Population intermediate outcomes of diabetes under pay for performance incentives in England from 2004 to 2008

Short title: *Diabetes outcomes and pay for performance*

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Objective: To evaluate diabetes outcomes under a national 'pay-for-performance' program.

Research Design and Methods: Data were analysed for 98% of all English family practices. For each practice, the proportion of diabetes subjects with HbA1c ≤7.5%, blood pressure ≤145/85mm Hg and cholesterol ≤5mmol/l was determined. Practices achieving less than the 25th centile for the HbA1c target for 2006-7 were classed as low-performing.

Results: The proportion achieving the HbA1c target at the median practice increased from 59.1% (interquartile range, IQR 51.7%-65.9%) in 2004-5 to 66.7% (IQR 60.6%-72.7%) in 2007-8; blood pressure from 70.9% in 2004-5 to 80.2% in 2007-8; cholesterol from 72.6% in 2004-5 to 83.6% in 2007-8. In 2004-5, 57% of practices were low-performing, (range by region, 42.4%-69.9%). In 2007-8, 26% of practices were low-performing (range 11.6%-37.5%).

Conclusion: Introduction of pay-for-performance may be one factor contributing to increasing achievement of targets and reducing problems of low performance.
In England, a novel system of contractual financial incentives, called the Quality and Outcomes Framework (QOF), has been introduced to reward family practices for achieving clinical targets across a range of conditions, including diabetes(1). Up to one third of practice income may be derived from the QOF, with diabetes accounting for nearly 10% of all incentives. Data are extracted from GP computer systems on 31st March each year and the most recent diabetes indicator measures are used to evaluate targets(2). We aimed to evaluate trends in the achievement of intermediate outcome targets following the introduction of pay-for-performance in 2004.

RESEARCH DESIGN AND METHODS

Administrative (QOF) data describing family practices' performance under the program were analysed for the years 2004-2008(3). Data for each family practice included the number of registered diabetic subjects, the proportion of eligible subjects that achieved the targets, and the proportion of diabetic subjects excluded from evaluation of each target as 'exceptions'. Exceptions arise because practices are permitted to identify some individuals as ineligible for evaluation if the target is regarded as clinically inappropriate(4). The targets included in this report were the percent of diabetes subjects with the last HbA1c ≤ 7.5%; with last blood pressure ≤ 145/85 mm Hg; or with the last measured total cholesterol ≤ 5 mmol/L. We estimated the total number of registered diabetes subjects, the total number excluded as ineligible, the number (and percent) that achieved the target after allowing for exclusions. The linear association between outcomes and year was estimated using robust standard errors to allow for repeated measures.

RESULTS

Data were analysed for family practices in England that remained independent and had more than 750 registered patients, or more than 500 patients per doctor, in the study year. Data were analysed for 8,423 practices in 2004-5, 8,264 in 2005-6, 8,192 in 2006-7 and 8,255 in 2007-8, representing approximately 98% of all practices. The number of registered diabetic subjects per practice increased from median 181 (interquartile range 107 to 284) in 2004-5 to 218 (IQR 130 to 342) in 2007-8 (Table). The total registered diabetic population increased from 1,764,063 in 2004-5 to 2,087,487 in 2007-8. The estimated resident population of England is approximately 51 million(5) giving an overall prevalence of approximately 4%. The median practice specific proportion of diabetic subjects declared ineligible for the HbA1c target was 9.4% in 2004-5 but declined to 8.7% in 2007-8 (P<0.001). The median proportion excluded for the blood pressure target was 6.3% in 2004-5 declining to 5.7% in 2007-8 (P<0.001) and for cholesterol, 9.0% in 2004-5 declining to 8.4% in 2007-8 (P<0.001).

The median practice-specific proportion achieving the HbA1c target of ≤ 7.5% increased from 59.1% in 2004-5 to 66.7% in 2007-8 (Table). The proportion achieving the blood pressure target of ≤ 145/85 mm Hg increased from 70.9% in 2004-5 to 80.2% in 2007-8. The proportion achieving the cholesterol target of ≤ 5 mmol/L increased from 72.6% in 2004-5 to 83.6% in 2007-8. The estimated annual increase in percent of diabetes subjects achieving targets was 3.03% (95% confidence interval, CI 2.95% to 3.10%, P<0.001) for the HbA1c target; 3.26% (95%CI 3.18% to 3.34%, P<0.001) for the blood pressure target; and 3.99% (95%CI 3.92% to 4.07%, P<0.001) for the cholesterol target.

The total number of diabetes subjects in England achieving the HbA1c target, after allowing for exclusions from assessment, increased by 341,173 between 2004-5 and 2007-8, representing 16% of diabetes subjects registered in 2007-8. Over the same period, the number achieving the blood pressure target increased by 453,785 (22% of
2007-8 registrations), and the number achieving the cholesterol target increased by 452,347 (22% of 2007-8 registrations).

