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Underprivileged areas and health care planning: implications of use of Jarman indicators of urban deprivation

Robin J Talbot

Abstract

Objective—To analyse critically the use of the Jarman underprivileged area index in health care planning and distribution of resources.

Design—The original derivation of the score was examined and evidence to support criticisms of the use of underprivileged area scores examined.

Main outcome measures—Discrepancies between areas classified as deprived according to the index and areas known to require government funding; the extent of the bias towards family practitioner areas in London; and how the results of using the Jarman index compared with those when another deprivation index based on different indicators was used.

Results—The use of electoral wards as geographical areas for which deprivation payments are made is unsatisfactory as the wards vary considerably in size. Of the 20 district health authorities with the highest underprivileged area scores in England, 12 were in London, and four of the six family practitioner committee areas with the highest scores were in London. No health authority or family practitioner committee area in the Northern region had one of the top 20 or 10 scores respectively. When an alternative deprivation index was used to determine the allocation of resources to doctors there was considerable variation compared with the Jarman index.

Conclusion—The Jarman index underprivileged area score is an inappropriate measure to use for health care planning and distribution of resources. There is a need for a revised measure for allocating deprivation payments to general practitioners.

Introduction

The Jarman score for underprivileged areas is a measure of general practitioners' workload. As well as the recent prominence as a trigger for special payments to general practitioners the Jarman underprivileged area index has been used as an indicator of urban deprivation. It has also been used in health service planning, where it was put forward as a measure to help in the allocation of resources in the discussions taking

place before the publication of *Working for Patients* in 1989.¹

In this paper I trace the development of the Jarman index and examine some criticisms and wider issues affecting measures of urban deprivation.

The 1981 Acheson committee, in their review of primary care in London, collected evidence about the social characteristics of the inner London population (such as how many elderly people there were living alone) and its need for primary care.² Replies and evidence to the committee formed the basis of a questionnaire that was distributed by Jarman in 1981 to a national 10% sample of general practitioners selected from a commercial mailing list.³ Much of the later work emanating from Jarman's research rests on responses to the single question:

Below is a list of factors which evidence suggests contribute to the pressure of work on general practitioners. Based on experience in your own practice, could you please score each factor on a scale from 0 (no problem) to 9 (very problematical) according to the degree to which it increases workload or contributes to the pressure of work when it is present. Those factors which you do not mark will not be included in our final calculations.

Jarman gave attention to service factors in his 1983 paper, but it was "social factors alone... [that were] used to measure workload according to the general practitioner's assessments."³ Ten such social indicators are taken into account in the calculation of the underprivileged area score.

A weighting procedure was adopted for calculating the underprivileged area score according to the average scores given in response to the above question. Table I gives the average score for each factor. To validate the index a matching procedure took place that compared maps showing areas of greatest workload or pressure compiled by local medical committees with those of Jarman's underprivileged area scores for the same geographical areas.⁴ In five family practitioner committee areas there was agreement on all but 6.3% of the wards. According to Jarman, variations in the method of calculating the scores has little effect on the ranking of ward scores.

The measure quickly gained the attention of health

Division of Continuing Education, Doncaster College, Doncaster DN5 7SZ
Robin J Talbot, PHD, senior lecturer

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TABLE 1—Average score (on a scale of 0 to 9) for each social factor identified by Jarman allocated by a 10% sample of general practitioners^a

Social factor	Average score
Children aged <5	4.64
Unemployment	3.34
Poor housing	3.60
Ethnic minorities (people born outside United Kingdom)	2.50
Single parent households	3.01
Elderly people living alone	6.62
Overcrowded households	2.88
Lower social classes	3.74
Highly mobile people (percentage changing house in a year)	2.68
Families of non-married couples (less stable family groups)	2.71

researchers. By 1984 a series of papers had both developed the use of underprivileged area scores and detailed their use as an information base for health planning.⁵

Further attention was drawn to the Jarman index with the publication of *Promoting Better Health*.⁶ Paragraph 3.38 states that “the Government will introduce a new allowance especially related to working in areas of deprivation.” The paragraph does not state how this allowance will operate but it does promise an examination of the allowance arrangements, and “if necessary other changes in the remuneration system will be introduced.”

