>74.02</td>
<td>73.78-74.26</td>
<td>73.79</td>
<td>73.57-74.0</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>73.70</td>
<td>73.46-73.95</td>
<td>73.70</td>
<td>73.48-73.92</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>73.75</td>
<td>73.47-74.03</td>
<td>73.72</td>
<td>73.48-73.97</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>73.39</td>
<td>73.12-73.66</td>
<td>73.54</td>
<td>73.30-73.79</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td></td>
<td>72.73</td>
<td>72.43-73.03</td>
<td>73.22</td>
<td>72.97-73.47</td>
</tr>
</tbody>
</table>

Table 11. Relationship between mean population achievement on 16 clinical QOF indicators and practice-level indicators, 2005/06

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area deprivation (IMD 2004 income quintile)</td>
<td>0.0030^a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least deprived)</td>
<td>-0.227</td>
<td>0.234</td>
<td>-0.602</td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.033</td>
<td>0.863</td>
<td>-0.411</td>
</tr>
<tr>
<td>quintile 3</td>
<td>-0.248</td>
<td>0.208</td>
<td>-0.634</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>-0.739</td>
<td>&lt;0.001</td>
<td>-1.147</td>
</tr>
<tr>
<td>Spearhead status of PCTs</td>
<td>-0.077</td>
<td>0.586</td>
<td>-0.353</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>0.018</td>
<td>&lt;0.001</td>
<td>0.014</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.0005</td>
<td>&lt;0.001</td>
<td>-0.0007</td>
</tr>
<tr>
<td>Proportion of older age group (≥ 65 years old)</td>
<td>0.099</td>
<td>&lt;0.001</td>
<td>0.074</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>-0.483</td>
<td>&lt;0.001</td>
<td>-0.733</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>0.1362^a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.141</td>
<td>0.466</td>
<td>-0.519</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.388</td>
<td>0.079</td>
<td>-0.821</td>
</tr>
</tbody>
</table>

^a overall p-value

Key findings
• The proportion of exception reported patients varied widely across practices in England. While the range narrowed, the mean rate of exception reported patients increased from 2005/06 to 2006/07, and then decreased in 2007/08 but remained higher than in 2005/06.

• Although higher levels of exception reporting were significantly associated with higher levels of achievement, no associations were found between exception reporting and deprivation (IMD 2004 income quintile) or between exception reporting and Spearhead status.

• The proportion of exception reported patients varied widely between indicators, with a number of treatment indicators having high levels of exception reporting. Levels of exception reporting for treatment indicators in heart failure and stroke were higher in non-Spearhead areas.

• Using “population achievement” as an outcome (i.e. including exception reported cases in denominator) instead of reported achievement did not have a substantial impact on observed associations with practice-level characteristics.

4.4.1 Discussion

Our analysis of average exception reporting masks wide variations in practice. Recent efforts have been made by the National Support Team to encourage PCTs to use information about levels of exception reporting to target those practices with high levels that cannot be justified clinically. The fear is that these practices, particularly in deprived areas, are using exception reporting to exclude challenging patients. This means these practices are not able to fully meet the needs of their population and will therefore fail to contribute to reducing health inequalities.

The lack of data on exception reporting in the first year of QOF when the variation in reported achievement levels was greatest means that our ability to analyse the contribution of this to performance is limited. However, analysis of subsequent years suggests that at least part of the reason why some practices are achieving higher reported achievement is because of higher levels of exception reporting; however, the contribution is very small.

There were no systematic differences in the levels of exception reporting by area or practice deprivation. The observed differences in reported achievement are unlikely to be due to differences in reporting behaviour. Using “population achievement” did not make a notable impact on its
relations with deprivation or other practice-level factors. We therefore use reported achievement in the remainder of the analysis.

4.5 Expected and reported prevalence

A further way in which practices can “game” QOF is by not putting patients on the disease register. Although possible, it is unlikely that practices will consciously decide not to register a patient whom they have seen and diagnosed. More likely is that they simply fail to identify the disease in the first instance because the patient has not been seen by them. The QOF may, however, provide a disincentive – particularly for practices serving more difficult populations (for whom they judge meeting the treatment or outcome indicators to be difficult) – to actively case find. We aimed to understand whether practices varied in the extent to which they identify cases with relevant clinical conditions by area and practice deprivation, and whether the under-identification was associated with achievement.

We sought to examine this issue by examining the gap between reported and estimated prevalence and whether this varied by area and practice deprivation. We also examined whether differential performance in QOF could, in part, be explained by different levels of unmet need (as measured by the gap between reported and estimated prevalence). The model estimated practice-level prevalence figures (APHO) were only available for four clinical conditions: CHD, hypertension, stroke and COPD (see Section 3, “Methodology”).

Looking across the four conditions, the differences between reported and estimated prevalence were greatest for hypertension and smallest for stroke (Table 12). Given that hypertension is largely asymptomatic and patients may self-treat, it is perhaps not surprising that these patients are more likely to remain unrecorded by GPs. Management of stroke in primary care is usually following an acute episode; there is, therefore, unlikely to be a problem of unrecorded disease. Anyone remaining unidentified by GPs is likely to result from poor communication between acute providers rather than a lack of case finding.

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>Range</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD</td>
<td>(-)8.67 - 6.79</td>
<td>0.87</td>
<td>0.82</td>
</tr>
<tr>
<td>Hypertension</td>
<td>(-)28.74 - 31.27</td>
<td>12.14</td>
<td>12.01</td>
</tr>
<tr>
<td>COPD</td>
<td>(-)3.44 - 6.12</td>
<td>1.68</td>
<td>1.64</td>
</tr>
<tr>
<td>Stroke</td>
<td>(-)3.24 - 3.46</td>
<td>0.47</td>
<td>0.44</td>
</tr>
</tbody>
</table>
Figure 7 shows that recorded prevalence of CHD did vary a little by deprivation income quintile. However, there was a more apparent gradient in estimated prevalence by deprivation. There were similar patterns for other conditions, except for stroke, where the gradient was similar. However, for hypertension, the gap in income quintile 5 (most deprived) was not significantly bigger than the gap in income quintile 1 (least deprived). This suggests that there was a greater problem of under-identification of CHD, COPD and stroke in the most deprived practices compared with the least deprived practices.

**Figure 7. Differences between recorded prevalence and estimated prevalence for CHD (2005/06)**

The gap between estimated and reported prevalence increased with deprivation and was greater in practices in Spearhead areas for CHD, COPD and stroke. However, the relationship was reversed for hypertension (Table 13).
Table 13. Correlation between difference in estimated and reported prevalence and Spearhead status of PCTs and income quintile (2005/06)

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>IMD 2004 income quintile</th>
<th>Spearhead status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>CHD</td>
<td>0.104</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-0.046</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>COPD</td>
<td>0.263</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.175</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Having established that under-identification appears to vary by area and practice deprivation, we were interested in the extent to which this was associated with performance on QOF (Table 14). We found no significant correlation between QOF achievement on the CHD domain indicators and the difference in estimated and recorded prevalence for CHD, and only a very weak positive relationship with COPD. This means that the larger the difference, the higher the levels of achievement. We found that the opposite was true for stroke and hypertension, where the relationship was negative – that is, the smaller the difference between reported and estimated prevalence, the higher the levels of achievement.

Table 14. Correlation between difference in estimated and reported prevalence and QOF achievement for relevant clinical conditions (2005/06)

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>Correlation coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD</td>
<td>-0.006</td>
<td>0.5708</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-0.062</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>COPD</td>
<td>0.032</td>
<td>0.0045</td>
</tr>
<tr>
<td>Stroke</td>
<td>-0.052</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Using the difference between estimated and recorded prevalence as an outcome variable in a series of multiple regression models, we observed significant weak negative associations between differences in prevalence and QOF achievement after adjustment for various practice-level variables. Generally, our findings suggest that the difference in disease recording or identification does not influence QOF achievement. If anything, more active case finding is associated with slightly higher achievement.

We also examined which practice characteristics were associated with differences between estimated and reported prevalence. The direction and significance of correlation varied depending on the clinical condition (Table
15). For CHD, COPD and stroke, a larger GP caseload was associated with larger differences in prevalence, as was the proportion of GPs who did not qualify in the UK, and smaller practices. As we showed earlier, these are attributes more commonly found in the least deprived practices. The opposite was true for hypertension, where larger prevalence gaps were associated with a higher proportion of GPs who qualified in the UK, larger practices, smaller caseloads, and practices with a greater proportion of elderly patients. The PMS status of practices seems to make little or no difference; a PMS practice was slightly more likely to have a smaller prevalence gap for CHD, hypertension and stroke, but not COPD.

Table 15. Summary of correlations between difference in estimated and reported prevalence and various practice-level factors

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>Practice-level characteristics</th>
<th>Number of GPs per practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>GP caseload</td>
</tr>
<tr>
<td>CHD</td>
<td>No</td>
<td>Positive</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Positive</td>
<td>Weak negative</td>
</tr>
<tr>
<td>COPD</td>
<td>Weak negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Stroke</td>
<td>Weak negative</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Key findings

- The gap between estimated and reported prevalence increased with deprivation and was greater in practices in Spearhead areas for CHD, COPD and stroke. However, the relationship was reversed for hypertension.

- There are significant weak negative associations between differences in prevalence and QOF achievement after adjustment for various practice-level variables.

- For CHD, COPD and stroke, a larger GP caseload was associated with larger differences in prevalence, as was the proportion of GPs who did not qualify in the UK, and smaller practices. The opposite was true for hypertension.
4.5.1 Discussion

There was significant variation among practices in the size of the gap between reported and estimated prevalence. At least some of this variation may in part be due to the accuracy of the estimation methodology employed by APHO. While modelled prevalence figures may provide an indication of completeness of disease registrations by general practices in England, they are comprised of estimated values based on limited numbers of available modelled variables. Therefore, comparisons between recorded and model estimated prevalence figures should be taken with caution. Also, practice-level modelled estimates of prevalence were not available for all clinical conditions covered by QOF.

Our findings suggest that for a number of conditions (CHD, COPD and stroke), despite incentives within QOF to keep a register of these patients, deprived practices and areas are failing to identify all cases of disease within their practice populations.

We also found that practices that performed better on QOF also had more complete recording of disease prevalence after adjusting for other factors. This suggests that unlike exception reporting, which to some extent can be gamed to support higher achievement, better case identification is associated with higher performance.

This suggests that practices are not gaming by failing to register patients. A more likely explanation is that well-organised practices that are able to achieve better QOF scores may also be more systematic in their approach to case finding. This is supported to some extent by the finding that larger practices in less deprived areas with UK-qualified doctors and smaller caseloads are more able to identify cases and to achieve on QOF.

4.6 Ambulatory care sensitive admissions

This section of the quantitative analysis aimed to establish whether there is a link between performance on QOF and other measures of population outcomes. Given the focus within QOF on chronic illnesses, we looked at the relationship between practice performance in specific clinical domains (using clinically relevant indicators) and the (standardised) rates of ambulatory care sensitive (ACS) hospital admissions. We would expect lower rates of emergency admissions for these conditions to be associated with higher performance on QOF if, indeed, performance on QOF equates to higher quality care.
Specifically, we sought to examine how and whether these relationships vary by area and practice deprivation. We undertook analysis for seven conditions within QOF: CHD, hypertension, stroke, CHF, diabetes, COPD and asthma. Previous analysis in this study used a composite indicator of QOF achievement across all clinical domains. In this section, the analysis is by clinical domain (based on the same subset of indicators used in the earlier parts of the study). We summarise the results below. More detailed results for each clinical condition are presented in Appendix 6.

Table 16. Mean reported QOF achievement (% with 95% CI) for selected clinical conditions (2004/05) by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>CHD</th>
<th>Hypertension</th>
<th>Stroke</th>
<th>CHF</th>
<th>Diabetes</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>All practices</td>
<td>82.37 (82.19-82.54)</td>
<td>82.59 (82.41-82.77)</td>
<td>81.0 (80.79-81.22)</td>
<td>82.51 (82.35-82.67)</td>
<td>78.21 (78.01-78.41)</td>
<td>90.67 (90.45-90.89)</td>
<td>76.58 (76.34-76.83)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81.55 (81.24-81.86)</td>
<td>81.83 (81.51-82.15)</td>
<td>80.07 (79.68-80.46)</td>
<td>81.74 (81.46-82.03)</td>
<td>77.42 (77.06-77.78)</td>
<td>89.18 (88.78-89.59)</td>
<td>76.36 (75.92-76.80)</td>
</tr>
<tr>
<td>No</td>
<td>82.82 (82.61-83.03)</td>
<td>83.01 (82.79-83.22)</td>
<td>81.51 (81.25-81.78)</td>
<td>82.94 (82.75-83.13)</td>
<td>78.64 (78.40-78.87)</td>
<td>91.49 (91.23-91.76)</td>
<td>76.71 (76.41-77.01)</td>
</tr>
<tr>
<td>Income quintile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>83.27 (82.92-83.61)</td>
<td>83.16 (82.82-83.51)</td>
<td>81.91 (81.49-82.33)</td>
<td>83.22 (82.91-83.54)</td>
<td>79.08 (78.70-79.47)</td>
<td>92.26 (91.88-92.65)</td>
<td>76.78 (76.27-77.28)</td>
</tr>
<tr>
<td>2</td>
<td>82.56 (82.18-82.94)</td>
<td>82.82 (82.44-83.20)</td>
<td>81.28 (80.81-81.75)</td>
<td>82.71 (82.36-83.06)</td>
<td>78.74 (78.32-78.90)</td>
<td>91.08 (90.58-91.57)</td>
<td>76.74 (76.19-77.30)</td>
</tr>
<tr>
<td>3</td>
<td>82.47 (82.09-82.84)</td>
<td>82.76 (82.36-83.17)</td>
<td>81.21 (80.75-81.68)</td>
<td>82.68 (82.33-83.03)</td>
<td>78.48 (78.05-78.90)</td>
<td>90.83 (90.36-91.30)</td>
<td>76.77 (76.24-77.31)</td>
</tr>
<tr>
<td>4</td>
<td>82.15 (81.76-82.54)</td>
<td>82.30 (81.87-82.72)</td>
<td>80.68 (80.16-81.19)</td>
<td>82.24 (81.87-82.62)</td>
<td>77.93 (77.46-78.40)</td>
<td>90.02 (89.47-90.54)</td>
<td>76.39 (75.81-76.98)</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>81.51 (81.07-81.95)</td>
<td>81.98 (81.55-82.40)</td>
<td>80.03 (79.48-80.58)</td>
<td>81.82 (81.44-82.21)</td>
<td>76.84 (76.35-77.34)</td>
<td>89.24 (88.66-89.83)</td>
<td>76.28 (75.69-76.88)</td>
</tr>
</tbody>
</table>

Table 17. Standardised emergency hospital admission rates (2005/06, per 1,000 people, with 95% CI) by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>CHD</th>
<th>Hypertension</th>
<th>Stroke</th>
<th>CHF</th>
<th>Diabetes</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>All practices</td>
<td>12.44 (12.31-12.56)</td>
<td>10.56 (10.45-10.66)</td>
<td>1.47 (1.46-1.48)</td>
<td>2.92 (2.89-2.96)</td>
<td>0.94 (0.92-0.96)</td>
<td>4.16 (4.10-4.22)</td>
<td>4.37 (4.32-4.43)</td>
</tr>
</tbody>
</table>
4.6.1 Descriptive statistics

Mean reported achievement for selected clinical QOF indicators varied from 76.58 percent (asthma) to 90.67 percent (COPD) across all practices (Table 16). Achievement was significantly higher within non-Spearhead PCTs and among the least deprived practices (except for asthma) compared with practices in Spearhead PCTs or the most deprived.

We estimated an age and sex standardised emergency hospital admission rate for each practice in England. Standardised emergency hospital admission rates were significantly higher in Spearhead areas and more deprived practices (Table 17). We found a strong positive correlation between standardised emergency hospital admissions and indicators of deprivation (Spearhead status of PCTs; IMD 2004 income quintile).

Similar estimates and relations of age and sex standardised emergency hospital admission rates by Spearhead status and deprivation were observed for 2004/05: admission was significantly higher in Spearhead areas and the most deprived practices (see Appendix 7).

Figures 8 and 9 illustrate the gradient in ACS admissions for CHD by deprivation quintile and Spearhead status.
Figure 8. Differences in age/sex standardised emergency hospital admission rates for CHD related indicators (2005/06) by income quintile

*1 - least deprived, 5 - most deprived

Figure 9. Differences in age/sex standardised emergency hospital admission rates for CHD (2005/06) by Spearhead status
Spearhead    Non-Spearhead

We used these data to examine the relationship between QOF achievement for selected clinical conditions and emergency hospital admissions for those conditions. We found a weak negative correlation; in other words, higher achievement on QOF was associated with lower admission rates for all conditions except asthma, where the relationship was not significant (Table 18). However, deprivation was more strongly associated with ACS admissions than QOF achievement.

Similar associations were observed when looking at cross-sectional correlation between emergency hospital admissions in 2004/05 and QOF achievement for 2004/05 (for data, see Appendix 7).

Table 18. Correlation between emergency hospital admission rates (2005/06) and QOF achievement for selected clinical conditions by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>QOF achievement Spearman coefficient</th>
<th>p-value</th>
<th>Spearhead status Spearman coefficient</th>
<th>p-value</th>
<th>IMD 2004 income quintile Spearman coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD</td>
<td>-0.086</td>
<td>&lt;0.001</td>
<td>0.380</td>
<td>&lt;0.001</td>
<td>0.241</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-0.050</td>
<td>&lt;0.001</td>
<td>0.288</td>
<td>&lt;0.001</td>
<td>0.206</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Stroke</td>
<td>-0.046</td>
<td>&lt;0.001</td>
<td>0.124</td>
<td>&lt;0.001</td>
<td>0.076</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CHF</td>
<td>-0.069</td>
<td>&lt;0.001</td>
<td>0.212</td>
<td>&lt;0.001</td>
<td>0.161</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-0.116</td>
<td>&lt;0.001</td>
<td>0.177</td>
<td>&lt;0.001</td>
<td>0.127</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>COPD</td>
<td>-0.172</td>
<td>&lt;0.001</td>
<td>0.396</td>
<td>&lt;0.001</td>
<td>0.231</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Asthma</td>
<td>-0.018</td>
<td>0.1064</td>
<td>0.309</td>
<td>&lt;0.001</td>
<td>0.142</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

We then examined whether these relationships varied by area and practice deprivation. We repeated the analysis for Spearhead and non-Spearhead practices, for practices in each income quintile, and also looked at income quintile within Spearhead and non-Spearhead PCTs. Details of results for each clinical condition are summarised in Table 19.

The results of the analyses suggest that correlations between emergency hospital admission and QOF achievement varied by area and practice deprivation, depending on the clinical condition studied.

For patients with diabetes and CHD, the correlation was significant regardless of Spearhead status or deprivation. Within Spearhead practices, the relationship between emergency hospital admissions and QOF achievement remained significant for the most deprived practices only. This suggests that overall, regardless of socio-economic factors, higher achievement on QOF for patients with CHD or diabetes was correlated with lower hospital admission rates.
For patients with stroke, COPD and hypertension, correlation between emergency hospital admissions and QOF achievement was mainly significant in more affluent areas (non-Spearhead, least deprived). This suggests that overall, in deprived areas, the level of achievement on QOF did not have an impact on hospital admissions. However, in more affluent areas, higher QOF achievement was correlated with lower hospital admissions.

Table 19. Summary results of correlation between emergency hospital admission rates and QOF achievement for selected clinical condition by Spearhead status and income quintile

<table>
<thead>
<tr>
<th></th>
<th>CHD</th>
<th>Asthma</th>
<th>Hypertension</th>
<th>CHF</th>
<th>COPD</th>
<th>Diabetes</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearhead</td>
<td>Yes, both for SH and non SH</td>
<td>No</td>
<td>For non SH only</td>
<td>For non SH only</td>
<td>Yes, both for SH and non SH</td>
<td>Yes, both for SH and non SH</td>
<td>For non SH only</td>
</tr>
<tr>
<td>Deprivation</td>
<td>Yes, both for least and most deprived</td>
<td>No</td>
<td>No</td>
<td>Yes, both for least and most deprived</td>
<td>Yes, both for least and most deprived</td>
<td>Yes, both for least and most deprived</td>
<td>For least deprived only</td>
</tr>
<tr>
<td>Deprivation for Spearhead practices</td>
<td>For most deprived only</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes, both for least and most deprived</td>
<td>For most deprived only</td>
<td>No</td>
</tr>
<tr>
<td>Deprivation for non-Spearhead practices</td>
<td>Yes, both for least and most deprived</td>
<td>No</td>
<td>For least deprived only</td>
<td>For least deprived only</td>
<td>Yes, both for least and most deprived</td>
<td>Yes, both for least and most deprived</td>
<td>For least deprived only</td>
</tr>
</tbody>
</table>

The strongest correlation between emergency hospital admissions and QOF achievement was observed for patients with COPD. Regardless of socio-economic factors (whether Spearhead or deprived), higher QOF achievement by primary care practices was correlated with lower emergency hospital admissions.
No correlation was observed between emergency hospital admissions and QOF achievement for patients with asthma, regardless of socio-economic factors. This may suggest that factors other than indicators listed in QOF have an impact on health outcomes for patients with asthma. In fact, there were no direct clinically relevant asthma management indicators in QOF. The indicators employed were smoking- or influenza vaccination-related (the latter was dropped since 2006/07).

4.6.2 Regression modelling

Using standardised emergency admissions rates (2005/06) as the outcome variable, we analysed the relationship with mean reported achievement on selected clinical QOF indicators (2004/05), controlling for practice characteristics and measures of practice and area deprivation in a series of multiple regression models (see Appendix 6 for full details of results). These regression models explained around 9 percent to 19 percent of observed variations (R-squared estimates).

