Rationale for the new GP deprivation payment scheme in England: effects of moving from electoral ward to enumeration district underprivileged area scores

Madhavi Bajekal, Bernadette Alves, Brian Jarman and Brian Hurwitz

SUMMARY

Background: *The Department of Health introduced a new deprivation payments system for general practitioners (GPs) on 1 April 1999. Following a three-year phasing-in process, registered patients will attract deprivation payments based on the underprivileged area (UPA) score of their enumeration district (ED) of residence, rather than their electoral ward, changing the pattern and distribution of payments throughout England.*

Aim: *To assess the rationale behind the changed deprivation payments system for GPs in England and to examine its impact on GP and practice payments.*

Design of study: *A quantitative study modelling practice-based deprivation payments.*

Setting: *A total of 25 450 unrestricted principal GPs in 8919 practices in England.*

Method: *The effect of three new components in the system were examined: changes in the ED score ranges attracting payment, the percentage increase in the size of successive payment bands, and the total budget. The relationship between consultation rates (used as a proxy for workload) and UPA score was examined, together with changes in GP payments calculated nationally and by geographical area.*

Results: *A total of 11.6% of the population of England live in wards with a UPA score of 30 or more, qualifying for deprivation payments, and a similar proportion (11.4%) live in EDs with a UPA score of 20 or more. The larger percentage increases in the size of payments in successive ED UPA bands is supported by the modelled relationship between consultation rate and UPA score. Financially, under the new deprivations payment system, entitlement widens with 88% of practices receiving a payment. Overall, 74% of GPs gain and 13% lose (3% losing more than £1500), with 13% receiving no payment.*

Conclusion: *The new ED system maps onto the previous system well. Moreover, it more finely discriminates between smaller areas of different relative deprivation and, thereby, targets payments more accurately.*

Keywords: *deprivation payments; underprivileged areas; GP remunerations; practice payments; inner-city general practition-*

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Introduction

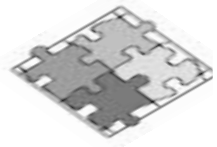
SINCE 1990, general practitioners (GPs) in England have received additional capitation payments for patients living in deprived areas. Deprivation is measured by the underprivileged area (UPA) score,[1,2] a composite indicator based on eight socioeconomic factors derived from the census at small area level.

The payments are made on the assumption that workload and pressure on GP services increase as the number of registered patients living in deprived areas increases. The scheme was originally intended to encourage GPs to work in deprived areas to allow a reduction in list sizes without loss of income. Since its introduction in the United Kingdom (UK), critics have raised concerns about the conceptual basis of the system, such as whether the UPA score is in fact the best measure of GP workload,[3-5] and the lack of an explicit means to encourage GPs to use the extra payments to improve quality of care.[6,7] Aspects of the system's implementation have also been criticised, with many commentators focusing upon the poor sensitivity of the system to small pockets of deprivation in relatively affluent areas.[8,9]

Despite these objections, at the time of its introduction in 1990, GPs generally welcomed the deprivation payments system, that in essence has endured. Recently, the Department of Health (DoH) introduced a series of changes to the whole system that were intended to address some issues of implementation and that, for the first time, introduced a quality-of-care threshold linked to full payment for practices with large average list sizes.[10] In December 1998, the DoH announced its intention to move from a payment system based upon electoral ward UPA scores (ward average population 5638) to one based upon the UPA score of census enumeration districts (EDs), that have an average population less than one-tenth the size (ED average population 450). At the same time, the DoH increased the budget devoted to deprivation payments by 45%, raising it in England by £21.5 millon (£25 million for the UK) to £69 million annually (£80 million for the UK) at 1999 figures.[11,12] These changes, taken together, aim to produce a fairer distribution of available resources within the current policy framework. Although the three-year phase-in period commenced on 1 April 1999, it is from 1 April 2000 that practices with reduced payments have begun to experience an actual drop in income from this source.

