

The effectiveness of UK-provider financial incentives on quality of care: systematic review

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Abstract

Background

Provider financial incentives are being increasingly adopted to help improve standards of care whilst promoting efficiency.

Aim

To review the UK evidence on whether provider financial incentives are an effective way of improving quality of care.

Design and Setting

Systematic review adhering to PRISMA recommendations.

Method

Medline and Embase databases were searched in August 2016. We included original articles that assessed the relationship between UK-provider financial incentives and a quantitative measure of quality of health care. We defined positive studies as those showing improvement for all measures of quality of care; Intermediate studies showing improvement in some measures; Negative studies showing worsening of measures. Quality assessment: Downs and Black quality checklist.

Results

Out of the 232 publications identified by the systematic search, 28 were included. Nine articles reported positive effects of incentives on quality of care, 16 reported intermediate effects, 2 reported no effect and 1 reported a negative effect. Quality assessment of included articles ranged between 15 to 19 out of a maximum of 22 points.

Conclusion

The effects of UK-provider financial incentives on health care quality are unclear. **Owing to this uncertainty and their significant costs, the use of provider financial incentives may be counter-productive to their goal of improving health care quality and efficiency.** UK policy makers should be cautious when implementing these incentives and if implemented, should be subject to careful long-term monitoring and evaluation. **Research is needed to assess whether UK-provider financial incentives represent a cost-effective intervention to improve the quality of care delivered.**

MeSH Keywords General Practice, Hospitals, Quality of Health Care, Motivation, Efficiency, Health policy

How this fits in

Provider financial incentives are being increasingly used in the NHS to promote efficiency whilst improving quality of care. This systematic review concludes that the effects of UK-provider financial incentives on health care quality are unclear and their use may be counter-productive to their goal of improving health care quality and efficiency.

Introduction

In the United Kingdom (UK), events including inquiries into Mid Staffordshire NHS Foundation Trust and paediatric cardiac surgery at Bristol Royal Infirmary have made safety and quality of care a major priority for health care professionals, politicians and the public.^{1,2} Policies aiming to improve quality of health care frequently focus on provider financial incentives,²⁻⁶ which are being increasingly used across the NHS to promote efficiency whilst maintaining or improving standards of care.^{2,5,7-9} Provider financial incentives traditionally consist of 4 main approaches: Capitation; fee-for-service; salary; and block budgets. Since the last decade, pay-for-performance and reputational payments (public reporting or PR) are also being implemented.⁴ The UK Quality and Outcomes Framework (QOF), introduced in April 2004, represents the world's largest primary care pay-for-performance programme, aiming to reward general practices for delivering good quality of care.⁹

There is uncertainty on the effectiveness of provider financial incentives in improving quality and safety of care.^{10,11} This paper reviews and critically appraises the evidence on whether provider financial incentives are an effective way of improving the quality of care delivered by health systems. Because the international evidence has been systematically reviewed in previous work^{4,5,7,12} we focus our review on the UK literature, aiming to specifically inform UK decision makers.

Method

A systematic review of the UK literature assessing the use of provider financial incentives to improve the quality of health care was performed adhering to the Preferred Reporting Items

for Systematic Reviews and Meta-Analyses (PRISMA) recommendations.¹³ A senior expert librarian designed and conducted a comprehensive search of the Medline and Embase databases from inception to August 2016 using the Ovid portal. The search terms used were: provider; providers; physicians; hospital; financial incentives; payment; reimbursement; fees; payment system; patient safety; quality of care; quality of healthcare; quality of health care; Britain or United Kingdom or UK or England or Northern Ireland or Wales or Scotland. Two authors (R.M and N.M), working independently, screened all titles and abstracts for eligibility; and records considered potentially relevant were retrieved in full text and assessed for eligibility. Reference lists of review articles were also screened to identify additional relevant articles. Any disagreements were discussed with the senior author (E.M) and resolved by consensus. Information were extracted independently by two authors (R.M and N.M) and disagreements were resolved by discussion and consensus.