Table 20. Summary of direction and strength of significant associations between emergency hospital admission rates and QOF achievement

<table>
<thead>
<tr>
<th>Clinical conditions</th>
<th>Multiple regression model</th>
<th>Significant practice-level characteristics</th>
<th>Univariate regression model*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>No</td>
<td>GP education in the UK</td>
<td>Yes (negative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GP caseload</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of GPs per practice</td>
<td></td>
</tr>
<tr>
<td>CHD</td>
<td>Yes (negative)</td>
<td>GP education in the UK</td>
<td>Yes (negative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PMS status of practices</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>Yes (negative)</td>
<td>GP education in the UK</td>
<td>Yes (positive)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PMS status of practices</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of GPs per practice</td>
<td></td>
</tr>
<tr>
<td>CHF</td>
<td>Yes (negative)</td>
<td>GP education in the UK</td>
<td>Yes (negative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GP caseload</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PMS status of practices</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes (negative)</td>
<td>GP education in the UK</td>
<td>Yes (negative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GP caseload (borderline significance)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PMS status of practices</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of GPs per practice</td>
<td></td>
</tr>
</tbody>
</table>
### COPD

<table>
<thead>
<tr>
<th>GP education in the UK</th>
<th>GP caseload</th>
<th>PMS status of practices</th>
<th>Number of GPs per practice</th>
<th>Yes (negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Asthma

<table>
<thead>
<tr>
<th>GP education in the UK</th>
<th>GP caseload</th>
<th>PMS status of practices</th>
<th>Number of GPs per practice</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*without adjustment for practice-level variables

Results varied by clinical condition. Emergency hospital admissions for stroke and asthma were not significantly associated with mean reported QOF achievement for those conditions (see Table 20). Results were similar as for the univariate model (without adjustment for practice characteristics), except for stroke, for which the relationships became statistically significant. We found significant but weak relationships between hospital admissions for CHD, hypertension, CHF, COPD and diabetes and mean reported QOF achievement for those conditions: in other words, lower achievement on QOF was associated with higher hospital admission rates.

The models also indicate which other practice characteristics are associated with admission rates after controlling for QOF achievement and deprivation (see Table 20). A higher proportion of GPs who qualified in the UK was significantly associated with lower ACS admissions for all conditions, but in most cases the relationship was weak. PMS practices were more likely to have higher admission rates for CHF, diabetes, COPD and asthma, but larger practices (number of GPs per practice) and those with higher caseloads were likely to have lower admission rates for the same conditions. Along with a higher proportion of GPs who qualified in the UK, larger practices and those with higher caseloads were associated with lower admissions for stroke. Likewise, larger practices were associated with lower admissions for hypertension. Patients with CHD and hypertension were more likely to be admitted to hospital as an emergency if coming from PMS practices.

#### 4.6.3 Deprived practices

In order to see whether these relationships held for the most deprived practices, we repeated the analyses for the most deprived practices only (IMD income quintile 5). Overall, similar correlations were found between QOF achievement for 2004/05 and emergency hospital admissions for 2005/06; also, Spearhead status of PCTs and hospital admissions.
Compared to all-case analyses, when considering the data for deprived practices only, there were some differences in significance of associations in multiple regression or univariate models. However, no apparent changes in overall direction or significance of associations were found. The most noticeable differences in deprived-only analyses were higher figures for emergency hospital admission rates, which were expected.

**Key findings**

- Emergency hospital admissions for stroke and asthma were not significantly associated with mean reported QOF achievement for those conditions.
- Lower mean reported QOF achievement for CHD, hypertension, CHF, COPD, and diabetes was significantly associated with higher emergency hospital admissions for those conditions.
- Correlation between emergency hospital admission and QOF achievement varied by area and practice deprivation, depending on the clinical condition studied.
- Emergency hospital admissions were strongly associated with area and practice deprivation after controlling for other factors.
- Some practice-level characteristics were associated with emergency hospital admissions but these varied by condition, except the proportion of GPs who qualified in the UK, which was significant across all conditions.

### 4.6.4 Discussion

In line with previous studies, we found that while higher levels of achievement on clinical indicators are associated with lower hospital admissions rates, the strength and significance of associations varied by clinical condition (Bottle et al 2008; Downing et al 2007). This is perhaps not surprising given the lack of variation within QOF achievement and the small number of admissions per practice within any given year.

We found significant negative relationships for CHD, hypertension, CHF, diabetes and COPD. We found no relationship for asthma and stroke.

One of the reasons for the lack of association may be related to the nature of condition-specific QOF indicators. For example, stroke-related QOF indicators are aimed at secondary prevention, or prevention of recurrence of stroke for patients with a history of transient ischemic attack (TIA) and stroke. While some of the patients admitted to hospital may have stroke as a recurrent condition, and thus their management could be reflected in some of the QOF indicators, a large proportion of patients being admitted...
for stroke as their first diagnosis would not have their condition monitored by QOF.

For asthma, where management in primary care is likely to prevent acute emergency admissions, it is surprising that no relationship was found. However, closer examination of the QOF indicators shows that the indicators relate to flu immunisation and smoking cessation advice, and do not directly target the causes of acute asthma attacks.

On the other hand, COPD-related QOF indicators are more relevant. Patients are frequently admitted to hospital if their COPD is uncontrolled or poorly managed, and good management in primary care (and self-management) can make a significant difference.

Lack of associations with QOF achievement may be indicative of the QOF not having a comprehensive range of measures to prevent acute episodes of illness. For some conditions, QOF is lacking in primary prevention (condition-specific) indicators. Another possible explanation for the lack of or weak associations observed could be that management of those conditions was already improving or good, and QOF had no additional effect.

We looked at how these relationships varied by area and practice deprivation by re-analysing data across practices by deprivation and Spearhead status. The relationship between QOF achievement and reduced ACS admissions was broadly equitable for COPD and diabetes. This suggests that wherever improvements in the management of these conditions (as measured by QOF) are occurring, they are having a small but significant impact on reducing ACS admissions. In contrast, for CHF, the lack of any relationship in Spearhead practices and the stronger and more significant relationship among the least deprived practices in non-Spearhead areas suggests that any impact of improved management of hypertension and CHD in primary care on reduced emergency admissions of CHF is slightly regressive.

Overall, our analysis indicates that it is the factors in the area where patients live (e.g. Spearhead status, income deprivation), as well as some practice-level factors, that have stronger associations with hospital admission rates. In multiple regression models, we found that deprivation and Spearhead status are more strongly associated with ACS admissions than QOF achievement. Wider social determinants of health appear to explain why some areas have higher levels of ACS admissions than any differences in the performance of general practice on QOF.
4.7 Summary

In this chapter we have used routinely available national data to assess the extent to which performance on QOF varies by area and practice deprivation. Our assumption was that general practice has the potential to improve outcomes and thus contribute to reductions in health inequalities. While differences in achievement have all but disappeared, these were only very small when QOF was introduced and therefore any health gain is likely to have been extremely modest.

The primary aim of the QOF was to improve the management of chronic conditions such as diabetes and CHD. We used ACS admissions as a measure of the extent to which QOF was having a demonstrable impact on health. For stroke and hypertension, there are clinical reasons why we might not have expected to find (and indeed did not find) any link between performance on QOF and emergency admissions. For other conditions, namely asthma, it appears that the design of QOF was such that it did not impact on reducing admissions. This appears to be a missed opportunity.

The conditions for which QOF appears to be having a demonstrable impact on ACS admissions are diabetes and COPD, and to a lesser extent, CHD and CHF. Conditions where there are both clinical grounds for believing that action in primary care can prevent hospital admission, and where specific preventive activities have been targeted in QOF, are those for which the greatest (and most equitable effects) are observed. Any future development of QOF would need to recognise this.

The capacity of practices to deliver more systematic management and treatment of patients with identified needs, and thereby achieve on QOF, appears to differ by deprivation. More work is needed to identify and better understand what factors influence whether primary care is able to deliver high-quality services and improve population health. We found that country of qualification, contract status, caseload and size of practice were all important to varying degrees. The qualitative strand of this study aims to shed further light on this question.

The design of the QOF means that practices can perform well even if there are some patients who are not receiving high-quality care. This can occur as a result of exception reporting, non-inclusion on the disease register or non-inclusion on the practice register. If QOF is to contribute to reducing health inequalities, it needs to provide practices with incentives to case find, particularly in areas of known high prevalence, and to minimise the number of exceptional cases reported. We examined the first two of these within our analysis.
We conclude that exception reporting does not differ systematically by deprivation; however, this masks wide variation at individual practice level. Exception reporting was associated with higher performance and therefore points to some gaming around this. In contrast, gaps in prevalence were higher in poorer areas. Practices that performed higher on QOF had lower gaps in prevalence, suggesting that case finding (or lack of it) are not used to game QOF, but rather, that practices that are successful on QOF are also more likely to be proactive.
5 Findings from our local case studies

The aim of this strand of our research was to gain an in-depth understanding of how local commissioners and managers working with general practice, and staff working in general practice, saw their role in reducing health inequalities, and their perception of how QOF was impacting on public health activities at a local level. We present the findings from our analysis of interviews with PCT staff first, followed by analysis of interviews with practice staff. The findings are organised thematically. Appendix 1 contains ‘vignettes’ for each case study PCT and GP practice referred to here. The demographic and performance data presented are designed to situate each practice in context.

5.1 PCT perspectives

We felt that it was important to locate our analysis of general practice within the wider primary care context. Given that policy to reduce health inequalities is largely focused on PCTs, particularly those in designated Spearhead areas, we expected to find that area-based initiatives in these areas would have an impact on general practice. We were interested in the extent to which PCTs were engaging general practice in meeting public health objectives and the extent to which QOF was seen as useful in this regard.

Three of our case study PCTs (PCTs B, C and D) had Spearhead status, while one had non-Spearhead status (PCT A). Three PCTs (A, B and C) covered urban areas, with significant challenges associated with socio-economic deprivation, and one (PCT D) comprised urban and some rural pockets, but still with a significant portion of practices serving deprived populations. This meant that there was a degree of consistency across each of the PCTs in terms of the health profile of their populations, with particular needs around diabetes, cardiovascular disease, cancer and mental health.

5.1.1 Primary care and public health in PCTs

PCT respondents spoke about the need to orientate primary care commissioning towards preventive strategies, public health interventions and improving the quality and coverage of primary care and community services.
In the context of these discussions, there were concerns across three PCTs about the internal organisational capacity and political will to formulate and deliver this agenda. In PCT A, significant financial problems had undermined recruitment in both public health and primary care commissioning departments, and had led to the direct dismantling of key public health programmes such as a smoking cessation programme. The Director of Public Health (DPH) highlighted a lack of joint working between the PCT and local authority that hindered the ability to address the wider determinants of health.

Despite having Spearhead status, which should encourage a focus on health inequalities, there was a “silo mentality” in PCT B. Primary care and public health were insufficiently integrated, resulting in poor engagement by public health with general practice:

"Public health has developed an LES [Local Enhanced Service agreement] for a new cohort so that we can tackle the ages that are not being immunised. There is a slow uptake and so it is “over to primary care”… Public health doesn’t go out and speak to GPs."

(PCT B, Director of Primary Care Commissioning)

Similarly, despite being a Spearhead PCT, the Joint DPH at PCT C described both public health and primary care departments as “weak cards” in the “public health deck”. He argued that commissioners were failing to take primary care services “by the scruff of the neck” due to understaffing in the PCT and local authority and a failure to exploit public health and QOF performance data (an issue to which we will return).

PCT D respondents did not appear to consider organisational capacity as a barrier to commissioning public health interventions and focused more on the balance of incentives needed to engage general practice in this agenda. The DPH mentioned problems associated with not being able to visit practices and have public health staff communicate and negotiate directly with GPs about their plans for public health interventions. According to respondents, the Spearhead status of PCT D did not appear to have influenced or focused its approach to addressing health inequalities.

5.1.2 Barriers and facilitators to achievement on QOF

All four PCTs considered general practice to be central to the delivery of public health and the reduction of health inequalities, yet they recognised that there were barriers to general practice playing this key role. GPs were viewed as either actively obstructing better public health outcomes or as largely benign actors operating in challenging circumstances.
In general, PCTs expressed frustration with variations in the level and standard of GP engagement and delivery. Commissioners and managers regarded the culture and attitude of GPs as an obstacle to successful commissioning and delivery of public health. This caused problems when trying to engage practices in the priorities of the PCT:

...my experience of primary care in general – and this PCT is no exception – is that while GPs give verbal recognition to the concept of health inequalities, it doesn’t actually make much of a difference in terms of what they do – with some very notable exceptions... I know there are GPs that do that locally, but I don’t think it is the norm really.

(PCT B, Director of Public Health)

Respondents from each case study PCT also spoke about the challenge of health inequalities in some parts of their locality, partly as a result of under-doctoring or poor primary care provision. A combination of poorly resourced single-handed GPs treating demanding populations was thought to lead to a more reactive model of general practice. These practices were seen to respond to patient needs as they present, limiting their ability to engage in more strategic, preventive activity.

Respondents identified the challenges associated with being a GP in a deprived urban environment where demand is high:

There is no doubt it is probably quite a tough time being a GP in ***** because you have got difficult patients, you have got big language problems, so patients turning up with languages nobody speaks and you can’t get advocacy services for that particular point in time... In addition to that... the vast majority or our population – two-thirds – are from BME [black and minority ethnic] populations, the majority of which were probably born abroad, so they come from different cultures and have different expectations.

(PCT B, Director of Public Health)

They also recognised the challenges presented by the structure of primary care, particularly the number of single-handed practices:

I think they (GPs) could do a hell of a lot more than they currently do – well some of them anyway – but I think part of that is related to the sort of structure of general practice here... We have got a lot of single-handers here – a third of our practices are single-handed, and as I say, they have got very high population need, so, you know, they have got people knocking on their doors all the time.

(PCT B, Director of Primary Care Commissioning)
Our case study practices in this PCT, as shown in vignette B, had at least two GP partners and were relatively stable, well-resourced practices. Therefore, it is difficult to examine this in more detail. The poorest performing practice of the three had a GP partner with public health training and a history of conducting preventive screening clinics, so despite a transient, demanding population, had embedded a preventive public health ethos. In PCT A, the DPH thought that poor QOF achievement and poor practice quality in general was related to “inefficient” single-handed practices and a lack of professional education and development and “not to do with the patient”.

Whereas the current national contract was seen to reduce PCT commissioning leverage and discourage practices from thinking strategically about local population health, respondents were positive about the potential of more integrated provision and stronger practice-based commissioning (PBC). If practices worked in locality networks, it was argued, this might provide opportunities to generate specific public health data and implement targeted interventions. It could also improve the capacity and sense of ownership of primary care, as services would be shared across localities between general practice, pharmacy, dentistry and other providers.

...we have got a strategy of primary care networks, divided up in localities, and there will be a range of services provided for that network of GPs either in a physical location or a virtual location, which will hopefully include a range of prevention type stuff, you know, that the patient comes in and can pop down the corridor and you can see somebody about advice on x...

(PCT B, Director of Public Health)

When reflecting on how practices achieve high QOF scores, most respondents considered this a matter of good organisation, as well as leadership from GP partners keen to improve their reputation and seek rewards for providing good-quality care. For one respondent, this showed the potential of a system like the QOF:

I don’t have any doubt that the QOF has improved healthcare. They do it well. It is interesting because they are competitive... because they have a number of points, some get very upset if they can’t score the full 1,000 points. It is interesting – as well as money, they also seem to feel that their score reflects the nature of their practice, and they don’t like to be seen to be low. That is helpful.

(PCT D, Director of Public Health)
However, there was also evidence of mistrust around QOF achievement levels and the real effect of the incentives. Respondents in PCTs A and B were sceptical about the relatively high levels of performance, and suggested that exception reporting was being used to inflate QOF achievement, with little real impact on the quality of practices that were not already performing well. In terms of exception reporting, we can see from vignette B that the poorest performing practice in this PCT also had the lowest level of exception reporting; however, practices that had QOF data managers also had higher achievement scores. This does not necessarily support the data manipulation theory, but perhaps illustrates the importance of having a dedicated data information “lead”. This supports other research evidence that QOF has helped to embed changes to records management and IT reporting protocols in general practice.

5.1.3 Levers and incentives

Commissioners considered the GMS contract to be a weak tool for delivering public health, arguing that it was “bog standard”, “inflexible” or a “default” and difficult to re-negotiate:

*If it is not in there (GMS contract), they are not obliged to do it, and trying to do the service in a slightly different way that addresses health inequalities... There is no obligation within that contract for people to do that...*

(PCT C, Director of Performance and Governance)

Reflecting specifically on the contribution of the QOF to public health and the tackling of health inequalities, PCT respondents were ambivalent. Most were supportive of the QOF and thought it had delivered improvements in the management of chronic disease. However, they were unconvinced of its value to a preventive public health strategy, believing that its targets are not focused enough on prevention of ill health:

*What we need to move towards is not just disease-based registers and targets based on particular diseases... What we need to move towards is a preventative strategy at primary care level.*

(PCT A, Director of Public Health)

The DPH at PCT D believed that while the QOF might have made general practice “boring” in the view of some GPs by incentivising a focus on more rigorous management of disease, it had positive public health benefits:

*I say about general practice that it is doing the simple things well that makes the difference, not the difficult things occasionally.*

(PCT D, Director of Public Health)
Another DPH, from PCT A, expressed concern about the “narrow range of services” the QOF incentivises and the low levels needed to meet targets on hypertension and diabetes. Most respondents had suggestions about where the QOF could be extended or improved, such as blood disorders, child health, osteoporosis, recording of alcohol consumption, and exercise prescription. All mentioned the implementation of the vascular risk assessment through Directed Enhanced Services (DES). PCT B had, according to the DPH, implemented this DES six months early in order to start uncovering undiagnosed illness and address variable standards of diagnosis in general practice.

Commissioners felt the only levers available to them through the GMS contract were to set more stringent QOF targets or thresholds, implement LES to deliver public health interventions, or performance manage the contract more closely.

Discussions of the QOF with PCT commissioners also explored concerns over the efficacy of some of the clinical domains and the need to try and plug “gaps” through LES agreements and / or “QOF plus” style arrangements. In both LES agreements and “QOF plus”, upper thresholds in particular domains are made more stringent. PCTs A, B and C were considering or implementing enhanced QOF thresholds, and all PCTs were using LES to contract GPs (as well as dentists and pharmacists where appropriate) to undertake public health interventions such as chlamydia screening, cervical screening, minor surgery and brief alcohol interventions.

Although many respondents considered LES to be a tool for filling the gaps in public health provision by general practice, some respondents spoke of their concerns about LES. These concerns were articulated in three ways.

First, some feared that LES were over-used and contributed to stagnant models of primary care delivery that militated against systemic restructuring by bolstering the independent contractor model:

“Well, I think we jump into LES too easily, and LES can be seen as a ‘oh yeah, that is another opportunity for me to make some money’ rather than seeing it in the holistic way in that ‘these are the clinical outcomes we need to deliver’... We jump into them in this PCT quite readily and it is a cop-out to me.

(PCT B, Director of Primary Care Commissioning)

Second, LES agreements were considered a “blunt instrument” that GPs can adopt or reject as they see fit. In PCT A, there were concerns that the LES being implemented did not sufficiently reflect the strategic public health goals of the PCT, were short-termist, and may well be increasing inequalities due to uneven take-up.
Third, LES agreements were viewed, along with the QOF, as entrenching financially driven models of general practice that will be difficult to retract in future as GPs become accustomed to receiving payments for “additional” as opposed to “core” activities. As one respondent argued, they encourage “a custom and practice with GPs screaming for more money” (PCT C, Joint Director of Public Health). Another noted: “They (GPs) don’t have to do anything. They can take the core medical services and deliver the core services and that is it. Anything that needs more work has to be paid for…” (PCT A, Director of Public Health). In PCT B, this was expressed in relation to an ongoing conflict with GPs about providing data about breastfeeding, where GPs receive an incentive to summarise notes on breastfeeding checks, but when the PCT asked GPs to send that data to them, local GPs – according to the PCT – refused, apparently because of the lack of financial reward on offer.

PCTs said they were also making increased use of Alternative Provider Medical Services (APMS) contracts, and thought these could be more useful opportunities to “build in flexibility” (PCT A, Director of Public Health) and more useful service specifications relevant to public health:

…it gives us more control and flexibility to do stuff, not just around health inequalities… but under APMS, there are clauses in there that require public engagement and so on.

(PCT C, Director of Performance and Governance)

In PCT C, one respondent argued for a combination of approaches to circumvent what he described as a legacy of primary care “never really being interested in public health”. This included enabling PBC clusters to identify improvement initiatives, implementing some LES “where you absolutely need to”, rigorously managing GMS and PMS contracts and stratifying practices into performance bands, and offering additional support staff to lower-performing practices (PCT C, Joint Director of Public Health).

The use of market pressure as a potentially useful tool for improving GP practice performance was mentioned in all PCTs. It was seen to exploit the competitive instincts of GPs. Other non-financial methods of incentivising GPs to undertake public health activity mentioned by respondents included engaging closely and appealing to professional pride, extra training for staff, appealing to a sense of community responsibility, having more integrated, better-resourced PBC consortia, having a convincing and credible case for public health interventions, and making use of public health data.
5.1.4 Data

The data generated by the QOF was a theme which most PCT respondents addressed. Achievement scores and reported prevalence data were viewed as having public health “potential” in that both data sets could be used to give a “little window” on population disease prevalence as well as primary care performance (PCT B, Director of Public Health). Most discussion of QOF data was hypothetical, illustrating that it was not being exploited fully, partly because of a perceived unreliability. However, it was considered as a possible tool for learning about gaps in provision and therefore prioritising public health interventions, improving the public health contribution of PBC, and performance managing general practice:

_I think QOF has some major limitations, not least is the validity and reliability of the data, but it’s all you’ve got. So, if you overlay QOF with local mortality profiles and admissions to hospital, I think, if those three together are telling you ‘this practice is not managing its patients to be healthy; it’s using an awful lot of referrals and a lot of people are dying prematurely and there’s a lot of excess deaths’, then I think you can actually turn round and say, ‘In public health terms, this is a poorly-performing practice; we need to prioritise intervention.’_  

(PCT C, Joint Director of Public Health)

However, this respondent admitted frustration that local PCTs were not using QOF data in this way, despite having received advice from the National Support Team for Health Inequalities. This was explained in terms of a lack of capacity within the PCT.

