Journal of Public Health Medicine
Vol. 20, No. 2, pp. 186–190
Printed in Great Britain

'My ward is more deprived than yours'

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Abstract

Background Increasingly, additional resources for infrastructure development and healthcare are directed at deprived areas. The commitment of the present government to reducing inequalities in health is likely to focus attention on identifying and providing special help to areas considered to be particularly deprived. This study compares the use of different deprivation measures at electoral ward level to rank wards according to deprivation and illustrates how the use of different deprivation measures may influence resourcing decisions.

Methods The 20 local authority electoral wards making up the city of Plymouth, Devon, were studied. Some of the wards within Plymouth are amongst the most deprived in England. The scores for each ward for different measures of deprivation – Townsend, Jarman, the Department of Environment's Index of Local Conditions and Breadline Britain – were calculated and the wards ranked according to the deprivation score for each measure. Decisions on funding bids and resource allocation for wards within Plymouth were reviewed in the light of the relative deprivation status of the wards according to the various measures.

Results The ranking of electoral wards for the selected measures of deprivation showed variation according to the measure used. The measure of deprivation chosen may have influenced resourcing decisions.

Conclusion Measures of deprivation are closely correlated one with another. However, by judicious choice of the deprivation measure used a ward can achieve a marked change in rank order. This may exert considerable influence on the decisions made by government departments, local authorities and health authorities when allocating resources.

Keywords: deprivation measure, resource allocation, electoral ward

Introduction

Deprivation measures have become important tools in examining variations in health and are valuable to Health Authorities (HAs) in the planning and delivery of healthcare, especially given that HAs and general practice fundholders are responsible for needs assessment.[1] The National Health Service (NHS) Executive has recognized the importance of the link between levels of deprivation and health status.[2] Various measures of deprivation have been used. The elements included in these deprivation measures are derived from Office of Population Censuses and Surveys (OPCS) national Census information. The variables used in the different measures are displayed in Table 1.

The Townsend score[3] is favoured by HAs for measuring deprivation. The Jarman score[4] is the measure used by the Department of Health to set additional payments for general practitioners (GPs) drawing patients from wards with high deprivation. Local authorities (LAs) use the Department of Environment's Index of Local Conditions (DoE ILC) to identify wards with the greatest deprivation.[5] The Breadline Britain score has been used by the media to estimate the percentage of 'poor' households in particular areas.[3] Elements of the various measures are described in the methods section.

HAs, LAs and charitable trusts have focused efforts on those areas, particularly in cities, with the greatest levels of deprivation. Increasingly, LAs plan jointly with HAs to concentrate resources on areas of highest deprivation. Many such initiatives are aimed at the 'most deprived' wards rather than shared across areas according to relative need. GPs have also realized that HAs are more sympathetic to calls for increased resources for primary care if the practice can demonstrate that patients are drawn from the most deprived areas. To what extent does the deprivation measure chosen influence the rank order of the most deprived areas?

Methods and derivation of the deprivation measures

The Townsend score

The Townsend Material Deprivation Score[3] uses four Census variables to assess the following: general lack of material resources and insecurity (unemployment); material living

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Table 1 Variables used in the construction of selected deprivation indices

	Townsend	Jarman	DoE ILC	Breadline Britain
Unemployment	X	X	X	X
Overcrowding	X	X	X	
Lone parents		X		X
No car	X		X	X
Lack amenities			X	
Elderly		X		
Ethnicity		X		
Low social class		X		X
Not owner occupied	X			X
Children in poor households			X	
Limiting long-term illness				X
Children living in flats			X	
Education participation (17 years)			X	
Under-fives		X		
Residential mobility		X		

Note: The variables are constructed or operationalized in different ways in the different indices.

conditions (unemployment); wealth (owner occupation is used as a proxy indicator); and income (car ownership is used as a proxy indicator). The unemployment and overcrowding variables are transformed to reduce their skew and then the scores of each variable are standardized (converted to z scores). The final Townsend score is a summation of the four standardized results.

The Jarman score

The Jarman Underprivileged Area Score was developed in response to various reports which drew attention to geographical variations in the demand for primary care.[4] It was not originally constructed to measure deprivation and was derived from GPs' subjective expressions of social factors in their patients that affect their workload. Initially 21 indicators were selected. These were then further refined by a questionnaire survey of a 10 per cent sample of GPs. GPs were asked to comment on the indicators and also to score each on a 0 to 9 point scale according to the degree to which they felt that the indicator increased their workload. Eight indicators were derived from this survey (see Table 1), together with an average weighting for each. Scores are derived by calculating the arc sin of the square root of each variable. These results are then standardized (converted to z scores). Each standardized variable is then weighted and the final score is a summation of the values.