Practices were classed as low-performing if they achieved less than the 25th centile for the HbA1c target across all practices in 2006-7. There were 57% of practices classed as low-performing in 2004-5. Among the ten English regions, 69.9% of practices were low-performing in London compared with 42.4% in the North West region. The overall proportion of low-performing practices declined to 47.4% in 2005-6, 25.0% in 2006-7 and 26.0% in 2007-8. In 2007-8, the proportion of low-performing practices ranged from 37.5% in London to 11.6% in the North East.

CONCLUSIONS
In the United Kingdom, the care of subjects with type 2 diabetes is increasingly undertaken outside of specialist clinics by family physicians and practice nurses in primary care. This has led to concerns that some patients may experience poor quality care(6). The new national contract for family practices introduced in 2004 scheme appears to have achieved favourable results in its initial year(4,7) and may have contributed to reducing socioeconomic inequalities in care(8,9).

The overall level of achievement of diabetes targets increased over four years. Lower-performing practices have shown the greatest improvements and regional variations in care have reduced. There has been a substantial increase in the proportion of all diabetes subjects achieving intermediate outcome targets. In our previous report we analysed clinical data from individual patient records for 26 practices in the period 2000-2003 that gave results consistent with administrative data from the QOF. Two other reports, including data from the first or second years of QOF, suggest that QOF data are consistent with audits of individual patients records(10,11).

In a single group study, without any control practices, it is not possible to conclude that pay-for-performance incentives caused the observed changes. Other development efforts may have been influential. There was already evidence of improving quality of care before the introduction of QOF(7,12). The QOF targets are designed for audit rather than best practice, and practitioners may be utilising clinical practice guidelines that recommend more stringent targets. Recommendations for widespread use of statins were introduced in many countries at the start of this period, leading to improvements even in the absence of pay-for-performance. The greater improvement of low-performing practices may, in part, be accounted for by a ceiling effect which restricted the potential improvement in high performing practices. We caution that it is not clear that proposed benefits from pay-for-performance would be observed if this model is adopted in systems with different organisational arrangements and models of practitioner remuneration.
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Table 1: Centiles for the achievement of intermediate outcome targets for English family practices by year.
Figures are percents of registered diabetes subjects at each practice except where indicated.

| Count of registered diabetes patients | Centiles of distribution for English family practices | Total number of subjects |
|---------------------------------------|-----------------------------------------------------|--------------------------|
|                                       | 1%  | 25% | Median | 75% | 99% | Figure are frequencies | Number of subjects |
|                                       |     |     |        |     |     |                          | (% year total)     |
| 2004-5                                | 29  | 107 | 181    | 284 | 601 | 1,764,063                | 194,226 (11.0)     |
| 2005-6                                | 36  | 118 | 196    | 307 | 650 | 1,877,748                | 216,200 (11.5)     |
| 2006-7                                | 34  | 121 | 205    | 322 | 689 | 1,944,006                | 225,205 (11.6)     |
| 2007-8                                | 39  | 130 | 218    | 342 | 730 | 2,087,487                | 209,090 (10.0)     |

Excluded from HbA1c target as exceptions

| Achieving HbA1c ≤7.5 % | 2004-5 | 28.0 | 51.7 | 59.1 | 65.9 | 89.7 | 845,522 (48.0) |
|                        | 2005-6 | 34.5 | 55.1 | 61.7 | 68.5 | 88.9 | 946,455 (50.4) |
|                        | 2006-7 | 42.7 | 61.1 | 67.6 | 74.3 | 95.6 | 1,094,684 (56.3) |
|                        | 2007-8 | 43.1 | 60.6 | 66.7 | 72.7 | 88.5 | 1,186,695 (57.0) |

Achieving Blood Pressure ≤145/85 mm Hg

| Achieving Blood Pressure ≤145/85 mm Hg | 2004-5 | 41.5 | 63.4 | 70.9 | 78.1 | 94.6 | 1,064,995 (60.0) |
|                                       | 2005-6 | 49.3 | 68.8 | 75.7 | 81.9 | 95.4 | 1,218,981 (64.9) |
|                                       | 2006-7 | 56.0 | 73.5 | 79.6 | 85.3 | 98.6 | 1,382,037 (71.1) |
|                                       | 2007-8 | 58.8 | 74.5 | 80.2 | 85.4 | 96.6 | 1,518,780 (73.0) |

Achieving Cholesterol ≤5.0 mmol/l

| Achieving Cholesterol ≤5.0 mmol/l | 2004-5 | 38.7 | 64.7 | 72.6 | 79.3 | 93.5 | 1,092,954 (62.0) |
|                                   | 2005-6 | 52.2 | 73.5 | 79.8 | 84.9 | 95.8 | 1,297,068 (69.1) |
|                                   | 2006-7 | 61.1 | 78.8 | 83.7 | 88.0 | 98.5 | 1,421,629 (73.1) |
|                                   | 2007-8 | 63.8 | 79.4 | 83.6 | 87.5 | 96.0 | 1,545,301 (74.0) |

a subjects excluded through 'exception reporting' were assumed not to have achieved target