Understanding the rationale behind the changes is of interest to planners operating within similar capitation-based healthcare systems outside the UK, as it provides one way

HOW THIS FITS IN



What do we know?
In April 1999, the Department of Health started to phase in modifications to the deprivation payments system for general practitioners (GPs) which had been in operation since 1990. The key change meant that GPs began to receive payments based on the underprivileged area (UPA) score of their patients' enumeration district, an area one-tenth the size, in population terms, of the electoral ward which had been used by the previous system. Three other components of the scheme were also modified: the range of UPA scores which attract payment; the percentage increase in the size of payments in successive deprivation bands; and the total budget committed to the new scheme.

What does this paper add?
Our study finds that the new components map onto the previous system well and are consistent with the modelled relationship between consultation rate and UPA score. We also conclude that the new system targets payments to GPs more accurately through finer discrimination of smaller areas of different UPA score.

of addressing the interrelated problems of high workload, financial incentives, and physician supply in medically underserved areas. Recent studies in the Netherlands and Sweden have found a similar association between community characteristics that result in high UPA scores and increased GP workload (using consultation rates as a proxy).[13,14] We believe our findings have application more widely and could inform development of primary care GP remuneration for deprivation in other European countries.

Commissioned by the DoH to investigate these changes within England,[15] in this paper we identify the rationale behind the new components of the ED-based system and explain its financial effect on GPs. Finally, we discuss whether the new system offers a fairer distribution of available resources.

Method

Development of a ward and ED population database at practice level

We used the following data sources:

- UPA scores for the 9503 wards and 108 343 general EDs in England and Wales, calculated from the 1991 census.[15,16]
- 1998 GP-registered population by ED level for each practice in England (provided by the DoH).
- Data on practice size and postcode taken from the annual census of GPs.[17]
- An Office of National Statistics (ONS) classification of health authorities based on cluster analysis of key sociodemographic data from the 1991 census that groups areas into six types: rural, prospering, maturer, urban, mining and industrial, and inner London.[18]

For 8919 practices in England we produced a database containing the following information:

- Number of whole time unrestricted principal GPs per practice.
- Numbers of practice patients in each of four ward UPA deprivation bands: no payment (ward score less than 30), low (ward score of 30 to less than 40), medium (ward score of 40 to less than 50), and high (ward score of 50 or more).
- The number of practice patients in each of five ED UPA deprivation bands: ED score less than 20, 20 to less than 30, 30 to less than 40, 40 to less than 50, and 50+.

Relationship between workload and UPA score

To examine the rationale behind the changes in payments at ward and ED level (payment slope and the qualifying cut-off), we compared the relationship between consultation rate as a proxy for workload and both ward and ED UPA scores. General practitioner workload is difficult to measure; we chose excess consultation rate as a proxy for it. Although consultation rate is only one component of workload, it is an important one, on which there is objectively measured national data. Excess consultation rates were calculated using the coefficients for univariate predictions of excess workload associated with each of the eight UPA factors, derived by Ben Shlomo *et al* from the 1981 National Morbidity Survey.[19] For each ward and ED we multiplied the eight factors of the UPA score by their corresponding coefficients, and summed the 'weighted' values to give a total excess consultation rate. Average rates across bands of 10 score units of ED and ward UPA were calculated and plotted.

Payment models

We considered three models shown in Box 1. Model A is the original ward-based model with a payment slope (i.e. the ratio of payments between bands) of approximately 1.33, the original ratio of payments when the system was introduced in 1990. Model C is the new ED model with payments at complete implementation level and with the following new components:

1. The qualifying cut-off score — the score at which patients begin to attract a payment — is reduced from ward score 30 to ED score 20, with the consequent introduction of four bands of deprivation attracting payment in place of three.
2. The payment slope is increased from 1.33 to 1.5.
3. Funding for the system has been increased for England from £47 million to £69 million annually.
4. Model B is an intermediate ED model with only the first two of model C's new components.

For each model a range of indicators was calculated, nationally, and by ONS cluster, including the percentage of practices qualifying for payment, the percentage of GPs gaining, i.e. with a higher payment under the ED than the ward system, and the percentage losing more than £1500 (some 2% of GP gross earnings). The new system has a conditionality clause; in practices with an average list size of more than 2500, full payment is made only if a range of services is offered and if lower target thresholds are met by the practice (Box 2). For large list practices failing to meet all these criteria, a reduced payment is made; we therefore looked at the proportion of practices and total budget potentially affected by this condition.