The other potential use of QOF data was to “band” practices according to QOF achievement. PCT B was particularly positive about this approach and stated that they were beginning to use QOF data to undertake GP contract reviews and stimulate competition between practices through the publication of achievement. The Head of Primary Care Contracting informed us that, at that time, practices in the lowest band, the “red light” practices, received additional funds to support improvements in services, and the top band of practices – “green light” – also received additional funds. However, she believed this to be a misguided system of reward and support, believing that “red light” practices should not receive any additional income:

_A practice… already receives an income to provide these services, why would you give them more money to improve? They have the money, this is not about increasing GP income, this is about_
patients... I haven’t got so much of a problem rewarding green light practices, but what does that say about those practices in the middle? That you poor perform and you get money!

(PCT B, Head of Primary Care Contracting)

For this respondent, there was little or no relationship between poor QOF performance and the resources available to the practice or the challenges faced by those practices in relation to the populations they serve. This contrasts with the claims of some GPs in our sample that they did not have the necessary funds or capacity to meet the demands of the QOF and the needs of deprived patient populations.

5.2 GP perspectives

In seeking to understand how the QOF impacted on the public health activities of general practice, we conducted a number of interviews with practice staff across our four PCT sites. We invited staff to explain how the QOF had changed their practice, and what kind of incentives it provided for preventive activities in general practice.

5.2.1 Understanding public health and health inequalities

In general, practice staff, including GPs, had a limited understanding of both “public health” and “health inequalities”.

With regard to public health, reflecting the critique of PCTs, there was little explicit recognition that general practice might be engaged in this kind of activity, or much sense of how it could be incentivised. When prompted, respondents would mention health promotion, immunisation and screening programmes as public health measures, and several practices stated that they were making use of exercise prescriptions. One practice had started an in-house exercise class in a newly refurbished part of their premises, and staff in another practice spoke of their desire to extend their premises in order to build a gym for patients unable or unwilling to use local municipal facilities. However, most respondents found it difficult to articulate what they contributed to public health and tended to conceive of their role as an educational one through which they could improve understanding of healthy behaviours and challenge “misconceived” health beliefs. This was a consistent finding across our sample, encompassing GPs, nurses and practice managers.

It became clear that public health activity as interpreted by these practices tended to be a restricted set of activities conducted by a small number of staff. Furthermore, when asked about the impact of the QOF on practice organisation and public health activity, no participants in this study suggested that the QOF had changed the working practices of the wider
primary care team (e.g. health visitors). The QOF was largely deemed to be a system for structuring the disease management of pre-existing GP patients. The data collection and analysis of QOF’s impact on general practice and public health in this study reflects how QOF is functioning as an organisational incentive: by structuring the activity and behaviour of GPs, practice managers and practice nurses/healthcare assistants according to process models of care.

The suggestion that there might be some parts of their population who received unequal treatment tended to be viewed as a problem of education and cultural difference:

> It is a struggle, and especially in this area in a city, as there is poor education, poor knowledge... We have stabilised them, nice control, everything. Off they go in winter for six months, they come back with multiple problems and they control it so poorly... They have no insight, in spite of giving them sound education, everything, but they are not prepared to listen...

(PCT B.3, high–high, GP partner)

Patient mobility and the lack of resources to respond to the demands of patients were also highlighted as challenges that made it more difficult for practices in deprived areas to deliver high-quality care:

> When the QOF domain was set up, I don’t think they have taken into consideration the difficulties of what the inner city doctors are facing... Here, the population is so mobile and the resources are not that much, so I personally feel the resources should have been set up first before the QOF targets came in.

(PCT B.3, high–high, GP partner)

Another GP was wary of the term “health inequalities”, as he considered it something of a stick with which to beat general practice. Moreover, he thought that addressing unequal health outcomes was outside a GP’s purview:

> If a patient of mine who is illiterate and uneducated gets a heart attack, the sort of care he would get would be the same as a social class 1 or 2 patient... Compliance and concordance is going to be different in this group than in that group. So, the end result is going to be unequal – not because I haven’t provided equal care, I have provided equal care – but the way they have taken it up is unequal. And I think that’s why we have more inequality.

(PCT C.2, high–high, GP partner)
This practice had high QOF achievement scores but the GP was sensitive about the possibility of some patients experiencing unequal care outcomes. He mentioned that the weighting of GMS contracts for those serving more deprived populations had been “watered down” relative to PMS contracts, and argued that some patients “deserved” better care than others in his population, a contrast with his earlier point about general practice having a benign influence on health inequalities:

> Standard care is okay, A, B, C is basic requirement. D, E, F is more than basic. Quite often, I'll say to my patients, 'everybody will get three-star service, that's my contract', but if you want more than that, then you have to show your commitment. I'm not going to waste my time, because the reason I say waste my time is, if I'm using my time on a patient who is not benefiting, that's a waste. But if some people can use their time better, then it's worth giving that, so you add stars. So I'm also guilty of providing unequal care.

(PCT C.2, high–high, GP partner)

### 5.2.2 Case finding

When we asked about case finding undiagnosed disease, some respondents doubted whether the QOF was an incentive:

> Obviously, the QOF is for patients who are actually seen, and found to have, for example, hypertension or COPD... We then use the targets and aim towards those or better than those, whereas obviously, there is always a problem that there are patients out there, probably a lot of patients who do need our care, who don't ever come in, and so for that reason alone, it certainly doesn't benefit all patients equally.

(PCT D.2, low–high, salaried GP)

This suggests a rather passive model of general practice, where practitioners do not view it as their responsibility to seek out new diagnoses. No respondents were explicit about that passivity, but it was implicit in some responses to questions about case finding and in a tendency to blame reticent or non-attending patients. The limited impact of QOF on case finding has been blamed on the “damping” effect of the prevalence square root, which effectively penalised practices for seeking undiagnosed illness; however, this was mentioned by only one GP.

There were also fears expressed that the QOF was encouraging the neglect of some patients not on QOF registers:
...I enjoy doing it (the QOF) but... it doesn’t always look at the patients in a whole... But it doesn’t tend to concentrate on other patients, which is a bit of a shame really...

(PCT D.1, high–high, administrator)

For the most part, practices were engaged in opportunistic case finding, screening patients with family members with particular conditions, or patients who looked overweight; but the exact causal relationship between the QOF and case finding was difficult to discern in most cases, as most practices that did extensive screening said they did it pre-QOF. This was evident in the better-organised and better-resourced practices, and was more common in practices with a relatively high QOF performance – for example, PCT A.3, where the GP partner thought that the QOF has given a “seal of approval” to their preventive approach rather than incentivise them to engage in new forms of practice.

One effect the QOF did appear to have in practices such as B.3 and D.2 was that because practices had implemented well-organised systems of disease management in response to the QOF, it provided some confidence that the practice could manage more patients with particular diseases and therefore encouraged them to set up screening clinics to assess at-risk patients. As shown by the vignettes in Appendix 1, these were also practices with a large and well-rounded workforce and established GP partners. There was no evidence of increased primary prevention activity, but there was some evidence from well-organised practices that the QOF encouraged more awareness of risk factors and facilitated more screening activity.

One area where the QOF did have a case finding effect was regarding co-morbidities, where respondents argued that they were incentivised to uncover, for example, CHD or hypertensive patients suffering with depression or chronic kidney disease.

Another reason why the QOF does not incentivise practices to manage all patients equally effectively is because of the thresholds and targets. Practices complained about the inflexibility of the targets:

...So, I think we need to be more realistic about our targets you know. To reduce somebody’s HbA1C from 8 if they have been going on for ten years at 8, to get them to 7.5 or even 7 is fantastic. You don’t necessarily have to hit... 6.5, and have him screaming and shouting and not understanding the value of doing that.

(PCT A.1, low–low, GP partner)
A similar point was made by respondents from other practices, who perceived some QOF thresholds as too stringent when dealing with deprived populations:

...some of the QOF targets are a bit unrealistic I think, like with our diabetics, we’re never going to get everyone down to below 7.5 or 7 just because of compliance issues and lifestyle issues and things like that... I mean, the new QOF target, I think, is 7, you can’t go down to that because it’s just not practical. So you’re working with real people, you’re not working with figures.

(PCT A.2, GP registrar)

While prevalence estimates and reported prevalence in our quantitative data did not systematically differ by deprivation, smaller “gaps” were associated with higher levels of achievement. This suggests that better-organised practices were more systematic in their approach to case finding (see vignettes in Appendix 1 for further detail). The qualitative findings support this to some extent.

5.2.3 Preventative activities

A key concern of our research was to explore whether the QOF had an impact on the public health activities of practices. Given the lack of awareness of public health as part of general practice, outlined above, it was unsurprising that many respondents found it challenging to discuss the impact of the QOF on public health activity.

There was weak evidence from the qualitative findings that the QOF encouraged practices to adopt a primary preventive approach to their populations. The QOF itself has little primary prevention activity –smoking cessation apart – incentivised within it. As noted in the previous section, there was limited evidence of at-risk screening being undertaken by practices, sometimes in response to the QOF. There was also some limited evidence of health promotion advice being given and exercise prescriptions being utilised for overweight patients. The primary prevention activity mentioned by respondents mostly referred to the LES they had signed up to deliver. Most practices appeared to have volunteered for most of the LES on offer by PCTs which improved their public health provision. Examples included alcohol intervention, vascular risk assessments, chlamydia screening, spirometry, screening of older people, phlebotomy and child health.

However, some respondents spoke of what they considered as insufficient financial rewards for doing this work, and their voluntary nature meant that practices were free to reject the LES if they felt it would not generate
income, or would not benefit patients. This raised concerns over the provision afforded by LES in one practice:

*The only one I didn’t send up for was the smoking LES, because that was not achievable for this practice... So they’re not going to give up smoking in that sort of way, you’ve got to do it a different way... put them [smokers] on a register and then have half an hour counselling sessions with them every so often. We’re finding that doesn’t work here, because our patients don’t keep their appointments.*

(PCT A.2, poor–poor, partner and practice manager)

As noted by the DPH at PCT B, over-reliance on or poorly designed LES might exacerbate health inequalities if it means that public health interventions are implemented unevenly. Of course, deprived practices might avoid LES for similar reasons to why they find QOF targets challenging – a demanding patient population. However, there was no evidence that this practice was offering non-incentivised counselling sessions for smokers, or ascertaining why patients did not want to attend such sessions, therefore conveying the impression that this was a decision driven by a profit motive rather than concerns about how to adequately address the needs of smokers. It is perhaps no coincidence that this respondent was a “business development manager” who was explicit about his attraction to general practice as a commercial venture in light of the 2004 GMS contract re-negotiation, which made general practice “very profitable”.

The most notable finding to emerge from interviews regarding the impact of the QOF on clinical provision was that almost all respondents interpreted it as enabling more rigorous, structured monitoring of chronic disease:

*We have to recall x number of patients to maintain our targets, but I think we have always done that... It just seems to be more obvious what we are doing, it comes under the QOF umbrella... It is just making sure you are getting everything in... Like I say, it is more structure to getting everything in when you see a patient for their respiratory problem, looking at their inhaler technique and making sure that you actually watch. You should do it anyway, but it is just making sure... and going through and making sure everything is done, and putting recalls on for the next check.*

(PCT D.3, high–high, nurse manager)

Even those practitioners who argued that they were already doing much of the disease management tasks conceded that the QOF had led to more consistent recall of patients and more intensive scrutiny of conditions and prescribing.
...the one thing that QOF has done, which I think has been very useful, is that it forced us really to do the measurable, tick box things that really do need to be done for people with chronic illnesses, which in the past we were... perhaps it wasn’t very high on our agenda or we were just not that interested in... But now we do that very boring stuff, making sure that all the people with ischaemic heart disease really have got their aspirin and they really are taking it.

(PCT B.2, GP partner)

5.2.4 Biomedical approach to care

Another important theme to emerge from the research was the effect of the QOF’s biomedical focus. A patient–practitioner relationship governed by a technical–rational model of care was seen to have a particularly negative effect on patients with complex co-morbidities or wider health or social needs:

The day that the consultation is no longer the key to general practice is the day I resign, because it’s not worth doing anything... Because essentially it is a dehumanising process, one is no longer a person, one is somebody to be smeared, blood tested, poked, foot checked, eye checked and all the rest of it, and anybody can do that.

(PCT B.2, low–high, GP partner)

This GP was expressing concern that the QOF was disrupting a model of general practice founded on a relationship with patients underpinned by trust and respect. For him, this “dehumanising process” could have a disproportionate effect on hard-to-reach patients, some of whom will already have strained relationships with medical professionals:

...for a lot of our patients, it drives them away... Hence it’s very hard to get proper smear rates, anything below 80 per cent really in Britain in the 21st century is dreadful. But people are disempowered, and they’re more disempowered if they are treated as a tick box, because that’s how they’re always treated. I suppose the middle-class will be happy to do that because they have enough sense of self to also interact with people, but a lot of our patients don’t, and they get marginalised, and their real health concerns then don’t get dealt with.

(PCT B.2, low–high, GP partner)
It was possible to detect some slight unease at the way the QOF was viewed to be reducing general practice to codified management processes:

*It doesn’t necessarily mean it has been a good consultation, and you can’t measure whether you have listened to the patient’s concerns or treated their symptoms or answered their worries, because all you can measure is what their blood pressure is or what their cholesterol is. QOF only measures measurable things.*

(PCT D.2, low–high, GP partner)

A related point was referred to by some respondents, who recognised that there was sometimes a conflict between the demands of the QOF and patient needs. This was a difficult negotiation for some:

*...we are sometimes chasing the QOF agenda rather than the patient’s agenda. So the patient may say ‘I don’t care what my blood pressure is, I came here to talk to you about the pain in my big toe’ or whatever.*

(PCT D.2, low–high, GP partner)

Another important issue here was that some practices serving deprived populations felt that the QOF did not provide them with appropriate incentives to meet the needs of their patients:

*I don’t know what the proportion is, but I would guess two-thirds of our consultations are to do with stuff that’s got absolutely nothing to do with those illnesses which are thought worthy of being included in a QOF process. No amount of protocols will deal with those people.*

(PCT B.2, low–high, GP partner)

The pressures applied to general practice from wider determinants of health were described by this respondent:

*Yeah, you know one of the things that fell out of the work we were doing here, was not just your bog standard blood pressure, what medical condition have you got, but, you know, actually helping people with their housing, benefits, things like that. That all takes time during the consultation. There was a failure to recognise that you need doctor time, you need more nurse time, because many of the refugees and asylum seekers whoever who are coming over here, you know, for the first time they are having structured medical care and post-traumatic stress, you know, people with all sorts of disabilities, injuries and, of course, medical conditions that*
haven’t been picked up because they have been in transit, or the facilities just haven’t been there.

(PCT A.1, GP partner)

One practice felt that they needed more support from the public health department in the PCT to take a population perspective. One GP partner felt strongly that the QOF – while having benefits – was not a satisfactory incentive and did not fully recognise the needs of his patients. He called for a different approach:

The incentives would be to have a local public health department that actually actively works with us to say ‘These are the areas we need to focus on... These are the ways we can help you, so that you have some meaningful result at the end of it which allows us and you to evaluate what we have done or what we have achieved together as a department’. I mean, public health to me, ideally, ought to be within practice... It ought to be looking at the structure and content of a practice, and say: ‘Actually let’s help you shape the way you run things here to the people you are actually serving...’ I think the incentive for me would be to have a well-informed organisation out there that helps me to improve the care that I deliver.

(PCT A.1, low–low, GP partner)

These points reflect what some of the PCT respondents argued when they asserted a need to restructure and expand primary and community care services as well as make better use of public health data to support practices in addressing health inequalities.

5.2.5 Exception reporting

Across our sample of practices, exception reporting levels were consistent, apart from three outlying practices. The vignettes in Appendix 1 show that practice A.1 was below local and national average, while practices A.3 and C.2 were more than double the local and national average. Explaining these trends is complex. Practice A.1, as noted, had a commitment to catering for a difficult population, so not exception reporting many patients might be related to a practice ethos. However, it might also be related to poor management and a lack of QOF training across practice staff. As we can see from vignette A, this practice had a part-time manager and, according to staff, was not “up to speed” as an organisation on the QOF until recently. Practice A.3 had a QOF data manager who might have been adept at monitoring data and readily exception reporting, although other practices that employed similar posts did not report as highly. Practice C.2, as noted earlier, was a single-handed practice where the GP partner was explicit
about providing unequal care, despite having a settled, community practice population. However, he may also have been using exception coding to exclude non-attending university students, of which he had a relatively high number registered. Again, however, another university practice (B.3) had average levels of exceptions, so that effect might not be relevant.

From vignette C, we can see that this practice, C.2, had a relatively high level of exception reporting (double the PCT average), which might suggest that the practice used exception reporting to exclude those he considered a “waste” of his time and resources in order to achieve its high QOF scores. However, this needs to be balanced with other data from the interview, in which the GP expressed concern about the gap between recorded and estimated prevalence in his population. It is possible that this GP sought out undiagnosed disease in his population, but acted as a gatekeeper to “more than basic” treatment.

The evidence from this practice can be contrasted with that of two practices in other PCTs which had staff who spoke explicitly about addressing health inequalities. For example, in PCT B, two GPs had secured funding to set up their practice in a social housing estate within a New Deal for Communities regeneration area, and built up a list of local residents. This practice had an “improving” QOF score and average levels of exception reporting. In PCT A, a low QOF-performing practice with a PMS contract to cater for asylum seekers and refugees, homeless people and patients “struck off” other practice lists had low levels of exception reporting and a GP partner committed to treating problematic patients:

> You know what are the things that really matter to these people? I will tell you something, there are patients here who don’t really care if they have got hypertension because their immediate priority is have they got enough money to pay for bills? Are they secure in the knowledge that their kids are going to get into the local school? Have they got a job that they are going to be able to hang onto? Have they got enough money to provide heating for some of them, you know, over the winter period? For some of them, have they actually got a home? We have a large number of homeless people who are registered here.

(PCT A.1, low–low, GP partner)

It is possible that both of these practices who did express commitment to addressing health inequalities did so in spite of the QOF, and in the latter case, suffered financially as a consequence of catering for complex patients and not exception reporting them.

GPs with difficult patient populations do not systematically use exception reporting to improve QOF achievement. Indeed, our quantitative analysis
shows that there are no systematic differences in exception reporting by deprivation. The lack of data about which patients are excluded means it is not possible to establish whether difficult patients from more deprived backgrounds are more likely to be excluded, even in practices with low or average levels of exception reporting.

5.2.6 Organisational changes

The development and maintenance of disease registers and the more intensive management of chronic disease was underpinned by a shift in the organisation of practices to manage the increasing workload. The vignettes show that none of our sample of practices appeared to have undergone radical structural change in response to the QOF being introduced, but some had recruited additional clinical and/or administrative staff in order to manage their growing QOF workload, which entailed more measurement of disease indicators, more screening of at-risk patients, and increased recording of QOF data. Two practices had employed an additional GP, but most of the extra employment was of nursing staff and healthcare support workers, for example:

> I mean, certainly, it's... a lot of our clinics are nurse-led, we have actually increased the establishment of our nursing times, so that they can actually take on more staff... We also have a specific nurse-led clinic, so we have them for CHD, diabetes, asthma, linked diabetic and CHD clinics, and we're currently working on getting a COPD clinic up and running as well.

(PCT D.2, low–high, practice manager)

This reflected a broader trend in our practices, where routine disease management and screening work seemed to be increasingly shifted from GPs to nursing and support staff:

> With regard to things like nurses taking over more of the care, I don't think I'm too worried about that... I think having GPs checking blood pressure is, in a sense, a bit of a waste of our time... It gives us GPs a chance to do other things rather than just that type of stuff, so it's okay to some degree.

(PCT D.2, low–high, salaried GP)

The extent to which the QOF had stimulated that shift was unclear in most practices, some of which seemed to have been redistributing activity in this way pre-QOF. It seemed more likely that the QOF had accelerated, cemented and perhaps structured this trend in light of the need for patients to be screened then placed on disease registers for monitoring:
What do the doctors do!? The doctors send them out to me to get all these things done! That’s what the doctors do. So my work really has quadrupled, really… But all of the baseline screening we do this side… And then they go back to the doctor to be assessed, and then they’re generally coded with ischaemic heart disease or whatever it is, and then we have to follow on from there, put them onto our clinics, onto our registers, and then we obviously need a recall system where we call them back in and book them in and keep monitoring them.

(PCT C.1, high–high, practice nurse)

It is unclear whether this redistributing of workload was attributable to a deliberate policy of GPs to use the QOF as an opportunity to divest themselves of routine general practice tasks, or perhaps a response to the demands of the QOF, either in terms of deploying nursing capacity as part of an assertive maximising of their scoring, or simply to manage the increased clinical and administrative workload. It was common for respondents to explain systems and procedures that had been devised for managing the clinical and administrative demands of the QOF, either based around QOF “teams”, usually consisting of a GP, nurse and administrator, with each “team” responsible for allocated QOF domains:

...we have a team for each of the clinical domains that consists of lead clinician, myself and one member of admin staff, so obviously the clinician’s, the admin staff’s role is to get the patients to make clinicians’ life a lot easier and they can see and do the necessary things.

(PCT B.3, high–high, QOF lead)

However, more commonly, the monitoring of QOF scoring tended to be led by one or two individuals within the practice. This was usually a GP partner, practice manager or, in some cases, a designated QOF lead who would work across each team, either providing IT and record management support for “teams”, or who was a central figure responsible for the monitoring and upkeep of disease registers, reminding clinicians of QOF alerts and the organisation of clinical QOF tasks.

There was some evidence that those practices that had poor facilities and found it more difficult to recruit and retain staff also found it more difficult to achieve on QOF. A poor QOF performer (practice B.1, see Appendix 1) with inadequate premises and what the GP partner described as an inability to retain good quality staff, given the highly deprived and demanding nature of the practice population, bemoaned the ability of practices in wealthier, neighbouring PCTs to attract good-quality salaried GPs and

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nurses. This supports the view, suggested by our quantitative findings, that practice characteristics are as, if not more, important in explaining QOF achievement as population characteristics. The fact that smaller, resource-poor practices are more concentrated in deprived areas may account for the differences in achievement. Where investments in general practice have been made in deprived practices to reduce under-doctoring and improve facilities, these are likely to reduce inequalities in care and potentially health.