We included English-language, original articles, that assessed the relationship between UK-provider financial incentives and a quantitative measure of the quality of health care. Included articles assessed financial incentives as the independent variable and quality of health care as the dependent variable. Articles were excluded if there was no comparison group or baseline analysis before the intervention. After identifying included articles, all publications published by each included author were screened on 1st September 2016 to identify any other relevant articles for inclusion.

We used Petersen et al's⁵ method of ranking effect: Positive studies showed improvement for all measures of quality of care; Intermediate studies showed improvement in some measures of quality but not all; Negative studies showed worsening of measures of quality. We also specified articles showing no effects.⁵ Quality of included papers were assessed using the quality checklist published by Downs and Black.¹⁴ Questions 15 and 23 to 27, of the Downs and Black checklist were omitted due to nature of included evidence. Owing to the heterogeneity of including studies, meta-analysis was not conducted and results are presented descriptively.

Results

The systematic search revealed 232 publications, removing duplicates left 184 publications for screening of title and abstract. 61 articles were full text assessed and 21 articles fulfilled the criteria for inclusion. The PRISMA flow chart can be seen in Figure 1. After screening all other publications by each included author, 7 additional papers were included for publication, resulting in 28 articles for analysis. Study designs included difference-in-differences regression analyses, regression discontinuity design, synthetic control method, retrospective analyses, probit modelling, longitudinal studies, cohort studies, cross-sectional studies and interrupted time series analyses.

Table 1 summarises the 28 included studies including their quality scores. **One study assessed the effects of payment by results on acute care hospitals, showing intermediate effect on quality of care.¹⁵ Five articles examined the impact of pay-for-performance in hospitals with 2 studies showing positive effect,^{17,20} 2 showing intermediate effect^{16,18} and 1 showing negative effect.¹⁹ Twenty-one articles assessed the impact of the pay-for-performance Quality Outwork Framework (QOF) scheme in the primary care setting, with 7 studies showing positive effect,^{13,21,23,24,30,35,40} 13 showing intermediate effect^{11,22,25,26,28,31-34,36-39} and 1 showing no effect.²⁹ One article reported on the effects of QOF on the UK population level, showing no effect⁴¹**

In total, 9 articles reported positive effects of financial incentives, 16 reported intermediate effects, 2 reported no effect and 1 reported a negative effect.

Studies reporting positive effects

Allen et al²⁰ found that the introduction of a best practice tariff in English hospitals was associated with reductions in post-operative length of stay and a lower proportion of laparoscopic cholecystectomies being converted to open procedures. The impact of an Advancing Quality pay-for-performance program on hospital mortality was assessed by Sutton et al,¹⁷ who found significant reductions in mortality during the 18-month study period. An earlier study by Sutton et al,²¹ assessed quality of care following implementation of the QOF scheme and showed annual recording rates of blood pressure, smoking status, cholesterol, body mass index and alcohol consumption increased by 19.9%. Five studies^{23,24,27,30,35} investigating clinical outcomes of diabetic patients following QOF found

significant improvements in glycated haemoglobin (HbA1c), total cholesterol and blood pressure levels. Fichera and colleagues⁴⁰ identified that the introduction of QOF was followed by improved lifestyle behaviours for individuals with targeted health conditions.

Studies reporting intermediate effects

Farrar et al¹⁵ found that introduction of payment by results in acute care hospitals was associated with a significant reduction in in-hospital mortality but there was no significant change in 30-day post surgical mortality and emergency re-admission post hip fracture treatment. Studies by Kristensen et al¹⁶ and McDonald et al¹⁸ report that whilst the advancing quality pay-for-performance program in English hospitals led to initial reductions in hospital mortality, these reductions were greater in non-participating hospitals¹⁶ and by the end of the follow-up period were not maintained.^{16,18}