Model A: old ward-based system using payment levels at 1 December 1998. Total payment for England of £47 million. Payment slope (ratio between bands) of approximately 1.33.

Ward score <30	£0.00
Ward score 30 to <40	£6.70
Ward score 40 to <50	£8.70
Ward score 50+	£11.60

Model B: intermediate ED-based system using the four new deprivation bands. Total payment for England held at £47 million. Payment slope of approximately 1.5.

ED score <20	£0.00
ED score 20 to <30	£6.50
ED score 30 to <40	£9.75
ED score 40 to <50	£14.63
ED score 50+	£21.94

Model C: new ED-based system using payment levels which become fully operational after a three-year phasing-in period, beginning 1 April 1999. Total payment for England = £69 million (increase of £21.5 million). Payment slope of approximately 1.5.

ED score <20	£0.00
ED score 20 to <30	£9.50
ED score 30 to <40	£14.25
ED score 40 to <50	£21.38
ED score 50+	£32.06

Box 1. Payment models considered.

Results

Table 1 compares the percentage of the 1998 GP-registered population classified as deprived, under both UPA score systems, nationally, and by ONS cluster. A total of 11.6% of the population of England lives in wards scoring 30 or more. In contrast, only 4.2% of the population has an ED score of 30 or more — but lowering the ED score to 20 includes 11.4% of the population. The more peaked distribution of ED UPA score (Figure 1), when compared with ward UPA score, is even more noticeable at the high UPA score end; 1.8% of the population reside in the ward band 50+ but only 0.1% reside within areas with an ED score of 50 or more.

Relationship between UPA score and consultation rate

Figure 2 shows that for each bandwidth above zero, the ED score corresponds to a higher excess consultation rate than does the same ward UPA score bandwidth: the average excess consultation rate associated with a ward score of 30 is approximately equivalent to an ED score of 20. We see from the fitted ED and ward models that every increase in one band of ward score (10 units) leads to an increase in excess consultation rate of 1.17 ($e^{0.153} = 1.17$), whereas every increase in one band of ED score (10 units) leads to a larger increase in excess consultation of 1.26 ($e^{0.229} = 1.26$). The ratio of these two relationships is 1.08 (1.26/1.17), which is similar to that between the ED payment slope and original ward payment slope of 1.12 (1.5/1.33).

Geographical and population effect of moving to an ED system

Table 2 shows that under the previous ward system (Model A), 63% of practices had at least one deprived patient (with ward score 30+) but, under the new ED system, entitlement widens with the proportion of qualifying practices with at least one patient (with an ED score of 20+) rising to 88%. This change is far from uniform across ONS clusters. In inner London, 100% of practices are entitled to payment under both systems, whereas in rural areas entitlement rises from 34% to 74%. Looking at changes in payment under Model B, 71% of GPs in inner London would lose more than £1500, as would 22% of GPs in Health Authorities falling partly or entirely within Health Action Zones (HAZ), as configured on 1 April 1999. The effect of a £21.5 million increase in funding indicated by Model C shows these proportions dropping to 20% and 6% in inner London and HAZs, respectively.

Seventeen per cent of all practices in England are potentially affected by the conditionality criteria which means that 4% (£3 million) of the deprivation payments budget in England is dependent on these criteria being satisfied. At the time of writing, there were no data available on the proportion of these practices that have not met the conditionality criteria (personal communication, Department of Health, 2000).

- Provide child health surveillance, or ensure that appropriate alternative provision of such services is available locally.
- Provide contraceptive services.
- Reach cervical cytology and childhood immunisation lower rate targets.
- Offer health promotion services in accordance with the Statement of Fees and Allowances.
- Provide chronic disease management programmes for asthma and diabetes.
- Be in receipt of postgraduate education allowance for each partner.

Box 2. Conditionality criteria: to receive full deprivation payments, practices with average list sizes of greater than 2500 per whole time principal must satisfy all the above conditions.