5.3 Summary

In seeking to examine the influence and role of the QOF in reducing health inequalities, this chapter has examined interview data from staff working in PCTs and general practice. The key findings from analysis of interviews with PCT staff are as follows.

- Organisational limitations of PCTs were impacting on their ability to commission effectively for public health and address health inequalities.
- General practice was often viewed as a barrier to public health delivery because of practitioner intransigence or because of the pressures on resources generated by working with deprived populations.
- The QOF was viewed as delivering some improvements in general practice and being an effective incentive, but lacking an emphasis on prevention and open to gaming by some GPs.
- The limitations of the GMS contract were widely recognised; PCTs were using LES and other financial incentives to “plug the gap”.
- PCTs recognised the potential value of QOF data to support public health and to performance manage under-performing practices, but it was not being fully exploited.
- PCTs believed the GMS contract was discouraging GPs from taking a population health perspective and entrenched a view that everything beyond the “core” of general practice has to be financially rewarded.

The key findings from analysis of interviews with practice staff are as follows.

- Few GPs saw that they had a role in public health or reducing health inequalities, except in practices which had specifically been set up (usually under PMS) to address particular needs.
• There was little evidence of practices uncovering more undiagnosed disease because of the QOF. Passive, opportunistic case finding continues to be the dominant model within general practice.

• Practices have responded to the incentives on offer from the QOF by reorganising and systematising their approach to the management of chronic disease.

• The QOF has not encouraged significant primary prevention in general practice.

• There is some evidence that the challenges of serving populations with complex health and social needs are not adequately addressed by the QOF.

• Most believed exception reporting to be an important protection against non-attending patients.

• Effective practice organisation is not the only determinant of high QOF achievement, but well-resourced practices – many of which had these systems in place pre-QOF – appeared to have performed better on QOF.

• QOF has led to organisational changes, including greater use of nurses and the appointment of QOF leads.

One important issue that arose was whether poor-performing practices should be given additional funds to support practice improvements. This implies that poor performance is a consequence of failing to adequately invest in staff and facilities, as opposed to having more challenging populations which drive down their QOF achievement. There was a case made by some practices for a different method of supporting public health activity that is not target-driven, but provides facilitative funds to support practices to provide adequate services for patients and engage in activities beyond the QOF that would benefit their populations.

From our sample, it was clear that those practices which had invested in staff and premises achieved higher QOF scores. However, not all practices that expressed concerns about capacity had poor QOF achievement. This means some practices overcame organisational shortcomings to achieve good QOF scores, without being reliant on high levels of exception reporting. The lack of resources and the inability to retain staff appeared to be a genuine concern in terms of delivering a higher standard of care, and part of the explanation for performing relatively poorly on the QOF. In this instance, additional funds to employ and retain staff over a period of time might well have a stabilising effect on the practice and improve overall standards of care.
It is difficult to argue on the basis of our findings that the QOF is having an impact on the reduction of health inequalities when looked at as a whole. Less well-organised and poorly resourced practices struggle to balance their QOF obligations with competing pressures. Deprived practices have to provide care to challenging populations that are often transient, have other complex social needs, and face language barriers. Practices often suffer from poor facilities, under-staffing, and uneven practice leadership. These factors appear to make it more difficult (and sometimes less relevant) to focus on achievement of QOF.

While it is possible to argue that the more rigorous monitoring of disease registers and systematic recall of patients, which QOF has incentivised, may have a positive benefit for patients, evidence suggests that “compliant” patients benefit more. While exception reporting was not used to game, there was evidence that more difficult patients were excluded. There was also some evidence that higher thresholds or more challenging targets (revised in recent years) were not seen to be realistic for these practices to achieve, and therefore they would not attempt to. Theoretically, rewards for secondary prevention could encourage practices to case find if they feel more confident in their ability to manage larger numbers of patients with chronic disease; however, there was little evidence of this in our data. There is a danger that the QOF embeds the measurement and management of conditions, which is not necessarily appropriate to the needs of more deprived populations and may, for some individuals, be counterproductive.
6 Discussion and recommendations

6.1 Background

This research was originally conceived and designed in 2007; a time when the government was putting significant pressure on the NHS, and in particular PCTs, to deliver on the national targets set to reduce health inequalities by 2010. Despite significant improvements in the life expectancy of the most socially and economically deprived, the gap between the poorest and the richest has actually widened and the targets will not be met by the end of 2010. There was a clear belief (and some evidence) that primary care and, in particular, secondary prevention activities in general practice could make a significant contribution to the achievement of these targets. Our research aimed to examine whether the GMS contract, and in particular, the QOF, was contributing to improvements in public health and reductions in health inequalities. The focus of our research was on health inequalities as determined by income deprivation, but as has been shown here, we were aware of other drivers of inequality which structured and shaped inequalities in particular ways. For example, in PCTs A and B, there were some specific issues around transient populations and cultural barriers which mediated how practices managed and addressed patient needs.

As stated in Chapter 1, we set out to use routine data to assess the extent to which this pay-for-performance scheme encouraged activities which, according to the evidence, contribute to improved population health, and whether this was more evident in practices serving deprived populations. We also sought, through interviews with PCTs and practices, to understand in more detail how different practices serving deprived populations had responded to QOF and the impact they felt that the QOF had on their activities locally, in particular those which contributed to population health and reduced inequalities.

From our review of the literature presented in Chapter 2, we established that:

- GPs have an important public health role and contribute to improving population health.
- Pay-for-performance schemes are effective in changing physician behaviour, but may lead to some gaming.
• Pay-for-performance schemes can result in a focus on areas of activities within the scheme, sometimes at the expense of other activities.

During our research, we have concluded that a number of assumptions need to hold if general practice, and specifically QOF, is to have a beneficial impact on reducing health inequalities:

• QOF indicators must provide incentives for GPs and practices to undertake activities that have a more systematic impact on people’s health.

• These activities must be more prevalent and/or increase faster in practices that serve deprived populations or (for the purposes of the target) practices in Spearhead areas.

• These activities must have a demonstrable impact on population health.

• Practices must be equally able to respond to the incentives and not face differential barriers in their ability to monitor and report activities (e.g. practices with less investment in facilities, IT or practice staff).

• These activities (which are targeted with incentives) must not crowd out other activities which are more beneficial to population health; in particular, this must not occur more frequently in practices which serve deprived populations or practices in Spearhead areas.

• Practices must have incentives to case find, particularly in areas of known high prevalence, and to minimise the number of exceptional cases reported.

In this final section, we examine these key assumptions and summarise what we found in our research.

6.2 Summary and discussion of findings

6.2.1 Incentives for prevention and public health activities

While the QOF has incentivised practices to have a more organised approach to chronic disease management, and provides a strong incentive to engage in secondary prevention, it has provided limited incentives for primary prevention or public health activities. None of the practices we interviewed saw the QOF as an opportunity to engage more actively in public health activities or to focus on health inequalities. Where practices were engaged with health inequalities and public health, other factors –
such as GP leadership, values and political commitment, and a concomitant sense of responsibility for the health of their patients and practice population – seemed important. If preventive activities were in place at all, they usually pre-dated the QOF.

The PCTs we interviewed often regarded general practice as a barrier to the delivery of public health objectives. They pointed to the limitations of the GMS contract, practitioner intransigence and the pressures on resources arising because of the needs of deprived populations. In particular, they felt that the contract entrenches a model whereby general practice is financially motivated and focused on activity rather than on population health. The data generated by the QOF about the performance of practices has the potential to be used to support public health objectives (as promoted by the National Support Team) and to manage under-performing practices, but our findings suggest that this opportunity is not being fully exploited by PCTs.

6.2.2 Differences in performance by deprivation

Over the first three years (2004/05 to 2006/07), there was an upward trend in mean reported QOF achievement on similar clinical indicators across practices in England. The level of achievement then stabilised and remained unchanged from 2006/07 to 2007/08.

We found that practices in non-Spearhead areas slightly out-performed practices in Spearhead areas on the set of clinical indicators in the first two years of QOF, but that practices in Spearhead areas improved more. Similarly, we found that the most deprived practices achieved less but improved more on QOF indicators than the least deprived practices. Consequently, the differences in average performance on clinical indicators within the QOF narrowed between Spearhead and non-Spearhead areas and between the least and most deprived practices. These differences virtually disappeared by years 3 and 4. In 2006/07 and 2007/08, there were no significant differences in QOF achievement by deprivation or Spearhead status. However, this analysis masks large variations in performance at individual practice level and between clinical domains/indicators.

Analysis of deprivation within and between Spearhead and non-Spearhead PCTs means we have identified more specifically the way in which deprivation and area-based inequalities interact. Observed differences in mean reported achievement between Spearhead and non-Spearhead PCTs appear to be mainly driven by differences in performance between the least deprived practices. The least deprived practices in Spearhead PCTs performed significantly worse than similar practices in non-Spearhead PCTs. We observed no difference in performance among the most deprived
practices between those in Spearhead and non-Spearhead areas. Given that close to a third of practices in non-Spearhead areas are deprived practices, it points to limitations of area-based initiatives to tackle inequalities. Using "population achievement" as an outcome (i.e. including exception reported cases in denominator) instead of reported QOF achievement did not have a substantial impact on observed associations with deprivation.

6.2.3 Impact on population health

Despite these improvements in performance on QOF, if general practice is to have an impact on population health, there needs to be a demonstrable link between QOF performance and other measures of population outcomes. Given the QOF’s focus on chronic illnesses, we looked at the relationship between practice performance in specific clinical domains (again, only using clinically relevant indicators) and the (standardised) rates of ambulatory care sensitive hospital admissions.

In line with previous studies, we found that while higher levels of achievement on clinical indicators are associated with lower hospital admissions rates, the strength and significance of associations varied by clinical condition (Bottle et al 2008; Downing et al 2007). This is perhaps not surprising given the lack of variation within QOF achievement and the small number of admissions per practice within any given year.

We found significant negative relationships for CHD, hypertension, CHF, diabetes and COPD. We found no relationship for asthma and stroke. The lack of relationship for these conditions can be explained by the selection of indicators for inclusion in the QOF. Indicators relating to stroke care focus on better management following an admission and are therefore not likely to prevent admission. For asthma, where management in primary care is likely to prevent acute emergency admissions, it might have been surprising that no relationship was found. However, in the early years of the QOF, asthma indicators related to smoking cessation and flu immunisation; there were no direct clinically relevant asthma management indicators.

We looked at how these relationships varied by area and practice deprivation by pooling data across practices by deprivation and Spearhead status. However, in multiple regression models, we found that deprivation and Spearhead status are more strongly associated with ACS admissions than QOF achievement. It is these wider social determinants of health that appear to explain why some areas have higher levels of ACS admissions, rather than differences in the performance of general practice on QOF.

Our qualitative data suggest that the QOF has provided incentives for the more systematic management of people with chronic conditions, with better
and more routine monitoring. This may explain the relationship observed. However, the significant socio-economic gradient in ACS admissions for all conditions we examined suggests that the QOF has not provided sufficient incentives for deprived practices to identify and successfully manage these patients to prevent admission. Factors such as setting targets below 100 percent, and the ability to exception report (i.e. allow patients to be excluded from the performance figures) mean that practices can achieve points (and the associated financial reward) while still failing to adequately manage a minority of patients effectively. It is therefore possible that patients who were already well controlled are benefiting from more systematic monitoring, whereas harder-to-reach patients are either not identified, or are exception reported for having not attended. The lack of data on reasons for exception reporting means we were not able to explore this further.

6.2.4 Practice characteristics

We also wanted to understand whether practices in more deprived areas or serving more deprived populations faced any barriers to monitoring and reporting activities in order to achieve high levels of performance on the QOF. Unfortunately, we were limited in our quantitative analysis to those practice variables that are routinely available: GP caseload, number of GPs per practice, contract status, and proportion of GPs who received their GP education in the UK. We were not able to access routine data on factors such as facilities, IT or the range and mix of practice staff. However, through the qualitative interviews, we were able to gather more in-depth information about some of these issues relating to practice organisation (described in the short vignettes in Appendix 1). Our qualitative interviews also suggest that other factors such as strong leadership, professional drive, and effective team working are important determinants of high-quality general practice.

In the multivariate analysis, we found that having a higher proportion of GPs who had their GP education in the UK, not being a PMS practice, and having a smaller caseload of patients per GP were significantly associated with higher QOF achievement. Improvements in achievement between years 1 and 2 were greater in practices with a lower proportion of GPs educated in the UK and being a PMS practice. However, larger practices were associated with lower levels of improvement.

After adjusting for practice characteristics, Spearhead status was not strongly associated with achievement or improvement, and deprivation only significantly associated with achievement but not change over time. While taken together these factors were only able to predict a small proportion of the variation in practice performance, when we included the previous year’s performance on QOF, the predictive power of the model increased
significantly. This suggests that other unobserved factors relating to practice or population characteristics explain most of the variation in achievement.

Looking across the qualitative and quantitative findings, it is possible to observe a relationship between well-resourced practices and high QOF achievement; in some cases, these systems and processes were in place before QOF was introduced. It appears that the QOF rewards better practice organisation. In particular, there was evidence that practices that had employed QOF managers performed better, whereas poor performers tended to be disorganised, have high staff turnover and lack effective leadership. We found that in deprived practices which were not well organised and lacked resources, the QOF has provided an incentive to adopt a more systematised approach. However, practices serving deprived populations have had to balance the desire to perform well on the QOF with other pressures such as lack of facilities and staff, uneven practice leadership, and more transitory populations with complex needs.

From our sample, it was clear that those practices which had invested in staff and premises achieved higher QOF scores; however, not all practices that expressed concerns about capacity had poor QOF achievement. Some practices overcame organisational shortcomings to achieve good QOF scores, without being reliant on high levels of exception reporting. Others found their circumstances more challenging – poor performance was in part seen to be a consequence of inadequate premises and an inability to retain good-quality staff, given the highly deprived and demanding nature of the practice population.

6.2.5 Crowding out

If GPs were giving priority to activities incentivised in the QOF, they felt this was a legitimate response to the incentives they faced. To some extent, the QOF has reinforced the traditional approach in general practice, which has not focused on prevention but is geared towards treating the patient in front of you. Even if GPs are predisposed to preventive approaches, the QOF appears to entrench a medicalised approach. This is surprising given that one of the key benefits in its early stages was the creation of disease registers which have the potential to enable GPs to have a more systematic profile of their practice population’s needs and to develop population responses to these. This is exacerbated by other difficulties such as organisational deficiencies, the complex needs of the population and a lack of interest or awareness of what prevention entails.

Furthermore, deprived practices appear to have needs which are not always adequately addressed through the QOF incentive. GPs were aware of the conflicting pressures to get points under the QOF and to meet the genuine
needs of patients. There appeared to be a genuine tension between achievement on QOF and a desire, on the part of some GPs, to provide care more appropriate to the complex needs of the population they serve and their interest in the social determinants of health.

Practice staff we spoke to expressed concern about the “tick box” approach that the QOF promoted and the impact this had on consultations. The QOF has, to some extent, promoted a mechanistic approach to managing chronic disease. While the biomedical focus of the QOF might be appropriate for some patients, some GPs we interviewed raised concerns that some patients feel threatened by closer monitoring and may need a more holistic and sensitive consultation style than that promoted by the QOF.

6.2.6 Exception reporting

Exception reporting has been justified as part of pay-for-performance schemes when goals are set at or near 100 percent of patients, in order to safeguard against inappropriate treatment, to mitigate the risk that practices shun “difficult patients” and to acknowledge doctors’ professional judgement in clinical matters. However, there is also a danger that exception reporting can be used to game the scheme, and may result in difficult patients simply being excluded. If gaming through the use of exception reporting was higher in more deprived areas and practices, this would have a negative impact on reducing health inequalities.

The range of variation in the levels of exception reporting on the clinical indicators we examined has narrowed steadily over the three years for which data are available. However, the mean rate increased in the second year and although it decreased again in 2007/08, it remained above the levels in the first year of the QOF.

However, the average levels of exception reporting disguise significant variation at individual practice level, between conditions and individual indicators. Other studies have found that exception reporting is higher in more complex conditions, is lowest for offering treatment and highest for providing treatment, and while exceptions are low for reviewing people with chronic disease, they are higher for achieving outcomes (Doran et al 2008b).

While other studies have found mixed evidence of gaming (Gravelle et al 2008; Doran et al 2008b), our findings suggest that the majority of practices are not using exception reporting as a means of achieving high performance on QOF. We found no significant association between exception reporting and deprivation (IMD 2004 income quintile) or between exception reporting and Spearhead status of PCTs.
While the QOF might provide deprived practices who want to exclude patients from disease registers with the opportunity to do so, no one we spoke to admitted using exception reporting in this way. Most saw exception reporting as an important “protection” against non-attending patients. Looking at our case studies, it was difficult to see a systematic explanation for why certain practices had levels of exception reporting either much higher or lower than the local or national average. Factors that appeared to be important included the ethos and attitude of the practice, the organisation of the practice, competence of the manager responsible for the QOF, and the nature of the practice population (e.g. university students).

PCT staff we spoke to recognised that the QOF was open to gaming, and some were concerned that it was therefore insufficient to deliver the improvements in quality that patients needed. Of course, low levels of gaming are not mutually exclusive with improving quality. Our findings suggest that the use of exception reporting is not, on average, more of a problem in deprived practices or areas.

6.2.7 Case finding

While the QOF did not explicitly aim to reduce health inequalities, one could assume that given levels of unmet need in areas of deprivation, improved case finding would contribute to reduced health inequalities. We sought to examine this issue by examining the gap between reported and estimated prevalence and whether this varied by area and practice deprivation. We also examined whether differential performance in the QOF could in part be explained by different levels of unmet need (as measured by the gap between reported and estimated prevalence).

There was significant variation among practices in the size of the gap between reported and estimated prevalence. At least some of this variation may be due to the accuracy of the estimation methodology employed by the Association of Public Health Observatories (APHO). However, differences were greatest for hypertension and smallest for stroke. Given that hypertension is asymptomatic and patients may self-treat, this is not surprising. As previously noted, management of stroke in primary care usually follows an acute episode; there is, therefore, unlikely to be a problem of unrecorded disease. Identification of patients at risk of stroke is likely to be more variable. The gap between estimated and reported prevalence increased with deprivation and was greater in practices in Spearhead areas for CHD, COPD and stroke. However, the relationship was reversed for hypertension. This suggests that for a number of conditions, despite incentives within the QOF to keep a register of these patients,
deprived practices and areas are failing to identify all cases of disease within their practice populations.

Until changes introduced in 2009/10, payment per point scored on the clinical indicators within QOF was not linear but calculated using the square root of prevalence, limiting the incentives for case finding. Practices with very low prevalence (less than 5 percent of the maximum) were treated as if they had higher prevalence, thus rewarding them more generously. This meant that practices with higher disease prevalence, particularly smaller practices, received a lower level of remuneration per patient than practices with low prevalence. As well as penalising practices in deprived areas which are more likely to be small and have high disease prevalence, this system was also seen to reduce the incentives to case find (Whitehead et al 2010).

We observed weak negative associations between difference in QOF-recorded and APHO model-estimated prevalence of selected clinical conditions and QOF achievement in multiple regression models. In other words, practices that performed better on QOF also had more complete recording of disease prevalence after adjusting for other factors. This suggests that practices are not gaming by failing to register patients. A more likely explanation is that well-organised practices that are able to achieve better QOF scores may also be more systematic in their approach to case finding.

Our qualitative research found that most practices have a passive and opportunistic approach to case finding. Even though practices had responded to the incentives by systematising their approach to the management of chronic disease, there was little evidence that these practices had uncovered more undiagnosed disease as a result of the QOF. This is not surprising given that practices in deprived areas faced a disincentive to actively case find: they received less remuneration per patient than practices in affluent areas with lower prevalence (Whitehead et al 2010). Since 2009, QOF payments are fully adjusted to reflect relative disease prevalence (DH 2009c).

### 6.3 Limitations

There are a number of documented limitations associated with the use of the QOF data set as a measure of practice performance: the data are linked directly to financial incentives; they only cover a limited number of conditions; few of the indicators relate to outcomes; and data are at practice rather than patient level.

There are a number of further limitations. First, differences in achievement are small and the distribution of performance is extremely concentrated at the upper end of the range. Most observed differences are very small but
may be statistically significant due to a large sample size (number of practices). Second, the ability to exclude patients from the denominator (through exception reporting) means that data coverage is not 100 percent. However, published research and our own analyses suggest that exception reporting beyond expected limits is relatively small.

In this study, the attribution of income deprivation to each practice is not simply based on its location but reflects the profile of the practice population. However, deprivation scores are still derived from data on small geographical areas (super output areas) and therefore may be vulnerable to misattribution – that is, not truly reflect the actual practice population. To minimise the effects of misattribution of income deprivation, we analysed the most and least deprived practices separately.

For the analysis, we used the mean achievement across a subset of clinical indicators. There is significant variation in performance on individual clinical indicators, which may have been lost by looking at a composite measure of performance.

There is also a possibility of “regression to the mean” (RTM) statistical phenomenon. Such possibility is higher when follow-up measurements are only examined on a sub-sample selected using a baseline value (Barnett et al 2005). In our study, there were no differences in measurement instruments, and follow-up measurements were examined using the whole sample. Therefore, while we cannot exclude the effect of “regression to the mean”, this should be less noticeable.

For the analysis of ACS admissions, we used one year of HES data to calculate an admission rate for each practice. Due to the small number of admissions per practice per year, there is a risk that some of the variation is due to random fluctuations rather than a systematic difference. Future research should combine data on admissions across multiple years.

For the analysis of unidentified need, we used APHO model-estimated prevalence of selected clinical conditions. Unfortunately, these were only available at the time of the study for four conditions. The estimation model used estimated values based on limited numbers of available modelled variables. Therefore, differences between recorded and estimated prevalence may be due to the accuracy of the estimation model rather than actual differences.