The DoE's Index of Local Conditions

The DoE ILC is the 'official' 1991 deprivation index which is used as part of the formula for resource allocation to LA districts.[5] The ILC was developed for the DoE over a period of three years by the Centre for Urban and Regional Development Studies (Newcastle-upon-Tyne University) and the Centre for Urban Policy Studies (Manchester University). It provides a general index of urban deprivation and also allows specific aspects of material and social deprivation to be identified (as sub-indices). The 13 indicators selected for inclusion in the index comprise seven Census derived and six non-Census derived variables. At the LA district level of analysis the index includes measurements of all 13 variables; however, at electoral ward and enumeration district (ED) level only the Census-based variables are used.

Breadline Britain score

The Breadline Britain score[3] was the result of a survey carried out for London Weekend Television in 1990. The survey attempted to define normative poverty (people's perceptions of poverty) in terms of a poverty threshold. The results of the survey were analysed using discriminant analysis to produce the best predictive variables. The weightings for each variable were obtained using logistic regression. The Breadline Britain score is obtained by summing the individually weighted variables and provides an estimate of the percentage of 'poor' households in an area.

The deprivation scores for the 20 wards within Plymouth were calculated using data from the 1991 Census based on published methods.[3,6] Where necessary the scores were standardized to Devon (258 wards). Pearson's Product Moment correlation coefficients between the various measures were calculated. The rankings of the wards for each measure were compared. In addition, the Breadline Britain score was calculated for each ED in Plymouth. The Great Britain ranking for each ward was also considered.[7]

Results

Great Britain ranking of Plymouth wards

The Great Britain ranking of the 20 Plymouth wards is

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displayed in Table 2. The wards are listed in the rank order of the Townsend score. There are a total of 10 511 wards in Great Britain. There is close correlation between deprivation measures but there are marked changes in rank order depending on the measure chosen.

Table 2 shows that although particular Plymouth wards are ranked as among the most deprived wards nationally, this is only according to the DoE ILC. For example, St Peters ward, which is ranked second on the DoE ILC, is ranked 226th on the Townsend score, 152nd on the Jarman score and 220th on the Breadline Britain score. Plymouth also includes wards which rank among the 100 least deprived wards nationally on the DoE ILC (Plympton Erle ranks at 10 456th out of the 10 511 wards in Great Britain).

Plymouth city ranking

Even when considering a relatively small number of wards – the 20 wards in Plymouth – there is still considerable variation in the rank order depending on the deprivation measure used. The local ranking of the Plymouth wards is shown in Table 3.

Ham ward, which is ranked third according to the Townsend score, drops to tenth place on the DoE ILC. Stoke, which is ranked fourth on the DoE ILC, drops to 12th place on the Breadline Britain score. In the local context, St Peters remains the most deprived ward regardless of the measure used.

The deprivation measures are closely correlated one with another and the correlation coefficients of the wards in Plymouth for the selected measures are shown in Table 4.

Poor households

The Breadline Britain score was calculated for each ED in Plymouth, and the location of those EDs where more than one-third of households are poor is displayed in Fig. 1. The ward boundaries and names are included to allow comparison with the information included in the tables.

Discussion

Wards are geographical, administrative and political areas. National and local initiatives to improve the circumstances of people living in poor housing and relative socio-economic deprivation often direct resources to the 'most deprived' wards in a city area. As all the measures of deprivation are calculated from data collected in the Census, there is a ten year window of opportunity for interested parties (e.g. ward councillors, community-based groups, and health and social care agencies) to highlight the relative status of a particular ward to attract funding and support. HAs and LAs already work together to allocate Joint Finance. Moves to locality commissioning will increasingly draw elected representatives, in many cases local councillors representing individual wards, into the process of determining priority areas for increased health service resources.

'Most deprived' ward status can be a gateway to funding but different agencies may use different measures of deprivation to

Table 2 Great Britain ranking of the Plymouth wards

Ward	Townsend	Jarman	DoE ILC91	Breadline Britain
St Peter	226	152	2	220
Sutton	866	735	156	967
Ham	1155	963	1323	1344
Budshead	1188	1172	829	885
Keyham	1238	785	275	1183
St Budeaux	1619	1429	1227	1554
Honicknowle	1803	1495	1055	1626
Mount Gould	1930	2008	711	2450
Stoke	2112	2001	693	3014
Drake	2360	2141	1185	2843
Efford	2672	2169	2455	2607
Southway	2815	3819	5450	2837
Trelawny	4181	3683	4496	4225
Compton	4915	5727	6346	6245
Estover	5181	5346	6243	5469
Eggbuckland	5322	6763	10110	5737
Plymstock Radford	5722	5405	7111	6547
Plymstock Dunstone	8047	7880	10447	9025
Plympton Erle	8255	6275	10456	8603
Plympton St Mary	9155	8017	10341	9595

Source: 1991 Census.
Total number of wards is 10511.