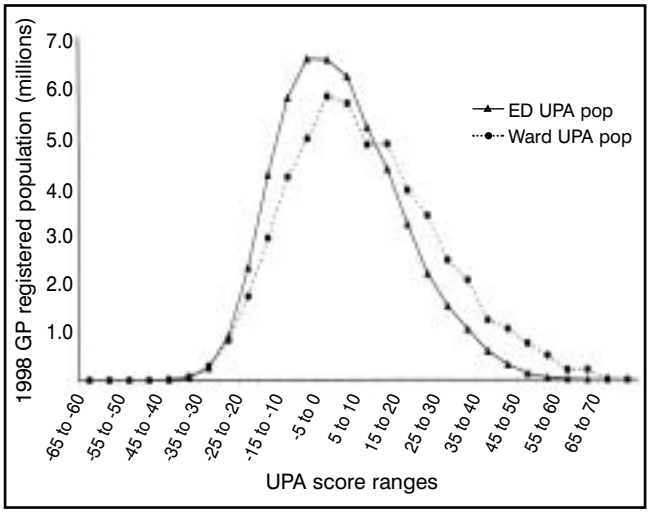


Figure 1. Distribution of 1998 GP registered populations by ED and ward UPA score ranges.

Discussion

Rationale behind the new system

The new ED model has three new components, aside from the conditionality criteria, that are examined in our analyses:

(a) Change in qualifying cut-off and payment bands. The

Table 1. Comparison of 1998 population of England registered with a GP classified as deprived under the ward and ED UPA score systems.

	GPs	Practices	GP registered population (1000s)	Percentage GP registered population by ward and ED UPA							
				UPA ≤ 50		UPA ≤ 40		UPA ≤ 30		UPA ≤ 20	
				Ward	ED	Ward	ED	Ward	ED	Ward	ED
England	25 450	8919	51 283	1.8	0.1	5.3	1.0	11.6	4.2	22.9	11.4
Rural	5877	1730	11 360	0.4	0.0	0.9	0.2	2.9	1.1	9.2	4.6
Prospering	6982	2134	14 060	0.2	0.0	0.5	0.2	2.6	1.0	9.4	4.1
Maturer	3925	1567	8008	0.3	0.1	3.5	0.6	12.7	3.4	29.6	11.4
Urban	3905	1621	7886	5.3	0.3	11.9	2.8	18.6	9.0	35.1	19.2
Mining and Industrial	3642	1337	7469	2.8	0.2	6.1	1.0	14.7	5.3	28.5	15.1
Inner London	1119	530	2501	8.3	0.7	34.9	4.6	67.1	19.2	84.2	46.5

Table 2. Distribution of payments under models A, B, and C by ONS cluster and by Health Action Zones.

	Total allocation £ million (%)						% Qualifying practices		% Qualifying practices with list size>2500	Mean £s per qualifying GP			% GPs gaining[c]		% GPs losing[c]		% GPs losing[c] >£1500	
Models[a]	A		B		C		A	B and C	B and C	A	B	C	B	C	B	C	B	C
England	47.7	(100)	47.4	(100)	69.2	(100)	63	88	17	3357	2174	3177	62	74	25	13	11	3
Rural	2.6	(5)	3.9	(8)	5.7	(8)	34	74	9	1319	893	1305	62	69	15	8	2	0
Prospering	2.7	(6)	4.4	(9)	6.4	(9)	38	81	12	1114	793	1159	67	72	13	8	2	1
Maturer	7.4	(15)	7.0	(15)	10.3	(15)	78	92	22	2625	1974	2885	62	75	30	17	13	5
Urban	12.9	(27)	13.3	(28)	19.5	(28)	87	97	19	3950	3542	5177	62	80	35	17	16	5
Mining and Industrial	8.8	(18)	9.0	(19)	13.2	(19)	77	97	18	3258	2596	3795	65	84	31	12	13	4
Inner London	13.5	(28)	9.7	(21)	14.2	(21)	100	100	38	12 036	8682	12 689	14	60	86	40	71	20
HAZ[b]	29.3	(61)	25.8	(54)	37.7	(54)	81	94	19	4913	3518	5141	54	75	40	18	22	6

[a]Model A: ward system with three deprivation payment bands. Payment slope of 1.33. Total payment for England = £47.7m. Model B: ED system with four deprivation payment bands. Payment slope of 1.5. Total payment for England = £47.7 million. Model C: ED system with four deprivation payment bands. Payment slope of 1.5. Total payment for England = £69 million. [b]Practices in Health Authorities wholly or partly in HAZ on 1 April 1999. [c]Compared with A.