The qualitative findings are based on a small study of 11 case study practices from four PCTs, raising issues about the generalisability of results. As explained in Chapter 2, recruitment difficulties meant we lacked two poor–high practices, undermining our sampling objectives and meaning an over-representation of high–high practices (5 of the 11) in the sample. It is possible, therefore, that the qualitative findings contain some bias towards
these high-achieving practices, thereby constraining the claims we can make about the impact of the QOF.

Qualitative interviews with practice staff tended to be with GPs and practice managers, meaning that the voices of nurses, healthcare assistants and other staff are under-represented in the findings. This could have generated a response bias in which attitudes towards and interpretations of the QOF are more reflective of GP and management perceptions than that of support staff. Those nursing and support staff that we did interview did not offer a radically different account of the QOF’s impact.

It was important that we interviewed GPs and practice managers, and in each practice except one, we achieved this. This provided a consistent and comparable set of responses from the key actors involved in the implementation and management of the QOF. The focus of the qualitative analysis on GP and practice management perspectives reflects the tendency of the QOF to be implemented and managed by a small number of individuals within practices. That is not to say that it does not have a bearing on the practice and behaviour of the wider team – indeed, we note here how the QOF generated new organisational cultures in some practices. Nor does it mean that voices outside the core GP practice management structure should therefore be excluded in future analyses of the QOF.

6.4 What the research adds

During the period of this study, there has been a glut of research about the QOF, much of which is summarised in Chapter 2. The majority of studies rely on analysis of QOF data; a few have linked this to primary care data (taken from clinical records) and routine hospital data (as we do in this study). There have been two qualitative studies which have examined the impact of the QOF on GP practitioner motivation and sense of clinical autonomy (McDonald et al 2007) and the impact of the QOF on practice organisation (Checkland and Harrison 2010).

While much has been written about the levels and variations in performance, the link to underlying clinical activities, and the extent of gaming through examining exception reporting, few studies have specifically focused on health inequalities or the experience of practices serving deprived populations.

Those studies which have examined inequalities have done so using practice-level measures of deprivation using either the postcode of the practice or, as we have done, attributing the characteristics of the population to the practice; but none, as far as we are aware, have looked at area-based inequalities (as defined by Spearhead status of the PCT in which the practice is located) and how these interact with the deprivation
status of the practice population. So, while the findings of this study confirm those of other studies conducted in parallel, we have been able to look in more depth at the specific issues as they relate to health inequalities.

This is the first mixed-methods study to be conducted to look at the QOF and inequalities. By bringing together quantitative analysis at national level with in-depth qualitative data at practice and PCT level, we have been able to gain insights into the factors that determine practice performance which are difficult to observe using routine data. It has also provided new insights into the relationship between the PCT, with its focus on reducing health inequalities and public health, and general practice; and within PCTs, between those who lead on primary care commissioning and public health. We have also been able to examine how the QOF has impacted specifically on practices serving deprived populations and the incentives it has provided for public health and preventive activities.

6.5 Implications for health care

Our research has a number of implications for health care delivery and organisation.

**First, the QOF, as currently structured, has not given general practice incentives to undertake primary prevention and public health activities.**

As a pay-for-performance scheme, the QOF appears to have impacted on activities undertaken in general practice, but these have focused on secondary prevention and improved chronic disease management. While there is potential that these will have a positive impact on population health, unless general practice takes greater responsibility for ensuring that patients at risk have appropriate primary prevention, this may not be realised nor may it contribute to reducing health inequalities.

One option to address this would be to include specific primary prevention activities in the QOF. NICE now has the responsibility for reviewing the QOF indicators and recommending which indicators should be retired and which introduced. While NICE recognises the need for a greater focus on health inequalities within the QOF, it is not yet clear how this will be achieved as many of the approaches to tackling major public health issues lack the evidence required by NICE to be included in the QOF. Many of the current indicators focus on clinical processes which are easier to measure and for which there is a great deal of available evidence. There is limited evidence for the efficacy of primary prevention activities in general, and specifically of those delivered by GPs. Outcomes, particularly those related to ill-health prevention, rely on factors besides GP behaviour, such as patient
adherence and wider socio-economic factors (Watts et al 2008). Prevention-related indicators may take months or years to be apparent – for example, the effects of increasing physical exercise may take years to demonstrate health impacts beyond simple weight loss. The new contract may, therefore, need to provide GPs with incentives to refer patients for the appropriate support (e.g. weight-loss programmes) and to improve outcomes (e.g. reducing alcohol consumption). But it is difficult to assess whether a GP’s actions are responsible for an individual’s decision to change lifestyle behaviours such as increasing exercise or losing weight. As a result, it may take some time before more public health and prevention indicators are fully reflected in the QOF.

The approach to chronic disease management promoted by the QOF is professionally led and disease-focused rather than patient-centred. It does not promote self-care and self-management, despite strong evidence that these result in better outcomes for patients. The annualised measurement and recording of levels of control also runs counter to the opportunities that ongoing patient monitoring (through remote devices) presents for the management of patients with chronic illness. Finally, the division of the QOF into domains promotes an approach which focuses on the disease rather than the patient, and is unlikely to promote a holistic approach for the growing number of patients with multiple co-morbidities. Future revisions to the QOF and the GP contract need to ensure they promote a more patient-centred approach to chronic disease management which recognises that patients may have multiple co-morbidities and includes incentives to promote more effective self-care and self-management.

**Second, performance on QOF is now equitable (recent years data suggest no significant differences in achievement by deprivation) but there is little evidence that the QOF has reduced inequalities in health.**

The QOF provides a powerful set of financial incentives and therefore it is vital that the indicators selected and weighting of points are aligned to the objective of reducing health inequalities. It is important that secondary prevention activities which are likely to have a disproportionate impact on the health of the poorest are included in future versions of the QOF. It is interesting to note that the QOF Advisory Committee is recommending the inclusion of statins prescribing for people with newly diagnosed hypertension with a 10-year risk of developing cardiovascular disease of 20 percent or more. Increased prescribing of statins and hypertensives was one of the factors identified by the National Support Team as a way to meet the health inequalities targets in the short term.

We found that the QOF is not relevant to some practices which serve particularly challenging populations such as refugees, homeless, or drug-
and alcohol-dependent patients. Other pay-for-performance frameworks may need to be developed to reward these practices for delivering care that meets the needs of their population. There was a case made by some practices for a different method of supporting public health activity that is not target-driven, but provides funds to support practices to provide adequate services for patients and engage in activities beyond the QOF that would benefit their populations.

It is clear from our analysis that practices serving deprived populations, wherever they are, face more challenges to attain high levels of achievement on QOF. This suggests that area-based approaches to reducing inequalities will fail to address the significant support needs of these practices. These limitations have been recognised by Sir Michael Marmot in his review (Marmot Review 2010) and suggest that future efforts to tackle health inequalities should focus on deprived practices, regardless of the area in which they are located.

The lack of a substantial difference in performance between the most deprived practices in Spearhead PCTs and non-Spearhead PCTs suggests that Spearhead status and its associated policies have not yet had an observable impact on the performance of deprived practices. Specific support and funding was provided to Spearhead areas, but this appeared to have had little observable effect on primary care. The fact that we found no effect of area-based initiatives might be due to a time lag; as the National Audit Office report (NAO 2010) has shown, many of the specific efforts to tackle health inequalities were slow to be implemented – Spearhead activities only really began in 2004. It may also be because some of the tools and approaches were quickly adopted by non-Spearhead areas, thus limiting any differential impact. Also, it is not clear whether the additional money allocated to Spearhead areas was actually spent on public health. Any future initiatives to tackle health inequalities need to be clear about what they expect to achieve, how they will achieve it, and then evaluate whether they are having the desired impact.

Third, the weak relationship between higher QOF performance and lower ACS admissions suggests that the QOF is having a limited impact on population outcomes.

There may be a number of reasons as to why the relationship observed was so weak: lack of resources to intensively case manage the more challenging patients; differences in QOF performance being due to practice organisation rather than differences in clinical activities; that practices are exception reporting these patients; lack of proactive case finding; or that factors causing ACS admissions are outside of the QOF or the control of general practice. We consider most of these issues subsequently, but briefly discuss the latter here.
The inclusion of indicators in the QOF has been narrowly focused on the activities and outcomes that fall directly within the purview of general practice. It may be that some of the determinants of ACS admissions lie outside the direct control of general practice, but the question then arises as to who will take responsibility for addressing these. There may be a need for a more radical reorientation of primary care to focus on population health and to establish a pay-for-performance framework which rewards population outcomes, such as reduced ACS admissions, rather than paying practices for carrying out individual activities in general practice relating to patients on disease registers. The development of federations of practices and the introduction of GP commissioning provide opportunities to make such a shift.

Although the relationship between high QOF achievement and lower ACS admissions is stronger in the most deprived practices, we found that deprivation is the main predictor of ACS admissions. This suggests that the QOF, as currently structured, does not provide sufficient incentives or support to enable deprived practices to address the needs of those patients in deprived areas who have preventable admissions.

**Fourth, the QOF appears to reward practices which have more resources, and are therefore more organised, able to attract and retain good staff, and able to focus on maximising their QOF scores.**

Given the profile of practices in deprived areas and serving deprived populations, this suggests the need to continue to provide additional investment and support to these practices outside QOF.

High-performing (and well-resourced) practices with little room for improvement were able to benefit more from QOF than poor-performing practices with significant need for improvement (and investment). Consequently, through the QOF, the NHS has paid a princely sum for activity that was already taking place. In future, pay for performance should be linked to improvements in performance above an established baseline, thus ensuring that inequalities in practice resources are not worsened.

It is difficult to be certain whether high performance represents a real difference in clinical activity or whether the differences simply reflect differences in the organisational capacity of the practices and their ability to monitor and report activities. We were not able to examine this directly. Other research suggests that changes in underlying clinical activity are in line with trends before QOF was introduced. For some conditions, QOF appears to have had an initial effect of accelerating this improvement, but the rate of change flattened off in later years (Campbell 2009). However, we did find that practice characteristics were significantly (though weakly)
associated with QOF achievement, and that practices which were high performers were generally more organised.

There is a need for a greater understanding of which practice characteristics – including organisational aspects and skill mix – are most important in determining whether a practice is high performing on the QOF. If practice factors mainly explain performance, it would suggest the need to support poor-performing practices to invest in staff, systems and processes to better manage their practice. However, if characteristics of practice populations are more important in explaining performance, this might suggest that practices with more challenging populations should not be penalised for failing to achieve on the QOF, but rather, supported to find more effective ways of identifying, treating and managing these patients.

**Fifth, our findings suggest that the use of exception reporting is not, on average, more of a problem in deprived practices or areas. However, there are some practices which have high levels of exception reporting.**

Where the reasons for high levels of exception reporting cannot be justified or where similar practices serving similar populations have lower rates, there is a need to manage the performance of these practices closely. This role currently sits with PCTs. It is not clear where the responsibility for this would sit in future. The ability to exempt patients who have been sent at least three invitations in the preceding 12 months but did not attend may also need to be reviewed. There needs to be an incentive for practices to reach out to these individuals and improve their capacity to respond to preventive interventions. Unfortunately, due to the lack of availability of data on the reasons for exception reporting, we were not able to examine whether this was a greater problem in deprived practices or areas. Our qualitative findings suggest this might be the case. Practices need to take greater responsibility for all patients and find ways of providing services to those patients who are less likely to attend the practice or respond to written invitations to attend.

The QOF has provided incentives for practices to manage registered patients with chronic conditions more systematically and effectively. However, the setting of thresholds below 100 percent and the ability to exception report patients means that practices are not required to manage all patients equally effectively. There is a risk, therefore, that practices focus on managing those patients who were already known to them, who attend when invited to do so, do not have complex social or medical needs, and are already managing their condition effectively. The combination of thresholds and exception reporting mean that some people fall outside the QOF; these are likely to be the people who most need help and support, and who consume a larger share of NHS (and other public sector)
resources. It is not clear that this can be solved by simply raising thresholds or preventing exception reporting; there are often valid (clinical) reasons why some patients should not receive treatment, for example. However, there are some reasons for exception reporting that may need review, and rules may need to be specific to the type of activity. For example, there might be few reasons for exceptions in the case of advice giving/referral, but there might be several legitimate reasons for treatment indicators.

There is a wealth of data available, both directly, from the QOF, and from other routine sources of data. The National Support Team has been encouraging PCTs to use these data to identify poor performers. However, it is not clear at the moment what consequences there are for having high (unjustified) exception reporting. More thought needs to be given as to how these data will be used in future to drive improvements. There were promising signs from practice-based commissioning that practices were willing to be more open with their peers about their performance and to have this discussed and scrutinised (Curry et al 2008). It is important that GP commissioning consortia are given clear responsibility for ensuring equity of access to high-quality primary care, and that practices know the consequences of being unable to justify levels of exception reporting.

The PCTs we spoke to still felt that the national framework contract limited their ability to influence the activities of practices. QOF plus, which gives PCTs the flexibility to add locally selected indicators to QOF, partially addresses this. While the contract is defined nationally, there remains little local discretion to ensure that practices are working towards wider public health and health inequalities targets. If PCTs are to remain responsible for public health and reducing health inequalities, they will need to retain some leverage over practices (or practice consortia). Changes to the GP contract and the role of GPs as commissioners may provide an opportunity to ensure that the needs of the local population are met, and that in order to reduce health inequalities, deprived practices are sufficiently and appropriately rewarded. However, there is also a risk that this will further weaken the role of primary care in public health.

Finally, the information systems currently used to manage the QOF do not support a proactive approach to case finding.

Analytical tools are now available which allow practices to identify patients with or at risk of disease who are not on their disease registers. Risk stratification tools such as the Patients at Risk of Readmission (PARR) tool and the combined model allow practices to identify those people who are at highest risk of admission. These tools also have the ability to identify gaps in care which, if addressed, would improve outcomes and reduce the risk of an emergency admission. It would therefore be possible to move the focus...
of pay for performance from managing the majority of easy patients (the current position) to effectively managing the few high-risk, high-cost patients in each practice population. Given that there are likely to be more of these patients in deprived practices, the rewards for improving outcomes for these individuals would be higher.

Until recently, there was a disincentive for practices, particularly those with higher prevalence, to actively case find. Thresholds within the QOF need to be set so that there are sufficient incentives for proactive case finding, particularly in deprived areas where prevalence is higher. This suggests that thresholds may need to be varied locally for individual practices to reflect the population characteristics, but this should not allow practices to “blame” their performance on their patients.

There may also be potential to develop tools to ensure that, where there are significant changes in prevalence – for example, a sudden increase in asthma or COPD concentrated in certain areas – practices are alerted to take action, not only for individual patients but at a population level. As part of the support that practice consortia will need for commissioning, there may be an important ongoing role for public health observatories to ensure that practices and consortia have data about the health needs of their population that is not only based on clinical activity data but on epidemiological data. Simply relying on the itemised approach to activity in the QOF will not deliver improved population outcomes.

6.6 Recommendations for further research

As previously noted, there has been a great deal of research using the QOF data over the period since the study was approved. We suggest there is a need for future research studies to move beyond the QOF and QOF data to examine some of the broader questions about primary care and its role in delivering population health and reducing health inequalities. In order of priority, this might include research on the following:

- The impact of future developments of QOF, including the introduction of new indicators, the setting of higher thresholds and the impact of QOF Plus (QOF+) schemes locally on outcomes and inequalities.
- The use of available data for the purposes of benchmarking performance of practices and quality improvement within primary care, including analysis of inequalities in need, access to and quality of care and outcomes.
- The development and impact of information systems which, instead of focusing on maximisation of income for the practice under QOF, are oriented to maximising population health at lowest cost for a registered population.
• The range of incentives, both financial and non-financial, that are needed for GPs and others working in primary care to ensure that those who are the most difficult to reach and those whose need of care is greatest get access to high-quality primary care.

• To examine the relative contribution of a wider set of practice, GP, patient and population-level variables (not just those routinely available in the GMS data set) to the performance of general practice.

• Patients’ views of the QOF and its impact on the consultation, and how this varies by socio-economic group, ethnicity, age and gender.

• Quantify the differences in QOF-related workload to achieving 100 percent population coverage for practices serving deprived and non-deprived populations.

• Identify cost-effective approaches to identifying and managing risk factors in deprived populations that can be used by practices serving populations with more complex and challenging needs.

In particular, there is an opportunity, given the changes to the GP contract, the role of GPs as commissioners, the focus on outcomes as a measure of success, and the increasing availability of linked data sets, to establish a programme of research which considers how general practice might be organised and delivered in order to maximise the impact on health and reducing health inequalities. Additional research priorities in the context of the government’s proposals to reform the NHS would include the following:

• GP commissioning and how this impacts on delivery of public health priorities, and the implications for health inequalities, particularly given the shift in responsibility to local authorities and the creation of a public health service.

• The relationship between nationally commissioned general practice and locally delivered public health services, and its impact on the ability to deliver services that are responsive to local needs.

6.7 Conclusions

It is important to acknowledge that reducing health inequalities was not an explicit policy objective of the QOF when it was originally designed. Therefore, any reduction in health inequalities as a result of the QOF would be a positive side-effect rather than an explicit objective. However, there was strong reason to believe that improved performance in general practice would contribute to improved population health and reduce health inequalities. Indeed, a recent Health Select Committee report on health
inequalities recognised the role that the QOF can play and recommended that “tackling health inequalities should be an explicit objective during annual QOF negotiations and that this objective should have measurable characteristics which can be evaluated over time” (Health Select Committee 2009).

Overall, we found that the QOF had a limited impact on public health and health inequalities. Although it is encouraging that the gap in performance between deprived and non-deprived practices, and between Spearhead and non-Spearhead areas, has narrowed, it does not appear that this has translated into reduced health inequalities.

On the plus side, the QOF is incentivising more measurement and management of certain conditions. We can reasonably assume this to have some positive effect on health outcomes, although the impact on preventable admissions appears modest. However, we know that those most in need might be exception reported or simply not identified in the first place. High levels of achievement on the QOF, in other words, are no guarantee that population health will improve and inequalities will reduce.

There may also be negative consequences for other aspects of quality of care. There is some evidence that the “tick box” approach to the QOF has a negative effect on access to care and the continuity of care, or the quality of the consultation and the patient–practitioner relationship. For some patients, this might not be the most appropriate way of meeting their needs, and by undermining the ability of generalists to provide holistic care, might corrode quality of care – in particular, for those with complex health and social problems such as worklessness, mental health, and alcohol or drug misuse.

Our evidence would suggest that this should be a concern for policymakers; they need to consider how best to incentivise and support practices to continue improving the identification and management of chronic disease, while enabling them to meet the wider health and social needs of their patients.

This research began under a Labour government which was committed to achieving a series of targets to reduce health inequalities, and at a time when practice-based commissioning was in its infancy. We report in the context of a coalition government that is proposing to make some fundamental revisions to the GP contract and changes to the way general practice is organised by creating GP commissioning consortia that will hold real budgets. While the QOF had the potential to support the delivery of national targets to reduce inequalities, this opportunity appears to have been missed. The opportunity now presents itself to shift the focus of general practice to the delivery of outcomes for the wider population, but this will require a radical rethink of the QOF and clear responsibilities and
rewards for practice consortia, particularly those serving deprived populations, to improve health, not just deliver higher quality primary medical services. This might prove challenging given our findings that GPs do not see that they have a role in promoting public health and reducing health inequalities.

Health services, and primary care in particular, have an important role in both primary and secondary prevention. It is not clear how the ring-fencing of public health funding will affect this. While this will ensure that money is spent on tackling the wider determinants of health in any given locality, there is a danger that it will send a signal that public health is not the business of the NHS. There needs to be further consideration of how local public health priorities can be linked to practice objectives. Even now, where primary commissioning sits with the PCT, these links are weak and often there is little connection between public health objectives and primary care commissioning.

It is clear from our research that GPs respond to incentives. However, if you get what you pay for, there is a danger that you only get what you pay for. It is likely to be impossible to translate all the outcomes for which primary care commissioners will be responsible into itemised indicators in future. Furthermore, it is not possible for a GP or practice team to have their attention constantly on a wide set of indicators; it is likely that they can only focus on a few areas for improvement at any one time. This points to a need to continue to measure and report (at least among practices within consortia) on a wide range of indicators, to hold consortia to account for a high-level set of population health outcomes, and to focus pay for performance on specific areas for improvement (which might be locally determined) – for example, reduction in ACS admissions.

Primary care has an important role to play in reducing health inequalities. The evidence from this research study suggests that it may prove challenging to shift the focus of general practice from providing medical services to taking responsibility for population health and reducing health inequalities. This will require changes to the current incentives. Practices serving deprived populations will need additional support if they are to address the health needs of their populations and prevent, as well as treat, ill health.
References


Appendix 1 Vignettes of each PCT and practice

We integrated both strands of research to construct small, descriptive vignettes to describe each of the practices analysed. These vignettes provide information on the organisational structure of practices, the demographics of the practice population and the practice’s contractual arrangement to help generate explanations of why the QOF has impacted the way it has and why it appears to have provided variable incentives to case find, engage in public health activity, and therefore address health inequalities.

**PCT A**

- Non-Spearhead
- Urban, London
- PCT population of 280,000
- Three case study practices
- 6.5 percent of the population aged under 5 years and 9.8 percent aged 65 years and over
- 72 percent of the population from black and other non-white ethnic groups

Figure 10. Mean recorded QOF achievement (2004 to 2006) and exception reporting (2005/06 only) in PCT A practices, with national and PCT benchmarks
Figure 11. Mean recorded QOF achievement 2005/06 and estimated prevalence, PCT A
Figure 12. Elective and emergency hospital admissions for selected clinical conditions 2005/06, PCT A

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Practice A.1

- Low–low QOF score 2004 to 2006
• List size 2,948 (recently increased)
• IMD 2004 score 31.5, income index 0.2
• PMS contract since 2001
• 1 x GP partner, 1 x locum GP (5 sessions per week), 1 x practice nurse, 1 x practice manager, diabetic nurse or respiratory nurse (1 day per week)
• 2001–2008 practice managed by PCT to provide for refugees and asylum seekers, homeless people and violent patients struck off other practice lists
• Located in two-floor converted house on a main thoroughfare
• Pre-2008, no systematic QOF monitoring, before locums set up QOF teams
• QOF encouraged focus on previously unscreened conditions (CKD) and co-morbidities
• Case finding of vitamin D deficiency and osteoporosis not related to the QOF
• Particular issues around depression and genital mutilation in refugee population, also a ‘forgotten’, reticent local white Irish community.