Vamos et al³³ and Alshamsan et al³⁴ examined the impact of QOF on achievement of national targets for blood pressure, HbA1c levels and cholesterol. Vamos et al³³ showed that following QOF there were significant improvements for cholesterol and blood pressure, but not for HbA1c level. Alshamsan³⁴ found that HbA1c significantly worsened compared to the baseline, cholesterol levels initially reduced in white and black patients, but not in South Asian patients and 3 years later, cholesterol levels significantly increased in white patients. QOF was associated with initial improvements in blood pressure but these were not sustained in the post-QOF period. Similar findings were obtained by Lee et al.³⁷ A local version of QOF assessed by Pape et al³⁶ led to higher target achievements for hypertension, heart disease and stroke. However this was driven by higher rates of exception reporting and there were no improvements in mean blood pressure, cholesterol or HbA1c levels. The impact of the QOF scheme on diabetes management was assessed by Millett et al²², who found that whilst there were improvements for diabetic patients with co-morbidities, there was a negative impact on diabetic patients without co-morbidities. Longitudinal studies by Campbell et al^{11,25} show initial improvements in quality of care for asthma and diabetes patients but not for coronary heart disease with rate of improvement slowing for all conditions. Continuity of care, was found to reduce immediately after QOF.¹¹

Calvert et al,²⁶ investigating the impact of QOF on diabetes management showed that after QOF, existing improvement rates in glycaemic control, cholesterol levels, and blood

pressure reduced. There was no improvement in the number of type 2 diabetic patients having HbA1c levels greater than 10%; and QOF may have increased the number of type 2 diabetic patients with HbA1c levels of $\leq 7.5\%$. Millett et al²⁸ found that introduction of QOF was followed by reductions in mean blood pressure for white, black and South Asian groups. However, HbA1c levels were only significantly reduced for white groups, potentially increasing ethnic inequality. A similar study by Hamilton³⁹ found reduced disparities in diabetes outcomes between men and women following QOF; but there was widening of age group disparities. Two studies^{31,32} examined achievement rates of quality indicators after the QOF scheme. Whilst there were significant increases in the rate of improvement of incentivised quality indicators, for non-incentivised indicators there was no significant effect in the first year and by 2007, achievement rates were significantly lower than expected.^{31,32} The impact of a local QOF initiative on smoking cessation was assessed by Hamilton et al,³⁸ who found increased recording of smoking status and smoking cessation advice. However there were age, social and ethnic inequalities associated with these findings.

Studies reporting no effect

Serumaga et al²⁹ assessed the effect of the QOF on hypertensive patients and found no significant change in blood pressure monitoring, control or treatment intensity; and no effects on hypertension related adverse outcome or all cause mortality. Similarly Ryan and colleagues⁴¹ found no significant associations between introduction of QOF and changes in population mortality.

Studies reporting negative effect

Kreif and colleagues¹⁹ re-analysed data from the study by Sutton et al¹⁷ and found that the advancing quality programme was associated with statistically significant increases in mortality for non-incentivised conditions with no significant reductions in incentivised conditions.

Quality of included studies

Quality of included studies ranged from 15 to 19 out of a maximum of 22 points. Frequent points missed on the quality checklist included: describing characteristics of included patients; describing distributions of potential confounders; reporting of adverse events;

describing characteristics of patients lost to follow up and taking into account patient loss to follow up. Other missed criteria included: providing estimates of random variability; reporting actual probability values for the main outcomes; adjusting for different lengths of patient follow up and recruitment of patients from the same population.

Discussion

Summary:

Twenty-eight eligible UK studies assessed the use of provider financial incentives to improve the quality of health care. Six studies reported on the effects in hospitals¹⁵⁻²⁰, 21 focused on the general practice setting,^{11,21-32,34-40,42} and 1 article reported at the UK population level.⁴¹ Nine articles reported positive effects of incentives on quality of care^{17,20,21,23,24,27,30,35,40}, 16 reported intermediate effects^{11,15,16,18,22,24-26,28,31,32,34,36-39}, 2 reported no effect^{29,41} and 1 reported a negative effect.¹⁹ Quality assessment of included articles ranged between 15 to 19 out of a maximum of 22 points.