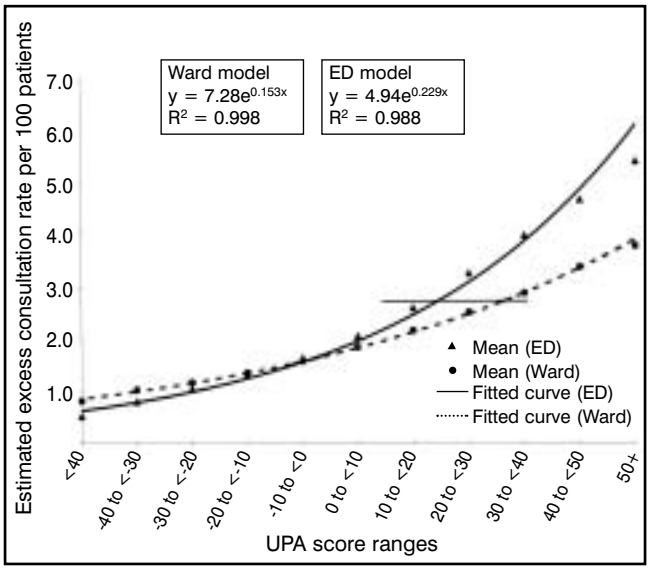


Figure 2. Mean estimated excess consultation rate by UPA score. The lowest range indicates the least deprived and the highest range indicates the most deprived.

lower qualifying cut-off score of ED 20, rather than ward 30, is consistent with the total proportion of patients defined as deprived under the two systems (approximately 11.5% in both cases) and the analysis of excess consultation rates, which showed that for patients in wards with a score of 30, and in EDs with a score of 20, modelled consultation rates were similar. The reduction in the UPA score threshold that qualifies for payment (from ward 30 to ED 20) does not therefore represent a genuine 'lowering' of cut-off, but rather a calibration of the new system to the old system's payment threshold. Indeed, patients resident in areas with an ED score of 50+ have a much higher estimated consultation rate than patients in wards with a score of 50+. The introduction of an extra deprivation band at the top end at the ED score range acknowledges this.

(b) Change in payment slope. The ratio of the payment slopes in the two systems of 1.12 (from 1.33 to 1.5) is similar to that of the consultation rate relationships of 1.08, suggesting that the calibration of payments in the ED system is consistent with the former system. We did not examine workload factors outside of the consultation rate, and it would appear that the DoH has assumed that the calibration of such factors could be treated in the same way as consultation rates.

(c) Budget increase. The final component of the DoH model is the increase in budget. Results from Model B show the effect of moving to an ED system if there had been no increase in total deprivation payments. The greater spread of entitlement means that the size of the losses would have been particularly large for urban GPs, especially in inner London.

Effect of new system on GPs in England

The averaging out of pockets of deprivation in a ward-based scoring system was particularly striking in rural and prospering areas. Because finer resolution allows remuneration for pockets of rural deprivation, these areas have gained most from the introduction of the ED score system, an effect already shown in Northern Ireland.[20] By contrast, oases of relative affluence within inner London have become apparent at the ED level, resulting in an overall reduction in the number of deprived residents in the area qualifying for payment (from 67.1% to 46.5%).

A fairer system?

Within wards, patients residing in pockets of deprivation may not attract a payment under the ward scoring system, whereas under the ED-based scheme GPs can receive payments for patients living in areas of deprivation within an otherwise affluent ward. Although wards have an average population of 5638, there is wide variation of ward populations, especially in deprived urban areas with some having populations in excess of 20 000. Assigning a single score to so many residents results in too crude a classification. Because EDs include a fixed number of addresses, generally covering neighbouring streets with similar types of housing, there is much less variation in their population size and characteristics. The ED system is a fairer basis for a payments system because it discriminates more effectively between smaller areas of different UPA score and thereby targets payments more accurately.