Practice A.2

• Low–low QOF score 2004 to 2006
• List size 1,949
• IMD 2004 score 39.5, income index 0.3
• GMS contract
• 1 x GP partner (a ‘few’ sessions per week), 1 x business development manager and partner, 2 x salaried GPs, 3 x receptionists, 1 x administrative assistant, 1 x nurse (1 day per week)
• Pre-2007 single-handed GP partner, then taken over by organisation which manages four other practices
• Two-floor converted house on a residential street
• Pre-2007, no apparent systematic QOF procedures, no IT system in place until 2007. Post-2007, QOF monitoring done by business development manager and administrative assistant
GP partner insistent that the QOF was about case finding, though did concede it helped uncover co-morbidity

Estimated 80 percent of patients are Afro-Caribbean; large numbers of hypertension and sickle cell disease, turnover of 20 patients per week join/leave the practice

QOF score from 2004 to 2006 could be due to lack of IT system and GPs approaching retirement

Practice A.3

- High–high QOF score 2004 to 2006
- List size 6,274
- IMD 2004 score 42.8, income index 0.3
- GMS contract
- 2 x GP partners, 1 x practice manager, 3 x part-time 'locum assistant' GPs, 1.5 x practice nurses, 3 x receptionists
- Same partners and management since 1997
- Converted terraced house in residential street
- Employed a 'GMS contract manager' to implement and conduct QOF data monitoring, releasing clinical staff from administration
- QOF has given a 'seal of approval' for measures already in place rather than generating new preventative approach
- Growing Eastern European population, high turnover of patients
- QOF score from 2004 to 2006 might be attributable to employment of QOF manager, rigorous monitoring of registers and recalling patients and pre-existing disease registers
PCT B

- Spearhead
- Urban, London
- PCT population of 250,000
- Three case study practices
- 7.8 percent of the population aged under 5 years and 6.9 percent aged 65 years and over
- 72 percent of the population from black and other non-white ethnic groups

Figure 13. Mean recorded QOF achievement (2004 to 2006) and exception reporting (2005/06 only) in PCT B practices, with national and PCT benchmarks
Figure 14. Mean recorded QOF achievement 2005/06 and estimated prevalence, PCT B

Figure 15. Elective and emergency hospital admissions rates for selected clinical conditions 2005/06, PCT B

Practice B.1
• Poor–poor QOF score
• QOF score from 2004 to 2006 is difficult to explain; might be due to transient, multifarious population; partner mentioned poor premises and inability to retain good staff in deprived areas as an issue
• GMS contract
• List size 4,536
• IMD 2004 score 46.4, income index 0.3
• 2 x GP partners (senior partner is a QOF assessor), 2 x receptionists, 2 x secretaries, 2 x 0.5 practice managers, 2 x 0.5 nurses, 1 x midwife (1 day per week), 1 x community matron
• Same GP partners since 1980s, senior partner has public health training
• Converted semi-detached two-storey house on a residential street, close to busy shopping thoroughfare
• 4,300 patients, mostly Asian with a growing Eastern European population
• Senior partner monitors population manager and communicates with the practice manager responsible for alerts, recalls and organising clinics
• Some evidence of case finding effect; practice was screening new patients in Well Man and Well Woman clinics before the QOF, but the QOF seems to have facilitated greater awareness and screening for potentially undiagnosed disease and greater scrutiny of diagnosed conditions
• Transient population, newcomers to London who move onto other areas; malaria patients common

**Practice B.2**

• Poor–high QOF score 2004 to 2006
• QOF score from 2004 to 2006 might be due to practice trying “not to have too much to do with the QOF” in the first year, then realising “how much money was involved” and pushing a bit harder; also expressed difficulties in recalling patients
• List size 3,185
• IMD 2004 score 37.9, income index 0.3
• PMS contract
• Teaching practice
• 2 x GP partners (1 a GPSI in mental health, both QOF assessors), 1 x practice manager, 1 x salaried GP, 2 x registrars, 1 x 0.5 practice nurse, 2 x receptionists

• Two partners set up practice from scratch in 2003 after receiving £250k from New Deal for Communities regeneration partnership and offered lease on premises

• Small practice, converted house, situated in a social housing estate but close to main thoroughfare and tube station

• List size around 3,500, trying to build to 4,000

• Male partner responsible for checking QOF codes; female partner and receptionist responsible for call/recall and basic clinical work; nurse not explicitly involved in QOF

• Little qualitative evidence of an impact on case finding

• 20 percent turnover of patients per year, perceived higher proportion of young people and refugees than PCT average, high numbers of refugees with complex health and social needs

**Practice B.3**

• High–high QOF score 2004 to 2006

• QOF score from 2004 to 2006 could be due to employment of data quality manager, premises, staff mix, IT systems in place

• List size 5,992, 30 percent turnover per year

• IMD 2004 score 47.7, income index 0.4

• PMS contract (since 2004)

• 2 x GP partners (1 is a GPSI in diabetes), 4 x salaried GPs, 1 x practice manager, 2 x practice nurses, 1 x IT and data quality performance manager, 2/3 x receptionists

• Husband and wife GP partners set up practice in 1990 due to population expansion and development of area; hired a management consultant to re-organise and advise on financial and skill capacity – worked out they had signed up to 31 clinical targets / objectives including PMS objectives and LES; restructured to a ‘middle level management structure’ in 2008

• Converted house on main thoroughfare near busy neighbourhood centre; moved to these (larger) premises in 1996

• Designated data quality manager who monitors scores and registers; QOF teams with a GP as a lead on two or three domains each
• QOF enabled case finding, although most seems to have pre-existed QOF or be part of PMS (at-risk diabetes register)

• Since mid-2000s has been surgery for local university students; mobile population
**PCT C**

- Spearhead
- Urban, Midlands
- PCT population of 300,000
- Two practices
- 9 percent of the population aged under 5 years and 9.8 percent aged 65 years and over
- 33 percent of the population from black and other non-white ethnic groups (local authority data)

**Figure 16.** Mean recorded QOF achievement (2004 to 2006) and exception reporting (2005/06 only) in PCT C practices, with national and PCT benchmarks
Figure 17. Mean recorded QOF achievement 2005/06 and estimated prevalence, PCT C

Figure 18. Elective and emergency hospital admissions for selected clinical conditions 2005/06, PCT C
Practice C.1

- High-high QOF score 2004 to 2006
- QOF score from 2004 to 2006 possibly due to strong leadership, IT systems in place, commitment to screening patients
- List size 4,436
- IMD 2004 score 56.6, income index 0.4
- Teaching practice, paper light practice
- 2 x GP partners, 0.5 x salaried GP, 1 x practice nurse, 1 x healthcare assistant, 1 x drugs worker (1 day per week)
- Same partners since the 1990s
• Converted house in quiet residential street
• QOF monitored by partners and an administrator; QOF teams with different domains
• QOF has encouraged routine screening of new patients and those deemed at risk of particular conditions
• High South Asian population with challenging health beliefs

**Practice C.2**

• High–high QOF score 2004 to 2006
• QOF score from 2004 to 2006 due to leadership, well-organised pre-QOF, screening programmes in place
• List size 2,149
• IMD 2004 score 41.5, income index 0.3
• GMS contract since 2003/04, PMS for two years before and GMS before PMS.
• 1 x GP partner, 2 x salaried GPs (1 x 4 sessions, 1 x 5 sessions per week), 2 x trainee healthcare assistants
• Single-handed practice since 1980s, part of a PBC consortium
• Converted house in quiet residential street; looking to extend premises with PBC savings but PCT blocked development. Money was invested in extra GPs instead
• QOF managed between partner, practice manager and secretary
• Most screening appears to have been done pre-QOF, but prevalence data has focused attention on undiagnosed disease
• Local students and mostly South Asian patients
PCT D

- Spearhead
- Suburban, some rural pockets
- North west
- PCT population of 180,000
- Three case study practices
- 6.2 percent of the population aged under 5 years and 15.3 percent aged 65 years and over
- 6 percent of the population from black and other non-white ethnic groups

Figure 19. Mean recorded QOF achievement (2004 to 2006) and exception reporting (2005/06 only) in PCT D practices, with national and PCT benchmarks
Figure 20. Mean recorded QOF achievement 2005/06 and estimated prevalence, PCT D

Figure 21. Elective and emergency hospital admissions for selected clinical conditions 2005/06, PCT D
Practice D.1

- Low–low QOF score 2004 to 2006
- QOF score from 2004 to 2006 difficult to understand given good staff mix and leadership, but perhaps due to difficulties in recalling patients and high prevalence
- List size 10,274
- IMD 2004 score 39.0, income index 0.2
- PMS practice
  - 3 x GP partners (1 is a lead for urgent care and IAPT for local PCT), 3 x salaried GPs, 2 x nurse practitioners, 4 x practice nurses, 1 x healthcare support worker, 1 x citizens advice worker, 3 x clinical receptionists, part of a national pilot study of employment advisers in practices so had one for 4/5 years
  - PMS since 2001; one surgery of three managed by partners
  - Semi-rural neighbourhood practice
  - Case finding does not seem to have been influenced by the QOF; partner mentioned QOF as a disincentive to case find in localities with high prevalence because of square root and insufficient reward for deprived practices

Practice D.2

- Low–high QOF score 2004 to 2006
- QOF score from 2004 to 2006 might have been due to time taken to set up QOF registers and ‘data cleanse’. Only signed GMS in 2004 so perhaps initial problems
- List size 7,570
- IMD 2004 score 48.8, income index 0.3
- GMS practice since 2004
  - 4 x GP partners, 2 x salaried GPs, 2 x trainee GPs, 2 x practice nurses, 1 x healthcare support worker, 6 x part time receptionists, 1 x QOF and finance administrator, 1 x medical secretary, 1 x IT administrator
  - Two senior partners since early 1980s
  - QOF administrator works with medical secretary to monitor registers; practice uses protocols that instruct trainee GPs how to code properly
• QOF encouraged setting up of clinics in diabetes, CHD and in house spirometry to monitor registers more closely and find ‘non-attenders’

• Semi-rural, but with a social housing estate nearby; large proportion of Jewish patients

**Practice D.3**

• High–high QOF score 2004 to 2006

• QOF score from 2004 to 2006 probably due to well-organised, motivated and well-resourced practice. Relatively benign population, with few perceived problems associated with deprivation

• List size 11,600

• IMD 2004 score 47.4, income index 0.3

• Teaching practice, just started RCGP Quality Practice Award

• 7 x GP partners, 1 x salaried GP, 4 x GP registrars, 1 x nurse manager, 2 x practice nurses, 1 x phlebotomist, 1 x healthcare support worker, 1 x nurse practitioner

• Stable senior partnership, one of whom is PEC chair of local PCT; PMS contract with women’s health and advanced contraception specialism

• Suburban practice in shared health centre

• QOF monitoring part of administrator’s responsibilities

• Encouraged more rigorous disease monitoring and more structured screening

• Described as having middle-class patients from local, new-build housing developments
Appendix 2 List of selected 26 QOF clinical indicators: reflects 2004/05 to 2005/06, with indication of changes for 2006/07 to 2007/08

(indicators used in analysis of exception reporting and population achievement shown in italics)

I. Coronary heart disease (seven indicators)

CHD4 The percentage of patients with coronary heart disease who smoke, whose notes contain a record that smoking cessation advice has been offered within the last 15 months (for 2006/07 to 2007/08: combined with all other smoking indicators)

CHD6 The percentage of patients with coronary heart disease, in whom the last blood pressure reading (measured in the last 15 months) is 150/90 or less (for 2006/07 to 2007/08: same)

CHD8 The percentage of patients with coronary heart disease whose last measured total cholesterol (measured in the last 15 months) is 5 mmol/l or less (for 2006/07 to 2007/08: same)

CHD9 The percentage of patients with coronary heart disease with a record in the last 15 months that aspirin, an alternative anti-platelet therapy, or an anti-coagulant is being taken (unless a contraindication or side effects are recorded) (for 2006/07 to 2007/08: same)

CHD10 The percentage of patients with coronary heart disease who are currently treated with a beta blocker (unless a contraindication or side-effects are recorded) (for 2006/07 to 2007/08: same)

CHD11 The percentage of patients with a history of myocardial infarction (diagnosed after 1 April 2003) who are currently treated with an ACE inhibitor (for 2006/07 to 2007/08: same)

CHD12 The percentage of patients with coronary heart disease who have a record of influenza vaccination in the preceding 1 September to 31 March (for 2006/07 to 2007/08: same)

II. LVD (one indicator)

LVD3 The percentage of patients with a diagnosis of CHD and left ventricular dysfunction who are currently treated with ACE inhibitors (or A2
antagonists) (for 2006/07 to 2007/08: slightly revised, but similar to 2004/05)

III. Stroke (five indicators)

Stroke4 The percentage of patients with a history of TIA or stroke who smoke and whose notes contain a record that smoking cessation advice has been offered in the last 15 months (for 2006/07 to 2007/08: combined with all other smoking indicators)

Stroke6 The percentage of patients with a history of TIA or stroke in whom the last blood pressure reading (measured in the last 15 months) is 150/90 or less (for 2006/07 to 2007/08: same)

Stroke8 The percentage of patients with TIA or stroke whose last measured total cholesterol (measured in the last 15 months) is 5 mmol/l or less (for 2006/07 to 2007/08: same)

Stroke9 The percentage of patients with a stroke shown to be nonhaemorrhagic, or a history of TIA, who have a record that aspirin, an alternative anti-platelet therapy, or an anti-coagulant is being taken (unless a contraindication or side-effects are recorded) (for 2006/07 to 2007/08: slightly revised, but similar to 2004/05)

Stroke10 The percentage of patients with TIA or stroke who have had influenza immunisation in the preceding 1 September to 31 March (for 2006/07 to 2007/08: same)

IV. Hypertension (two indicators)

BP3 The percentage of patients with hypertension who smoke, whose notes contain a record that smoking cessation advice has been offered at least once (for 2006/07 to 2007/08: combined with all other smoking indicators)

BP5 The percentage of patients with hypertension in whom the last blood pressure (measured in last 9 months) is 150/90 or less (for 2006/07 to 2007/08: same)

V. Diabetes mellitus (seven indicators)

DM4 The percentage of patients with diabetes who smoke and whose notes contain a record that smoking cessation advice has been offered in the last 15 months (for 2006/07 to 2007/08: combined with all other smoking indicators)

DM6 The percentage of patients with diabetes in whom the last HbA1C is 7.4 or less (or equivalent test / reference range depending on local laboratory) in last 15 months (for 2006/07 to 2007/08: slightly revised, but similar to 2004/05)
DM7 The percentage of patients with diabetes in whom the last HbA1C is 10 or less (or equivalent test / reference range depending on local laboratory) in last 15 months (for 2006/07 to 2007/08: same)

DM12 The percentage of patients with diabetes in whom the last blood pressure is 145/85 or less (for 2006/07 to 2007/08: same)

DM15 The percentage of patients with diabetes with proteinuria or microalbuminuria who are treated with ACE inhibitors (or A2 antagonists) (for 2006/07 to 2007/08: same)

DM17 The percentage of patients with diabetes whose last measured total cholesterol within previous 15 months is 5 or less (for 2006/07 to 2007/08: same)

DM18 The percentage of patients with diabetes who have had influenza immunisation in the preceding 1 September to 31 March (for 2006/07 to 2007/08: same)

VI. COPD (two indicators)

COPD5 The percentage of patients with COPD who smoke, whose notes contain a record that smoking cessation advice has been offered in the past 15 months (for 2006/07 to 2007/08: combined with all other smoking indicators)

COPD8 The percentage of patients with COPD who have had influenza immunisation in the preceding 1 September to 31 March (for 2006/07 to 2007/08: same)

VII. Asthma (two indicators)

Asthma5 The percentage of patients with asthma who smoke, and whose notes contain a record that smoking cessation advice has been offered within last 15 months (for 2006/07 to 2007/08: combined with all other smoking indicators)

Asthma7 The percentage of patients age 16 years and over with asthma who have had influenza immunisation in the preceding 1 September to 31 March (for 2006/07 to 2007/08: dropped)
Appendix 3 PCT interview schedule

Background

1.1 Can you tell me about your role within the PCT and how long you have been in this role?

1.2 Can you describe how the PCT pursues a public health agenda?
   • What are the PCT’s public health priorities? Where do they come from?
   • What sort of public health challenges exist locally?
   • What kinds of public health strategies is the PCT involved in, either through direct provision or commissioning?
   • How is it tackling health inequalities?
   • How is the PCT assessing the needs of the local population?
   • What does your role at the PCT contribute to this agenda?

Practices

2.1 What role do GP practices play in delivering public health within ________? Where do other clinicians / professional groups fit in?

2.2 What does the PCT want practices to do vis-à-vis meeting public health needs?
   • What incentives are there for practices to do this work?
   • How could the PCT improve on its support for practices?
   • To what extent are the objectives of PCTs and GP practices aligned? Are there any tensions?
   • What is the role of practice-based commissioning in terms of commissioning for public health in ________?
   • Where is GP management located in the PCT? What is the role of the PEC?

2.3 Can you tell me about how the Quality and Outcomes Framework was introduced in ________?
   • What role do you perceive the GMS contract and specifically the QOF to be playing in supporting public health activity at practice level?
   • How does it compare with other incentives?
• Are there any areas that QOF does not address but should?
• Is it a useful tool for tackling health inequalities?

2.4 What other incentives are there for practices to engage in public health activities?
• financial?
• quality improvement schemes?
• Local Enhanced Services - what and how are they organised in ________?
• professional / organisational?

2.5 Can you describe some of the challenges faced by practices in delivering better public health?

2.6 What is the PCT doing to monitor the performance of GP practices?

2.7 How would you account for the differing levels of QOF performance of local practices?

**Commissioning**

3.1 Can you describe how the PCT is commissioning to meet public health needs?
• What is the relationship like with Public Health?
• What plans are in place?

3.2 Does the PCT have the appropriate governance and incentive frameworks to support public health improvements and tackle inequalities?
• What are your most significant / or most innovative levers for change?
• Are there any ways in which these could be enhanced?
• What are some of the barriers that exist? What do you lack?

3.3 How have the Commissioning Framework for Health and Well Being and A Vision for World Class Commissioning been implemented? Are they useful tools?

3.4 What has been the impact of the Healthcare for London consultation (if relevant)?

3.5 How is the role of the Joint Strategic Needs Assessment integrated into commissioning?

3.6 What about the role of Local Area Agreements in commissioning?
Performance management and regulation

4.1 How does the current performance management / regulatory regime influence public health activity at PCT level?

- NSFs?
- PSA targets
- Vital Signs / Annual Health Check?
- Service Level Agreements?
- Role of the SHA?
- Contract reviews?
- Spearhead status (if relevant)?
Appendix 4 General practice interview schedule

Background and local context

1.1 Can you tell me a bit about your role within the practice, how long you have worked here and a bit about your professional background?

1.2 What sort of population does this practice serve and how has it changed?

1.3 Can you tell me a bit about this organisation? (e.g. what type of practice? PBC? Social enterprise? Resource levels?)

The public health role of the practice

2.1 Thinking specifically about this practice, what sort of public health activities do you engage in?

   • Why?
   • How successful do you think you are as a team in tackling health inequalities?
   • How are they addressed?

2.2 What incentivises / encourages the practice to undertake public health activities – any examples? If there are no incentives, why does the practice engage in such activity?

2.3 What are some of the challenges in serving and treating deprived populations?

2.4 Can you tell me what steps have been taken to case find among traditionally under-served populations?

2.5 Thinking about public health activities, can you give me examples of where the practice could improve its coverage? How could it do that?

2.6 How would you judge the success of the practice’s public health activity?

2.7 If the practice is involved in practice-based commissioning, how does public health fit within that role?

P/GMS, the QOF and its impact


3.1 Thinking about the GMS/PMS contract, can you tell me how its introduction affected the way the practice worked, and your role in particular?

3.2 Has it had any impact on how the practice engages in public health activity? Examples?

3.3 In terms of the QOF, can you tell me how that has changed the way the practice works and impacted upon public health practice?
   - How about the changes in QOF over the years?
   - What would the practice do differently without the QOF?

3.4 Do you consider the QOF to be a useful tool in improving health / public health outcomes? Do you consider it to present any problems? Multitasking?

3.5 Have there been any changes in referral and prescribing patterns since the introduction of the QOF?

3.6 How has the recording of QOF-related data been handled within this practice?

3.7 Do you think your practice’s QOF score is fair/accurate? Could it be improved? If so, how?
   - What have practices done to improve QOF performance since its introduction?
   - Do you think this has led to better patient care?

3.8 How has exception reporting been handled and kept to a minimum by the practice?

3.9 What other kinds of incentives would improve the level and coverage of public health activity within general practice?

3.10 Have there been any other quality improvement strategies the practice has taken part in vis-à-vis population health and tackling health inequalities?
   - If so, how has the QOF fitted with these – complemented?

3.11 How has the QOF affected patient / community involvement in the practice?
   - How successful is the practice at patient involvement?

**Professional roles and relationships**
4.1 To what extent do the priorities of the QOF align with your values and priorities as a primary care practitioner? Does this affect motivation? Working to the target?

4.2 To what extent does the QOF encourage an holistic approach to patient care? What do you think? Examples? What has it done for working as a primary care team?

- Have there been any shifts in workload between staff? What has been the effect?

4.3 Thinking about the rewards from the QOF, how are they distributed within the practice given that it is a practice-based scheme. Why is it done this way?

**The wider context**

5.1 How would you describe the relationship of this practice with the PCT? With Public Health?

5.2 Do you think the PCT supports practices in pursuing public health activities and tackling health inequalities? Is there anything you lack that you would like?