Implications

Our findings suggest that the effects of UK-provider financial incentives on health care quality are unclear. Included studies lack consensus: the majority show improvement in some quality measures but not all; and identify that whilst incentives may initially improve quality, these improvements can plateau and even decline.^{11,16,18,27,32-34} **This uncertainty is also apparent when considering the effects of different types of financial incentive on quality of care.**

There is evidence of adverse effects including: worsening of quality outcomes,^{22,34} reduced continuity of care,¹¹ increased inequity amongst ethnic groups and age,^{28,34,37-39} increased exception reporting³⁶ and non-incentivised conditions having higher mortality levels and receiving poorer quality of care.^{19,31} Generalisability of findings are also limited with the majority of studies focusing on the QOF incentive. Impact of QOF is particularly difficult to assess since the incentive was implemented nationwide, resulting in no clear control group. Moreover, quality of care was already improving before QOF and it is unclear whether improvements after the incentive exceeded previous trends; especially considering that

quality outcomes have been measured for less than 3 years post implementation.^{11,25-27} We highlight the limited UK evidence available assessing the effects of payment by results, with only 1 study identified.¹⁵

The Downs checklist¹⁴ quality assessment scores suggest that within the constraints of this research area, the majority of included articles were of high quality. Owing to the nature of financial incentives research, it is very difficult to perform randomised controlled trials, adjust for confounding, report on all adverse events and account for patient lost to follow up. The different study designs employed by included papers do not appear to lean towards a higher quality score or effect size. Similarly, articles with the highest quality scores do not appear to lean towards a positive, intermediate or negative ranking effect.

Provider financial incentives are expensive; total annual expenditure for QOF alone is approximately £1bn.¹⁰ These significant opportunity costs do not appear to be justified by their unclear effects on health care quality; and the use of provider financial incentives may be counter-productive to their goal of improving health care efficiency.¹⁰ Research is needed to incorporate these findings and assess whether UK-provider financial incentives represent a cost-effective intervention to improve the quality of care delivered.

Comparison with existing literature

International research also suggests that the effects of provider financial incentives on health care quality are unclear and that the evidence base is unable to support widespread implementation into health policy.^{9,43-45,49} There have been no randomised control trials evaluating provider financial incentives and the majority of studies have no control groups and lack generalisability.^{10,43} Studies with control groups have mixed results and relatively few significant improvements are reported.^{7,10,43,46} A number of adverse effects have been reported internationally. These include: reduced clinician job satisfaction,⁴⁷ declining continuity of care,¹¹ diverting focus from quality of care to quality of record keeping,⁴³ increased gaming⁴⁸ and exception reporting.⁴³ Mendelson and colleagues,⁴⁹ in their recent systematic review concluded that there was no clear evidence to suggest that pay-for-performance programs improve patient outcomes in any health care setting. Markovitz and Ryan⁴⁵ systematically assessed whether these apparently disappointing results of provider

incentives are masked by heterogeneity of patient and catchment factors, organisational and institutional capabilities and program characteristics. They found that accounting for this heterogeneity does not sufficiently alter the conclusion that provider financial incentives have largely failed to improve health care quality.

Despite uncertainty on their effectiveness, provider financial incentives receive widespread political attention and are increasingly being implemented.⁴³ UK policy makers should be cautious when implementing these incentives and if implemented, should be subject to careful long-term monitoring and evaluation so that origins of shortcomings can be understood and acted upon.

Strengths and limitations

This systematic review may be affected by publication bias since health care decision makers may not wish to publish studies showing negative effects of financial incentives. We acknowledge that by only including UK evidence, potentially informative international studies were excluded. However, this study is particularly relevant to UK policy makers, being the only systematic review evaluating the effectiveness of UK-provider financial incentives in improving quality of care. All included studies had a baseline or comparison group and quality assessment of included articles was conducted using a validated and transparent quality checklist.¹⁴

Conclusion

The effects of UK-provider financial incentives on health care quality are unclear. **Owing to this uncertainty and their significant costs, the use of provider financial incentives may be counter-productive to their goal of improving health care quality and efficiency.** UK policy makers should be cautious when implementing these incentives and if implemented, should be subject to careful long-term monitoring and evaluation. **Research is needed to assess whether UK-provider financial incentives represent a cost-effective intervention to improve the quality of care delivered.**

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