Compared to the ward system, the new ED system is fairer in other respects too: total practice payments are less dependent on purely artifactual changes that can arise from alterations in census area boundaries between censuses. Also, ED populations are smaller than for wards and a change in score in an ED affects fewer people and hence has less impact on associated practice payment. In addition, practices draw patients from many more EDs than they do from wards; within the same practice area, a shift in the score of one ED is likely to be offset by a shift in the opposite direction in a neighbouring ED.[21]

Conclusion

The new deprivation payments system that came into operation in England on 1 April, 1999 targets deprivation payments more fairly than the one based on electoral wards that it replaced. However, it may introduce unwanted adverse effects; some GPs, especially in inner London, will receive less money and this may affect the recruitment and retention of GPs in these areas. The new system addresses many implementation issues that have been raised in the last few years, but does not tackle some of the broader concerns.[22] Aside from the conditionality criteria, it confines itself to the assumptions on which the original system was based. Although only 4% of the total deprivation budget has been made dependent upon practices demonstrating quality of care markers, this apparently small change may point towards the development of incentive schemes that, in future, could link GP deprivation payments more closely to measures of health care quality.

References

1. Jarman B. Identification of underprivileged areas. *BMJ* 1983; **312:** 1705-1709.
2. Jarman B. Underprivileged areas: validation and distribution of scores. *BMJ* 1984; **289:** 1587-1592.
3. Hobbs R, Cole T. Deprivation payments revisited (again). [Editorial.] *BMJ* 1996; **313:** 641-642.
4. Majeed FA, Martin D, Crayford T. Deprivation payments to general practitioners: limitations of census data. *BMJ* 1996; **313:** 669.
5. Carr Hill RA, Sheldon T. Designing a deprivation payment for general practitioners: the UPA(8) wonderland. *BMJ* 1991; **302:** 393-396.
6. Pringle M. The quality divide in primary care. *BMJ* 1989; **299:** 470-471.
7. Main J, Main P. Jarman index. [Letter.] *BMJ* 1991; **302:** 850-851.
8. Hastings A. Deprivation payments should be based on enumeration districts. *BMJ* 1996; **312:** 183-184.
9. Brown CW. Deprivation payments fairer in Scotland. *BMJ* 1993; **306:** 1544-1545.
10. Department of Health. *Allocation of DDRB £60 million to GPs*. London: HSC, 1999.
11. Department of Health. *Deprived areas to benefit from a £25 million boost*. [Press release 0584], 1998.
12. Department of Health. *GPs and patients to benefit from £60m package*. [Press release 0154], 1999.
13. Reijneveld SA. Predicting the workload in urban general practice in the Netherlands from Jarman's indictators of deprivation at patient level. *J Epidemiol Community Health* 1996; **50:** 541-544.
14. Malmstrom M, Sundquist J, Bajekal M, Johannsson E. Indices of need and social deprivation for primary health care. *Scand J Soc Med* 1998; **26:** 124-129.
15. Alves B, Bajekal M, Jarman B. *Moving to an enumeration district-based deprivation payments system for general practitioners in England and Wales*. London: Department of Health, 1998.
16. Dale A, Marsh C (eds). *The 1991 census users guide.* London: The Stationery Office, 1993.
17. Department of Health. *GMS GMP Census*. London: DoH, 1997.
18. Wallace M, Denham C. *The ONS classification of local and health authorities of Great Britain*. London: The Stationery Office, 1996.
19. Ben Shlomo Y, White I, McKeigue PM. Prediction of general practice workload from census-based social deprivation scores. *J Epidemiol Community Health* 1992; **46:** 532-536.
20. O'Reilly D, Steele K. General practice deprivation payments: are rural practices disadvantaged? *J Epidemiol Community Health* 1998; **52:** 530-534.
21. Crayford T, Shanks J, Bajekal M, Langford S. Analysis from inner London of deprivation payments based on enumeration districts rather than wards. *BMJ* 1995; **311:** 787-788.
22. Leavy R, Wood J. Does the underprivileged area index work? *BMJ* 1985; **291:** 709-712.

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