5.3 Is practice performance governed adequately?

5.4 What is the role of DES / LES in enabling the practice to address public health needs?

5.5 What are the most innovative levers for change in terms of addressing public health needs locally?
Appendix 5 Members of the Advisory Group

David Buck, Deputy Director of Health Inequalities Unit, Department of Health
Charlotte Gosden, Information Analyst, Diabetes UK
Adrian Jacobs, NHS Employers
Mike Knapton, Director, Prevention & Care/GP, British Heart Foundation
Philip Leech, Primary Care, Department of Health/ Daniel Mann, Primary Care, Department of Health
Geoff Meads, Visiting Professor, Warwick Medical School (Chair)
Rachel Newell, Senior Policy Officer (QOF & GMS Finance), NHS
Lorraine Sloan, Quality Improvement Programme Manager, Macmillan Cancer Support
Richard Williams, GP, Lambeth PCT
Lynn Young, Primary Health Care Advisor, Royal College of Nursing
Tasia Malinowski, Macmillan Cancer Support
Daniel Mann, Primary Care, Department of Health
Jude Williams, Healthcare Commission/ David Woodhead, Healthcare Commission
Anne Griffin, Health Inequalities Unit, Department of Health
Tim Crayford, Croydon PCT
Rachel Foskett-Tharby, NHS Employers
Michael Horah, Department of Health
Appendix 6 Analysis of hospital admissions data by clinical condition

A.6.1 Stroke

Descriptive statistics

Mean reported achievement for stroke-related clinical QOF indicators was 81.0 percent (95 percent CI 80.79 percent-81.22 percent). It varied from 0.10 percent to 100 percent across all practices (median 82.87 percent). Figure 22 shows the overall distribution of QOF achievement: while resembling a normal distribution, it was skewed towards left (low-performing outlier practices).

Figure 22. Distribution of reported mean QOF achievement for clinical stroke indicators, by practices in England, 2004/05

Mean reported QOF achievement for stroke-related indicators was significantly higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (81.51 percent vs. 80.07 percent, Table 22). Similar relations were observed between QOF achievement for stroke-related indicators and
practice-level deprivation, as measured by IMD 2004 income quintile (80.03 percent in the most deprived practices vs. 81.91 percent in the least deprived ones, Table 22).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 21.

Table 21. Mean crude and age/sex standardised rates of hospital admission for stroke, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude</th>
<th>Standardised</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate per 1,000 people</td>
<td>95% CI</td>
</tr>
<tr>
<td>Emergency</td>
<td>1.41</td>
<td>1.40-1.43</td>
</tr>
</tbody>
</table>

There were significant differences in hospital admission rates by Spearhead status of PCTs and practice-level deprivation: 1.40 in non-Spearhead practices vs. 1.61 in Spearhead practices; 1.39 in the least deprived practices vs. 1.60 in the most deprived ones for emergency admissions (Table 22).

Table 22. Differences in reported mean QOF achievement (2004/05) and emergency hospital admission rates (2005/06) for stroke, by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>95% CI</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80.07</td>
<td>79.68-80.46</td>
</tr>
<tr>
<td>No</td>
<td>81.51</td>
<td>81.25-81.78</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>81.91</td>
<td>81.49-82.33</td>
</tr>
<tr>
<td>2</td>
<td>81.28</td>
<td>80.81-81.75</td>
</tr>
<tr>
<td>3</td>
<td>81.21</td>
<td>80.75-81.68</td>
</tr>
<tr>
<td>4</td>
<td>80.68</td>
<td>80.16-81.19</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>80.03</td>
<td>79.48-80.58</td>
</tr>
</tbody>
</table>

There was a weak negative significant correlation between mean reported QOF achievement and emergency hospital admissions: higher admission rates were associated with lower QOF achievement (Table 23).

Also, weak but positive significant correlation was observed between Spearhead status of PCTs and hospital admissions (standardised rates only) (Table 23). This means that patients from Spearhead practices were more
likely to be admitted to the hospital as an emergency, and less likely, as an elective admission, than patients from non-Spearhead areas. Likewise, there was a weak positive significant correlation between practice-level deprivation, as measured by IMD 2004 income quintile, and emergency admissions (standardised rates only): higher admission rates were associated with more deprived practices.

**Table 23. Correlation between emergency hospital admission rates (2005/06) and QOF achievement (2004/05) by Spearhead status and income quintile**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
<th>Crude</th>
<th>Standardised</th>
</tr>
</thead>
<tbody>
<tr>
<td>QOF achievement</td>
<td>-0.0511 (p&lt;0.001)</td>
<td>-0.0463 (p&lt;0.001)</td>
<td></td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.0040 (p=0.7226)</td>
<td>0.1236 (p&lt;0.001)</td>
<td></td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>-0.0456 (p&lt;0.001)</td>
<td>0.0761 (p&lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>

**Regression models**

We considered age/sex standardised emergency hospital admission rates for stroke as an outcome (dependent variable), and mean reported QOF achievement for stroke-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 24).

**Table 24. Relationship between age/sex standardised emergency hospital admission for stroke (2005/06) and mean reported QOF achievement for stroke-related clinical indicators (2004/05), adjusted for practice-level indicators**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical stroke-related indicators</td>
<td>-0.0014</td>
<td>0.115</td>
<td>-0.0031</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td></td>
<td>0.3549**</td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.0196</td>
<td>0.511</td>
<td>-0.0781</td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.0332</td>
<td>0.287</td>
<td>-0.0279</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.0389</td>
<td>0.248</td>
<td>-0.0271</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.0009</td>
<td>0.983</td>
<td>-0.0167</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>0.0910</td>
<td>0.098</td>
<td>-0.1670</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0014</td>
<td>&lt;0.001</td>
<td>-0.0018</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.00004</td>
<td>&lt;0.001</td>
<td>0.00007</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>-0.0018</td>
<td>0.923</td>
<td>-0.0378</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>&lt;0.001**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.1346</td>
<td>&lt;0.001</td>
<td>-0.1841</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.1467</td>
<td>&lt;0.001</td>
<td>-0.2041</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p=0.0014)
**overall p-value**

After adjustment by practice-level indicators in a multiple regression model, there was no association between emergency hospital admission for stroke and mean reported QOF achievement for stroke-related clinical indicators by practices (Table 24). There were no significant associations between hospital admission for stroke and deprivation (IMD 2004 income quintile), Spearhead status of PCTs or PMS status of practices. Negative significant associations were observed with the GP caseload, GP education in the UK and the number of GPs per practice. However, regression models explained only around 3 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), there were weak but significant relationships between age/sex standardised emergency hospital admissions and mean reported QOF achievement (p<0.05): higher admissions were associated with lower achievement on QOF.
A.6.2 Coronary heart disease

Descriptive statistics

Mean achievement for CHD-related clinical QOF indicators was 82.37 percent (95 percent CI 82.19 percent-82.54 percent). It varied from 0.17 percent to 100 percent across all practices (median 83.54 percent). Figure 23 shows the overall distribution of QOF achievement: while resembling a normal distribution, it was skewed towards left (low-performing outlier practices).

Mean reported QOF achievement for CHD-related indicators was significantly higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (82.82 percent vs. 81.55 percent, Table 26). Similar relations were observed between QOF achievement for CHD-related indicators and practice-level deprivation, as measured by IMD 2004 income quintile (81.51 percent in the most deprived practices vs. 83.27 percent in the least deprived ones, Table 26).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 25.

Figure 23. Distribution of reported mean QOF achievement for clinical CHD indicators, by practices in England, 2004/05
Table 25. Mean crude and age/sex standardised rates of hospital admission for CHD, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude Rate per 1,000 people</th>
<th>95% CI Rate per 1,000 people</th>
<th>Standardised Rate per 1,000 people</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>11.81</td>
<td>11.69-11.93</td>
<td>Emergency 11.81</td>
<td></td>
</tr>
</tbody>
</table>

There were significant differences in emergency hospital admission rates by Spearhead status of PCTs and practice-level deprivation, with hospital admission rates for CHD-related complications being significantly higher in Spearhead areas and among the most deprived practices (10.64 in non-Spearhead practices vs. 15.71 in Spearhead practices; 10.63 in the least deprived practices vs. 14.90 in the most deprived ones). Differences were more substantial compared with QOF achievement (Table 26).

Table 26. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for CHD, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>95% CI</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81.55</td>
<td>81.24-81.86</td>
</tr>
<tr>
<td>No</td>
<td>82.82</td>
<td>82.61-83.03</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>83.27</td>
<td>82.92-83.61</td>
</tr>
<tr>
<td>2</td>
<td>82.56</td>
<td>82.18-82.94</td>
</tr>
<tr>
<td>3</td>
<td>82.47</td>
<td>82.09-82.84</td>
</tr>
<tr>
<td>4</td>
<td>82.15</td>
<td>81.76-82.54</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>81.51</td>
<td>81.07-81.95</td>
</tr>
</tbody>
</table>

There was significant but weak negative correlation between mean reported QOF achievement for CHD and hospital admissions for the same condition: higher admission rates were associated with lower QOF achievement (Table 27). Correlation was stronger and significant between hospital admissions and Spearhead status of PCTs or IMD 2004 income quintile: patients from more deprived or Spearhead practices were more likely to be admitted to the hospital as an emergency than patients from affluent or non-Spearhead practices (Table 27).
Table 27. Correlation between hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
</tr>
<tr>
<td>QOF achievement</td>
<td>-0.1050 (p&lt;0.001)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.2852 (p&lt;0.001)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>0.1448 (p&lt;0.001)</td>
</tr>
</tbody>
</table>

Regression models

We considered age/sex standardised hospital admission rate for CHD as an outcome (dependent variable), and mean reported QOF achievement for CHD-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 28).

Table 28. Relationship between age/sex standardised emergency hospital admission for CHD (2005/06) and mean reported QOF achievement for CHD-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical CHD-related indicators</td>
<td>-0.0243</td>
<td>0.002</td>
<td>-0.0398 -0.0088</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.1255</td>
<td>0.562</td>
<td>-0.5495 0.2986</td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.2842</td>
<td>0.208</td>
<td>-0.1587 0.7279</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.9702</td>
<td>&lt;0.001</td>
<td>0.4927 1.4477</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>1.0229</td>
<td>0.001</td>
<td>0.4448 1.6010</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>2.4423</td>
<td>&lt;0.001</td>
<td>1.6803 3.2042</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0166</td>
<td>&lt;0.001</td>
<td>-0.0201 -0.0130</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>0.00003</td>
<td>0.771</td>
<td>-0.0001 0.0002</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.5594</td>
<td>&lt;0.001</td>
<td>0.2990 0.8197</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td></td>
<td>0.1005**</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.1437</td>
<td>0.422</td>
<td>-0.4942 0.2068</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.4123</td>
<td>0.048</td>
<td>-0.8215 -0.0032</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p<0.001)

**overall p-value
After adjustment by practice-level indicators in a multiple regression model, there was negative significant association between emergency hospital admission for CHD and mean reported QOF achievement for CHD-related clinical indicators by practices (Table 28). There were positive significant associations between hospital admission for CHD and deprivation (IMD 2004 income quintile), Spearhead status of PCTs and PMS contract status of practices. Negative significant associations were observed with GP education in the UK and proportion of older age group. There were no significant associations between hospital admission for CHD and GP caseload or the number of GPs per practice. Regression models explain around 18 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), there was a similar (significant but weak) relationship between age/sex standardised emergency hospital admissions and mean reported QOF achievement (p<0.001): higher admissions were associated with lower achievement on QOF.
A.6.3 Hypertension

Descriptive statistics

Mean achievement for hypertension-related clinical QOF indicators was 82.59 percent (95 percent CI 82.41 percent-82.77 percent). It varied from 12.5 percent to 100 percent across all practices (median 84.09 percent). Figure 24 shows the overall distribution of QOF achievement: while resembling a normal distribution, it was skewed towards left (low-performing outlier practices).

Figure 24. Distribution of reported mean QOF achievement for clinical hypertension indicators, by practices in England, 2004/05

Mean reported QOF achievement for hypertension-related indicators was higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (83.01 percent vs. 81.83 percent, Table 30). Similar relations were observed between QOF achievement for hypertension-related indicators and practice-level deprivation, as measured by IMD 2004 income quintile (81.98 percent in the most deprived practices vs. 83.16 percent in the least deprived ones, Table 30).

The estimates of crude and standardised emergency hospital admission rates across all practices in England are presented in Table 29.
Table 29. Mean crude and age/sex standardised rates of admission for hypertension, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude Rate per 1,000 people</th>
<th>95% CI</th>
<th>Standardised Rate per 1,000 people</th>
<th>95% CI</th>
</tr>
</thead>
</table>

There were significant differences in emergency hospital admission rates by Spearhead status of PCTs and practice-level deprivation, regardless of type of admission (total, elective or emergency), with total hospital admission rates for hypertension being significantly higher in Spearhead areas and among the most deprived practices (9.55 in non-Spearhead practices vs. 12.38 in Spearhead practices; 9.56 in the least deprived practices vs. 12.23 in the most deprived ones). Differences were more substantial compared with QOF achievement (Table 30).

Table 30. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for hypertension, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% 95% CI</td>
<td>Rate per 1,000 people 95% CI</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81.83 81.51-82.15</td>
<td>12.38 12.20-12.57</td>
</tr>
<tr>
<td>No</td>
<td>83.01 82.79-83.22</td>
<td>9.55 9.44-9.67</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>83.16 82.82-83.51</td>
<td>9.56 9.37-9.75</td>
</tr>
<tr>
<td>2</td>
<td>82.82 82.44-83.20</td>
<td>9.60 9.40-9.80</td>
</tr>
<tr>
<td>3</td>
<td>82.76 82.36-83.17</td>
<td>10.16 9.94-10.39</td>
</tr>
<tr>
<td>4</td>
<td>82.30 81.87-82.72</td>
<td>11.27 11.03-11.50</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>81.98 81.55-82.40</td>
<td>12.23 11.97-12.50</td>
</tr>
</tbody>
</table>

There was a weak negative significant correlation between mean reported QOF achievement for hypertension and emergency hospital admissions: higher admission rates were associated with lower QOF achievement (Table 31). Correlation was stronger and significant between hospital admissions and Spearhead status of PCTs or deprivation (IMD 2004 income quintile): patients from more deprived or Spearhead practices were more likely to be admitted to hospital as an emergency than patients from affluent or non-Spearhead practices (Table 31).
Table 31. Correlation between hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
</tr>
<tr>
<td>QOF achievement</td>
<td>-0.0690 (p&lt;0.001)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.1509 (p&lt;0.001)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>0.0662 (p&lt;0.001)</td>
</tr>
</tbody>
</table>

Regression models

We considered age/sex standardised emergency hospital admission rate for hypertension as an outcome (dependent variable), and mean reported QOF achievement for hypertension-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 32).

Table 32. Relationship between age/sex standardised emergency hospital admission for hypertension (2005/06) and mean reported QOF achievement for hypertension-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical hypertension-related indicators</td>
<td>-0.0134</td>
<td>0.027</td>
<td>-0.0252, -0.0016</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td>&lt;0.001**</td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.3011</td>
<td>0.076</td>
<td>-0.6337, 0.0315</td>
</tr>
<tr>
<td>quintile 3</td>
<td>-0.2026</td>
<td>0.253</td>
<td>-0.5500, 0.1447</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.7315</td>
<td>&lt;0.001</td>
<td>0.3568, 1.1061</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.2078</td>
<td>0.369</td>
<td>-0.2453, 0.6609</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>0.8889</td>
<td>0.004</td>
<td>0.2912, 1.4867</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0223</td>
<td>&lt;0.001</td>
<td>-0.0250, -0.0195</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>0.00005</td>
<td>0.441</td>
<td>-0.00008, 0.0002</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.3631</td>
<td>0.001</td>
<td>0.1587, 0.5676</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td></td>
<td>0.0014**</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.3301</td>
<td>0.019</td>
<td>-0.6050, -0.0551</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.5929</td>
<td>&lt;0.001</td>
<td>-0.9139, -0.2718</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p<0.001)

**overall p-value
After adjustment by practice-level indicators in a multiple regression model, there was negative significant association between emergency hospital admission for hypertension and mean reported QOF achievement for hypertension-related clinical indicators by practices (Table 32). There were significant positive associations between hospital admission for hypertension and deprivation IMD 2004 income quintile, Spearhead status of PCT, and PMS contract status of practices; and negative significant associations with GP education in the UK and the number of GPs per practice. No significant relations were observed with GP caseload. Regression model explained only around 14 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), there was a significant but weak positive association between age/sex standardised emergency hospital admissions and mean reported QOF achievement ($p<0.001$): higher admissions were associated with higher achievement on QOF. Hypertension was the only clinical condition among those studied that in a univariate analysis (no adjustment for practice-level characteristics) showed positive association with QOF achievement. However, after adjustments for practice-level characteristics, as described above, the direction of relationships became negative, similar to other clinical conditions: higher emergency hospital admissions were associated with lower achievement on QOF.
A.6.4 Congestive heart failure

Descriptive statistics

Mean achievement for CHF-related clinical QOF indicators was 82.51 percent (95 percent CI 82.35 percent-82.67 percent). It varied from 12.5 percent to 100 percent across all practices (median 83.71 percent). Figure 25 shows the overall distribution of QOF achievement: a normal distribution, it was skewed towards left (low-performing outlier practices).

Figure 25. Distribution of reported mean QOF achievement for clinical CHF indicators, by practices in England, 2004/05

Mean reported QOF achievement for CHF-related indicators was higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (82.94 percent vs. 81.74 percent, Table 34). Similar relations were observed between QOF achievement for CHF-related indicators and practice-level deprivation, as measured by IMD 2004 income quintile (81.82 percent in the most deprived practices vs. 83.22 percent in the least deprived ones, Table 34).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 33.
Table 33. Mean crude and age/sex standardised rates of admission for CHF, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude Rates</th>
<th>Standardised Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate per 1,000 people</td>
<td>95% CI</td>
</tr>
<tr>
<td>Emergency</td>
<td>2.74</td>
<td>2.71-2.77</td>
</tr>
</tbody>
</table>

There were significant differences in emergency hospital admission rates by Spearhead status of PCTs and practice-level deprivation, with hospital admission rates for CHF being significantly higher in Spearhead areas and among the most deprived practices (2.69 in non-Spearhead practices vs. 3.34 in Spearhead practices; 2.64 in the least deprived practices vs. 3.30 in the most deprived ones). Differences were more substantial compared with QOF achievement (Table 34).

Table 34. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for congestive heart failure, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>Rate per 1,000 people</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81.74</td>
<td>81.46-82.03</td>
</tr>
<tr>
<td>No</td>
<td>82.94</td>
<td>82.75-83.13</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>83.22</td>
<td>82.91-83.54</td>
</tr>
<tr>
<td>2</td>
<td>82.71</td>
<td>82.36-83.06</td>
</tr>
<tr>
<td>3</td>
<td>82.68</td>
<td>82.33-83.03</td>
</tr>
<tr>
<td>4</td>
<td>82.24</td>
<td>81.87-82.62</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>81.82</td>
<td>81.44-82.21</td>
</tr>
</tbody>
</table>

There was a weak but negative significant correlation between mean reported QOF achievement for CHF and emergency hospital admissions for the same condition: higher admission rates were associated with lower QOF achievement (Table 35). Correlation was stronger and significant between hospital admissions and Spearhead status of PCTs or deprivation (IMD 2004 income quintile): patients from more deprived or Spearhead practices were more likely to be admitted to hospital than patients from affluent or non-Spearhead practices (Table 35).
Table 35. Correlation between emergency hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
</tr>
<tr>
<td>QOF achievement</td>
<td>-0.0847 (p&lt;0.001)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.0565 (p&lt;0.001)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>0.0105 (p=0.3424)</td>
</tr>
</tbody>
</table>

Regression models

We considered age/sex standardised hospital admission rate for CHF as an outcome (dependent) variable, and mean reported QOF achievement for CHF-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 36).

After adjustment by practice-level indicators in a multiple regression model, there was a significant but weak negative association between emergency hospital admission for CHF and mean reported QOF achievement for CHF-related clinical indicators by practices: the higher the QOF achievement, the lower the hospital admission rate (Table 36). There were positive significant associations between emergency hospital admission for CHF and deprivation IMD 2004 income quintile, as well as PMS contract status of practices. However, no significant associations were observed for Spearhead status of PCTs. There were negative significant associations with the GP caseload, the number of GPs per practice and GP education in the UK. However, regression models explain only around 8 percent of observed variations (R-squared estimate).
Table 36. Relationship between age/sex standardised emergency hospital admission for CHF (2005/06) and mean reported QOF achievement for CHF-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical CHF-related indicators</td>
<td>-0.0065</td>
<td>0.003</td>
<td>-0.0107 -0.0022</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td>0.0080**</td>
<td>0.00080**</td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.0469</td>
<td>0.384</td>
<td>-0.1525 0.0587</td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.0498</td>
<td>0.377</td>
<td>-0.0606 0.1602</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.1385</td>
<td>0.023</td>
<td>0.0195 0.2574</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.1560</td>
<td>0.034</td>
<td>0.0118 0.3002</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>0.0893</td>
<td>0.359</td>
<td>-0.1016 0.2802</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0043</td>
<td>&lt;0.001</td>
<td>-0.0052 -0.0034</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.0006</td>
<td>0.012</td>
<td>-0.0001 0.00001</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.1121</td>
<td>0.001</td>
<td>0.0471 0.1770</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td>&lt;0.001**</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td>-</td>
<td>&lt;0.001</td>
<td>-0.2653 -0.0893</td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.1773</td>
<td>&lt;0.001</td>
<td>-0.2653 -0.0893</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.2475</td>
<td>&lt;0.001</td>
<td>-0.3501 -0.1450</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p=0.0018)

**overall p-value

In a univariate analysis (not presented here), there was a similar (significant but weak) relationship between emergency admissions and mean reported QOF achievement: higher admissions were associated with lower achievement on QOF.
A.6.5 Diabetes

Descriptive statistics

Mean achievement for diabetes-related clinical QOF indicators was 78.21 percent (95 percent CI 78.01 percent-78.41 percent). It varied from 2.17 percent to 100 percent across all practices (median 80.17 percent). Figure 26 shows the overall distribution of QOF achievement: while resembling a normal distribution, it was skewed towards left (low-performing outlier practices).