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Table 3 The rankings and scores of the Plymouth wards for selected measures

Ward	Townsend		Jarman		DoE ILC		Breadline Britain	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
St Peter	1	14.98	1	65.44	1	17.10	1	38.65
Sutton	2	10.13	3	41.40	3	14.53	3	30.09
Ham	3	8.98	4	35.93	10	5.17	5	28.24
Budshead	4	8.86	6	31.62	7	9.26	2	31.03
Keyham	5	8.62	2	42.25	2	15.21	4	28.87
St Budeaux	6	7.30	5	32.95	9	7.71	6	27.30
Honicknowle	7	6.72	10	26.10	8	8.01	7	27.11
Mount Gould	8	6.37	8	26.55	5	12.65	8	23.52
Stoke	9	5.94	9	26.11	4	13 12	12	21.79
Drake	10	5.28	7	26.63	6	10.45	11	22.32
Efford	11	4.63	11	20.36	11	2.54	9	23.17
Southway	12	4.48	12	10.98	14	−2.56	10	22 46
Trelawny	13	1.83	13	8.43	12	2.31	13	19.00
Compton	14	0.79	15	3.40	13	−0.05	16	15.29
Estover	15	0.58	14	3.65	17	−10.17	14	16.66
Eggbuckland	16	0.40	18	−5.36	16	−8 08	15	16.31
Plymstock Radford	17	−0.17	16	0.37	15	−6.13	17	15.14
Plymstock Dunstone	18	−2.46	19	−9.42	18	−10.90	19	11 32
Plympton Erle	19	−2.66	17	−0.43	20	−11.87	18	11.91
Plympton St Mary	20	−3 74	20	−12.61	19	−11 63	20	10.39

Source: 1991 Census.

attract and allocate funding. LAs use the DoE ILC and although additional 'deprivation payments' made to GPs are based on Jarman score, HAs tend to use the Townsend score to identify relatively deprived areas. This has certainly been the case in Plymouth. Decisions on funding bids and resource allocations made by LAs, HAs and other agencies have been influenced by the relative status of the wards to the financial advantage of particular wards. South & West Devon Health Authority's

Figure 1 Location of enumeration districts in Plymouth where more than one-third of households are 'poor'. Crown copyright 1991.

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Table 4 Correlation coefficients (Pearson's) of the Plymouth wards for the selected measures

	Townsend	Jarman	DoE ILC	Breadline
Townsend		0.98	0.91	0.99
Jarman	0.98		0.93	0.97
DoE ILC	0.91	0.93		0.87
Breadline	0.99	0.97	0.87	

deprivation initiative has been aimed at the St Peters ward (identified on the basis of its Townsend score) and as a result additional HA resources (£150 000 per annum for five years) have been directed to the ward.[8] The LAs funding bids to the Single Regeneration Budget (SRB) have predictably focused on those wards which rank high on the DoE ILC. St Peters, Keyham and Sutton wards in the Plymouth 'Waterfront' area have successfully attracted a total of £96.5 million from the SRB Rounds 1 and 2 together with matched funding from other sources.[9]

The focus on wards ranked high for deprivation, as has happened in Plymouth, has consequences for wards that rank highly on certain measures but not on others. They may not receive any additional or special funding despite arguably similar deprivation. For example, Ham and Budshead wards, which rank above Keyham in third and fourth place according to the Townsend score (see Table 3), have received no additional funding. Budshead ward has the second highest Breadline Britain score based on the proportion of poor households.

Is the concentration on deprived geographical areas appropriate? The ward boundary is artificial and poor people live in all areas of a large city. Using spatially referenced data collected in the Census has the problem of the 'ecological fallacy' – assuming that all people who live within a defined geographical area are equally likely to share the social and health characteristics of the area. Crayford *et al.* showed that deprivation payments to GPs using the Jarman score could be more sensitively and appropriately applied using EDs rather than electoral wards.[10] Enumeration districts are the smallest administrative areas used to collect Census data and typically contain 150 households. Perhaps it would be more appropriate to target resources to poor households wherever they are placed rather than to concentrate on specific geographic areas? Figure 1 shows the location of EDs in Plymouth where more than one-third of households are 'poor' using the Breadline Britain score.

Conclusion

Priorities for funding may be based on the ranking of wards rather than directed to the people in greatest need. There is a simplicity and political expediency in choosing the most deprived wards for greatest attention, but such an approach should come with a public health warning.

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Accepted on 7 January 1998

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