Figure 26. Distribution of reported mean QOF achievement for clinical diabetes indicators, by practices in England, 2004/05

Mean reported QOF achievement for diabetes-related indicators was higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (78.64 percent vs. 77.42 percent, Table 38). Similar relations were observed between QOF achievement for diabetes-related indicators and practice-level deprivation, as measured by IMD 2004 income quintile (76.84 percent in the most deprived practices vs. 79.08 percent in the least deprived ones, Table 38).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 37.
Table 37. Mean crude and age/sex standardised rates of admission for diabetes, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude</th>
<th>Standardised</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate per 1,000 people</td>
<td>95% CI</td>
</tr>
<tr>
<td>Emergency</td>
<td>0.88</td>
<td>0.87-0.89</td>
</tr>
</tbody>
</table>

There were significant differences in emergency hospital admission rates by Spearhead status of PCTs and practice-level deprivation, with total hospital admission rates for diabetes being significantly higher in Spearhead areas and among the most deprived practices (0.82 in non-Spearhead practices vs. 1.16 in Spearhead practices; 0.82 in the least deprived practices vs. 1.14 in the most deprived ones, Table 38).

Table 38. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for diabetes, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>95% CI</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>77.42</td>
<td>77.06-77.78</td>
</tr>
<tr>
<td>No</td>
<td>78.64</td>
<td>78.40-78.87</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>79.08</td>
<td>78.70-79.47</td>
</tr>
<tr>
<td>2</td>
<td>78.74</td>
<td>78.32-79.16</td>
</tr>
<tr>
<td>3</td>
<td>78.48</td>
<td>78.05-78.90</td>
</tr>
<tr>
<td>4</td>
<td>77.93</td>
<td>77.46-78.40</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>76.84</td>
<td>76.35-77.34</td>
</tr>
</tbody>
</table>

There was significant but weak negative correlation between mean reported QOF achievement for diabetes and emergency hospital admissions for the same condition: higher admission rates were associated with lower QOF achievement (Table 39). Correlation was stronger and significant between hospital admissions and indicators of deprivation (Spearhead status of PCTs; IMD 2004 income quintile): patients from more deprived or Spearhead practices were more likely to be admitted to hospital as an emergency than patients from affluent or non-Spearhead practices (Table 39).
Table 39. Correlation between emergency hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
</tr>
<tr>
<td>QOF achievement</td>
<td>-0.0886 (p&lt;0.001)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.1317 (p&lt;0.001)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>0.0797 (p&lt;0.001)</td>
</tr>
</tbody>
</table>

Regression models

We considered age/sex standardised emergency hospital admission rate for diabetes as an outcome (dependent variable), and mean reported QOF achievement for diabetes-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 40).

Table 40. Relationship between age/sex standardised emergency hospital admission for diabetes (2005/06) and mean reported QOF achievement for diabetes-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical diabetes, related indicators</td>
<td>-0.0050</td>
<td>&lt;0.001</td>
<td>-0.0069 -0.0030</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)</td>
<td></td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.0124</td>
<td>0.643</td>
<td>-0.0648 0.0400</td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.0319</td>
<td>0.238</td>
<td>-0.0211 0.0849</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.0391</td>
<td>0.156</td>
<td>-0.0150 0.0932</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.1197</td>
<td>&lt;0.001</td>
<td>0.0625 0.1768</td>
</tr>
<tr>
<td>Spearhead status of PCTs</td>
<td>0.2505</td>
<td>&lt;0.001</td>
<td>0.2117 0.2892</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0016</td>
<td>&lt;0.001</td>
<td>-0.0021 -0.0012</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.00002</td>
<td>0.051</td>
<td>0.00005 1.54e-07</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.0477</td>
<td>0.008</td>
<td>0.0122 0.0831</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td></td>
<td>&lt;0.001*</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.0804</td>
<td>0.001</td>
<td>-0.1294 0.0314</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.1395</td>
<td>&lt;0.001</td>
<td>-0.1964 -0.0827</td>
</tr>
</tbody>
</table>

*overall p-value

After adjustment by practice-level indicators in a multiple regression model, there was significant but weak association between total hospital admission for diabetes and mean reported QOF achievement for diabetes-related clinical indicators by practices: the higher the QOF achievement, the lower the hospital admission rate (Table 40). There were positive significant
associations between hospital admission for diabetes and deprivation (IMD 2004 income quintile) or Spearhead status of PCTs, and PMS contract status of practices; negative significant associations with the GP caseload (borderline significance), number of GPs per practice and GP education in the UK. However, regression models explained only around 7 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), there were weak but significant negative relationships between standardised hospital admissions and mean reported QOF achievement: higher admissions were associated with lower achievement on QOF.
A.6.6 COPD

Descriptive statistics

Mean achievement for COPD-related clinical QOF indicators was 90.67 percent (95 percent CI 90.45 percent–90.89 percent). It varied from 0 percent to 100 percent across all practices (median 93.61 percent). Figure 27 shows the overall distribution of QOF achievement: it was skewed towards left.

Figure 27. Distribution of reported mean QOF achievement for clinical COPD indicators, by practices in England, 2004/05

Mean reported QOF achievement for COPD-related indicators was higher in primary care practices within non-Spearhead PCTs compared to practices in Spearhead PCTs, although differences were small (91.49 percent vs. 91.23–91.76 percent, Table 42). Similar relations were observed between QOF achievement for COPD-related indicators and practice-level deprivation, as measured by IMD 2004 income quintile (89.24 percent in the most deprived practices vs. 92.26 percent in the least deprived ones, Table 42).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 41.
Table 41. Mean crude and age/sex standardised rates of hospital admission for COPD, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude Rate per 1,000 people</th>
<th>95% CI</th>
<th>Standardised Rate per 1,000 people</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>3.87</td>
<td>3.82-3.92</td>
<td>4.16</td>
<td>4.10-4.22</td>
</tr>
</tbody>
</table>

There were significant differences in hospital admission rates by Spearhead status of PCTs and practice-level deprivation, with total hospital admission rates for COPD being significantly higher in Spearhead areas and among the most deprived practices (3.35 in non-Spearhead practices vs. 5.62 in Spearhead practices; 3.39 in the least deprived practices vs. 5.31 in the most deprived ones, Table 42).

Table 42. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for COPD, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement</th>
<th>Emergency hospital admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>95% CI</td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>89.18</td>
<td>88.78-89.59</td>
</tr>
<tr>
<td>No</td>
<td>91.49</td>
<td>91.23-91.76</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>92.26</td>
<td>91.88-92.65</td>
</tr>
<tr>
<td>2</td>
<td>91.08</td>
<td>90.58-91.57</td>
</tr>
<tr>
<td>3</td>
<td>90.83</td>
<td>90.36-91.30</td>
</tr>
<tr>
<td>4</td>
<td>90.02</td>
<td>89.47-90.54</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>89.24</td>
<td>88.66-89.83</td>
</tr>
</tbody>
</table>

There was significant but relatively weak negative correlation between mean reported QOF achievement for COPD and emergency hospital admissions for the same condition: higher admission rates were associated with lower QOF achievement (Table 43). Correlation was stronger and significant between hospital admissions and Spearhead status of PCTs or deprivation (IMD 2004 income quintile), and particularly with the Spearhead status of PCTs: patients from more deprived or Spearhead practices were more likely to be admitted to hospital as an emergency than patients from affluent or non-Spearhead practices (Table 43).
Table 43. Correlation between emergency hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
</tr>
<tr>
<td>QOF achievement</td>
<td>-0.1864 (p&lt;0.001)</td>
</tr>
<tr>
<td>Spearhead status</td>
<td>0.3056 (p&lt;0.001)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td>0.1401 (p&lt;0.001)</td>
</tr>
</tbody>
</table>

Regression models

We considered age/sex standardised emergency hospital admission rate for COPD as an outcome (dependent variable), and mean reported QOF achievement for COPD-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 44).

Table 44. Relationship between age/sex standardised emergency hospital admission for COPD (2005/06) and mean reported QOF achievement for COPD-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical COPD-related indicators</td>
<td>-0.0099</td>
<td>&lt;0.001</td>
<td>-0.0153 -0.0045</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td>0.0001**</td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.0710</td>
<td>0.462</td>
<td>-0.2603 0.1183</td>
</tr>
<tr>
<td>quintile 3</td>
<td>-0.0069</td>
<td>0.954</td>
<td>-0.2046 0.1907</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.2778</td>
<td>0.011</td>
<td>0.0644 0.4912</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.4535</td>
<td>0.001</td>
<td>0.1951 0.7120</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>0.9671</td>
<td>&lt;0.001</td>
<td>0.6260 1.3083</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0051</td>
<td>&lt;0.001</td>
<td>-0.0067 -0.0035</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.0001</td>
<td>0.001</td>
<td>-0.0002 0.00005</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.2520</td>
<td>&lt;0.001</td>
<td>0.1358 0.3682</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td></td>
<td>0.0001**</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.2579</td>
<td>0.001</td>
<td>-0.4150 -0.1008</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.3933</td>
<td>&lt;0.001</td>
<td>-0.5765 -0.2101</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p<0.001)

**overall p-value
After adjustment by practice-level indicators in a multiple regression model, there was significant but weak association between emergency hospital admission for COPD and mean reported QOF achievement for COPD-related clinical indicators by practices: the higher the QOF achievement, the lower the hospital admission rate (Table 44). There were positive significant associations between hospital admission for COPD and deprivation (IMD 2004 income quintile) or Spearhead status of PCTs, and PMS contract status of practices; negative significant associations with the GP caseload, the number of GPs per practice and GP education in the UK. However, regression models explained only around 18 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), there was a similar (significant but weak) relationship between emergency hospital admissions and mean reported QOF achievement: higher admissions were associated with lower achievement on QOF.
A.6.7 Asthma

Descriptive statistics

Mean achievement for asthma related clinical QOF indicators was 76.58 percent (95 percent CI 76.34 percent-76.83 percent). It varied from 6.67 percent to 100 percent across all practices (median 77.95 percent). Figure 28 shows the overall distribution of QOF achievement: while resembling a normal distribution, it was skewed towards left (low-performing outlier practices).

Figure 28. Distribution of reported mean QOF achievement for clinical asthma indicators, by practices in England, 2004/05

There were no significant differences in mean reported QOF achievement for asthma-related indicators between practices in Spearhead and non-Spearhead PCTS, as well as in the most and the least deprived practices (Table 46).

The estimates of crude and age/sex standardised emergency hospital admission rates across all practices in England are presented in Table 45.
Table 45. Mean crude and age/sex standardised rates of emergency hospital admission for asthma, 2005/06

<table>
<thead>
<tr>
<th>Rates</th>
<th>Crude Rate per 1,000 people</th>
<th>95% CI</th>
<th>Standardised Rate per 1,000 people</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>4.19</td>
<td>4.14-4.24</td>
<td>4.37</td>
<td>4.32-4.43</td>
</tr>
</tbody>
</table>

There were significant differences in emergency hospital admission rates by Spearhead status of PCTs and practice-level deprivation, with hospital admission rates for asthma being significantly higher in Spearhead areas and among the most deprived practices (3.81 in non-Spearhead practices vs. 5.39 in Spearhead practices; 3.86 in the least deprived practices vs. 5.10 in the most deprived ones, Table 46).

Table 46. Differences in reported mean QOF achievement (2004/05) and emergency hospital admissions (2005/06) for asthma, by IMD 2004 income quintile and Spearhead status

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean QOF achievement %</th>
<th>95% CI</th>
<th>Emergency hospital admissions Rate per 1,000 people</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>76.36</td>
<td>75.92-76.80</td>
<td>5.39</td>
<td>5.29-5.50</td>
</tr>
<tr>
<td>No</td>
<td>76.71</td>
<td>76.41-77.01</td>
<td>3.81</td>
<td>3.76-3.86</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>76.78</td>
<td>76.27-77.28</td>
<td>3.86</td>
<td>3.76-3.95</td>
</tr>
<tr>
<td>2</td>
<td>76.74</td>
<td>76.19-77.30</td>
<td>3.97</td>
<td>3.87-4.08</td>
</tr>
<tr>
<td>3</td>
<td>76.77</td>
<td>76.24-77.31</td>
<td>4.32</td>
<td>4.20-4.44</td>
</tr>
<tr>
<td>4</td>
<td>76.39</td>
<td>75.81-76.98</td>
<td>4.64</td>
<td>4.52-4.76</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>76.28</td>
<td>75.69-76.88</td>
<td>5.10</td>
<td>4.96-5.24</td>
</tr>
</tbody>
</table>

There was no significant correlation between mean reported QOF achievement for asthma and emergency hospital admissions for the same condition (Table 47). Correlation was significant between hospital admissions and Spearhead status of PCTs or deprivation (IMD 2004 income quintile): patients from more deprived or Spearhead practices were more likely to be admitted to hospital than patients from affluent or non-Spearhead practices (Table 47).
### Table 47. Correlation between emergency hospital admissions (2005/06) and QOF achievement (2004/05), Spearhead status, IMD 2004 income quintile

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Total emergency admissions</th>
<th>Crude</th>
<th>Standardised</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>QOF achievement</td>
<td></td>
<td>-0.0161 (p=0.1441)</td>
<td>-0.0178 (p=0.1064)</td>
<td></td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td>0.2827 (p&lt;0.001)</td>
<td>0.3092 (p&lt;0.001)</td>
<td></td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td>0.1418 (p&lt;0.001)</td>
<td>0.1792 (p&lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>

**Regression models**

We considered age/sex standardised emergency hospital admission rate for asthma as an outcome (dependent) variable, and mean reported QOF achievement for asthma-related clinical indicators as an explanatory (independent) variable, adjusted for practice-level indicators, in a multiple regression model (Table 48).

### Table 48. Relationship between age/sex standardised emergency hospital admission for asthma (2005/06) and mean reported QOF achievement for asthma-related clinical indicators (2004/05), adjusted for practice-level indicators

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean reported QOF achievement for clinical ASTHMA-related indicators</td>
<td>-0.0030</td>
<td>0.171</td>
<td>-0.0073</td>
</tr>
<tr>
<td>Area deprivation (IMD 2004 income quintile)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 1 (least quintile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quintile 2</td>
<td>-0.0183</td>
<td>0.834</td>
<td>-0.1893</td>
</tr>
<tr>
<td>quintile 3</td>
<td>0.0796</td>
<td>0.383</td>
<td>-0.0990</td>
</tr>
<tr>
<td>quintile 4</td>
<td>0.3483</td>
<td>&lt;0.001</td>
<td>0.1557</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.0904</td>
<td>0.446</td>
<td>-0.1423</td>
</tr>
<tr>
<td>Spearhead status of PCTs*</td>
<td>0.9623</td>
<td>&lt;0.001</td>
<td>0.6547</td>
</tr>
<tr>
<td>GP education in the UK (percentage)</td>
<td>-0.0054</td>
<td>&lt;0.001</td>
<td>-0.0068</td>
</tr>
<tr>
<td>GP caseload (number of patients / FTEs)</td>
<td>-0.00010</td>
<td>0.007</td>
<td>-0.0002</td>
</tr>
<tr>
<td>PMS status of practices</td>
<td>0.1422</td>
<td>0.008</td>
<td>0.0372</td>
</tr>
<tr>
<td>Number of GPs per practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 GPs</td>
<td>-0.1907</td>
<td>0.008</td>
<td>-0.3323</td>
</tr>
<tr>
<td>5+ GPs</td>
<td>-0.2442</td>
<td>0.004</td>
<td>-0.4097</td>
</tr>
</tbody>
</table>

*significant interaction between area deprivation and Spearhead status of PCTs (p=0.0002)

**overall p-value
After adjustment by practice-level indicators in a multiple regression model, there was no significant association between emergency hospital admission for asthma and mean reported QOF achievement for asthma-related clinical indicators by practices (Table 48). There were some significant positive associations between hospital admission for asthma and deprivation (IMD 2004 income quintile) or Spearhead status of PCTs, and PMS contract status of practices; negative significant associations with the GP caseload, GP education in the UK, and the number of GPs per practice. However, regression models explained only around 12 percent of observed variations (R-squared estimate).

In a univariate analysis (not presented here), no significant association was observed between emergency hospital admissions and mean reported QOF achievement for asthma.
Appendix 7 Cross-sectional analyses for QOF achievement in 2004/05 and emergency hospital admissions in 2004/05

Table 49. Emergency hospital admission rates (2004/05, per 1,000 patients, with 95% CI) by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>CHD</th>
<th>Hypertension</th>
<th>Stroke</th>
<th>CHF</th>
<th>Diabetes</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>All practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHD</td>
<td>11.54 (11.40-11.67)</td>
<td>8.94 (8.84-9.04)</td>
<td>1.51 (1.49-1.53)</td>
<td>2.94 (2.91-2.97)</td>
<td>0.85 (0.83-0.87)</td>
<td>3.99 (3.93-4.05)</td>
<td>4.03 (3.98-4.09)</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COPD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearhead status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14.70 (14.45-14.96)</td>
<td>10.60 (10.41-10.79)</td>
<td>1.67 (1.61-1.72)</td>
<td>3.36 (3.30-3.42)</td>
<td>1.02 (0.98-1.05)</td>
<td>5.45 (5.34-5.56)</td>
<td>4.96 (4.86-5.07)</td>
</tr>
<tr>
<td>No</td>
<td>9.79 (9.67-9.92)</td>
<td>8.03 (7.93-8.14)</td>
<td>1.42 (1.40-1.44)</td>
<td>2.71 (2.67-2.75)</td>
<td>0.76 (0.74-0.78)</td>
<td>3.19 (3.13-3.25)</td>
<td>3.52 (3.47-3.57)</td>
</tr>
<tr>
<td>IMD 2004 income quintile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9.87 (9.64-10.10)</td>
<td>8.04 (7.85-8.23)</td>
<td>1.40 (1.37-1.44)</td>
<td>2.66 (2.60-2.73)</td>
<td>0.73 (0.70-0.76)</td>
<td>3.23 (3.13-3.32)</td>
<td>3.54 (3.44-3.63)</td>
</tr>
<tr>
<td>2</td>
<td>10.40 (10.16-10.65)</td>
<td>8.10 (7.91-8.29)</td>
<td>1.45 (1.42-1.49)</td>
<td>2.79 (2.72-2.86)</td>
<td>0.79 (0.76-0.82)</td>
<td>3.51 (3.40-3.62)</td>
<td>3.77 (3.66-3.88)</td>
</tr>
<tr>
<td>3</td>
<td>11.35 (11.07-11.63)</td>
<td>8.68 (8.46-8.91)</td>
<td>1.53 (1.45-1.61)</td>
<td>2.95 (2.87-3.02)</td>
<td>0.83 (0.80-0.87)</td>
<td>3.89 (3.76-4.01)</td>
<td>3.95 (3.83-4.06)</td>
</tr>
<tr>
<td>4</td>
<td>12.47 (12.18-12.77)</td>
<td>9.68 (9.46-9.91)</td>
<td>1.54 (1.50-1.58)</td>
<td>3.12 (3.04-3.20)</td>
<td>0.94 (0.90-0.99)</td>
<td>4.38 (4.25-4.52)</td>
<td>4.30 (4.19-4.42)</td>
</tr>
<tr>
<td>5</td>
<td>13.74 (13.38-14.11)</td>
<td>10.32 (10.07-10.57)</td>
<td>1.63 (1.58-1.68)</td>
<td>3.22 (3.13-3.30)</td>
<td>0.97 (0.93-1.01)</td>
<td>5.01 (4.82-5.19)</td>
<td>4.65 (4.51-4.79)</td>
</tr>
</tbody>
</table>

Table 50. Correlation between emergency hospital admissions rates (2004/05) and QOF achievement (2004/05) for selected clinical conditions by Spearhead status and income quintile

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>QOF achievement</th>
<th>Spearhead status</th>
<th>IMD 2004 income quintile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spearman coefficient</td>
<td>p-value</td>
<td>Spearman coefficient</td>
</tr>
<tr>
<td>CHD</td>
<td>-0.0825 &lt;0.001</td>
<td>0.3852 &lt;0.001</td>
<td>0.2273 &lt;0.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-0.0450 &lt;0.001</td>
<td>0.2682 &lt;0.001</td>
<td>0.1833 &lt;0.001</td>
</tr>
<tr>
<td>Stroke</td>
<td>-0.0365 0.0011</td>
<td>0.1315 &lt;0.001</td>
<td>0.0769 &lt;0.001</td>
</tr>
<tr>
<td>CHF</td>
<td>-0.0534 &lt;0.001</td>
<td>0.2135 &lt;0.001</td>
<td>0.1468 &lt;0.001</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-0.1092 &lt;0.001</td>
<td>0.1431 &lt;0.001</td>
<td>0.1045 &lt;0.001</td>
</tr>
<tr>
<td>COPD</td>
<td>-0.1744 &lt;0.001</td>
<td>0.4055 &lt;0.001</td>
<td>0.2212 &lt;0.001</td>
</tr>
<tr>
<td>Asthma</td>
<td>-0.0148 0.1793</td>
<td>0.2721 &lt;0.001</td>
<td>0.1539 &lt;0.001</td>
</tr>
</tbody>
</table>
Addendum:

This document is an output from a research project that was commissioned by the Service Delivery and Organisation (SDO) programme whilst it was managed by the National Coordinating Centre for the Service Delivery and Organisation (NCCSDO) at the London School of Hygiene & Tropical Medicine. The NIHR SDO programme is now managed by the National Institute for Health Research Evaluations, Trials and Studies Coordinating Centre (NETSCC) based at the University of Southampton.

Although NETSCC, SDO has managed the project and conducted the editorial review of this document, we had no involvement in the commissioning, and therefore may not be able to comment on the background of this document. Should you have any queries please contact sdo@southampton.ac.uk.