A new basic practice allowance supplement for general practitioners practising in areas of deprivation in England⁷ was payable from 1 April 1990⁸ with respect to all patients on their lists who live in areas with underprivileged area scores of >30.³

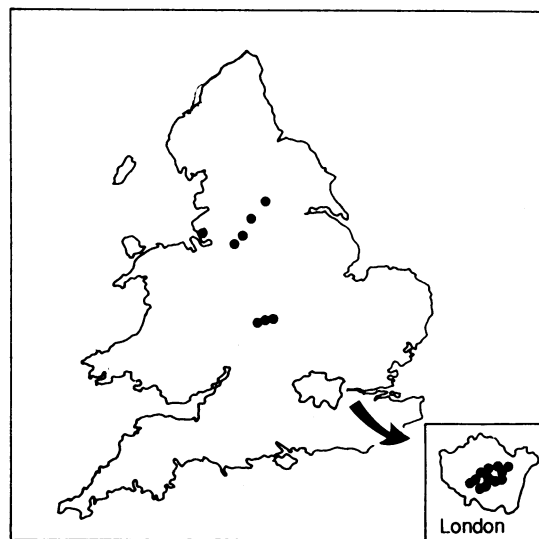
Criticisms of the Jarman index

Problems arise in using the Jarman index; three areas of concern are described below.

USE OF WARD AREAS OR ANOTHER AREA MEASURE

Electoral wards are used as the geographical areas for which deprivation payments are made. For these new payments to general practitioners (with effect from 1 April 1990) the deprivation allowance is triggered where patients live in wards with an underprivileged area score of >30 (lower payment), >40 (middle payment), and >50 (higher payment). In addition, much attention is given to local health service planning at the ward level. However, wards vary considerably in size: in the Northern Regional Health Authority in 1981 the smallest ward had a population of 500 and the largest 15 500. As census figures are available at the enumeration district level it would be possible to obtain data for these units of analysis. Each ward area consists of several enumeration districts; these are delineated by the Office of Population Censuses and Surveys at each 10 year census and correspond to the areas covered by each census enumerator. In the case of Doncaster Family Practitioner Committee there are between 22 and 33 enumeration districts in each of its 21 wards. Table II gives a breakdown of population for the enumeration districts within the area of this committee according to data published in 1983. About 86% (493/573) of the districts had a population between 300 and 699.⁹

At the very least, use of enumeration districts would allow geographical areas of smaller size and with less variation in their population to be compared. Family practitioner committee registers have been allocated postcodes to help identify patients of deprived area status.¹⁰ The loading of such postcodes includes information relating to enumeration districts. No modification is being permitted of the levels of deprivation payment or of the breaking down of ward figures into enumeration districts.⁸ The introduction of the deprivation



District health authorities in England with the 20 highest underprivileged area scores

payments and the designation of the levels of allowance has led to controversy among general practitioners. To overcome some of these problems Professor Jarman himself recommended that the score for the lower level of allowance should be set at 16.¹¹

DISCREPANCIES AND LONDON BIAS

The figure shows the 20 districts with the highest underprivileged area scores among the 192 district health authorities. Seven of the authorities with one of the 10 highest scores and 12 of those with one of the 20 highest scores are in London; a further five London authorities (Haringey, Brent, Victoria, Greenwich, and Ealing) have underprivileged area scores between the fourth and fifth quintile of health districts.

Family practitioner committees cover larger geographical areas. Table III gives the 10 highest of the underprivileged area scores for the 98 family practitioner committees in England and Wales.¹² The areas with the top three scores and four of the areas with the top six scores are in London. Another London committee (Ealing, Hammersmith, and Hounslow) has an underprivileged area score of 18.88.

Despite having the highest regional distribution in England of permanently sick people in 1981 and the highest figures for people certified as incapacitated because of sickness and invalidity in 1982-3¹³ no health authority or family practitioner committee from the Northern region appears in figure 1 or table III. The lack of any northern district with a score in the top 20 mirrors the comments of Townsend *et al* that this “flies in the face of most observation and experience.”¹⁴ The issue of bias towards London has been taken up by some northern authorities.¹⁵ Moreover, when attention is given to areas whose populations are classified as deprived large parts of the country are virtually excluded (table IV). Even some parts that obtain government funding and support for economic assistance or inner city regeneration are excluded from designation for the deprivation allowance; examples include Mid Glamorgan, Wakefield, and Doncaster.

In England and Wales 4.203 million (8.66%) of the resident population of 48.520 million live in areas qualifying for the deprivation allowances.¹⁰ Again there is a considerable variation in the distribution of the population living in the designated deprived areas. In all, 1.467 million (34.90%) of the 4.203 million population in these deprived areas live in London.

ALTERNATIVE INDICES

The Jarman index has been criticised by Thurnhurst¹⁶ and Carr-Hill and Sheldon (p 393)¹⁷ for its use of

TABLE II—Population size of enumeration districts in Doncaster Family Practitioner Committee according to data published in 1981^a

Population size*	No of enumeration districts
< 100	9†
100-299	49
300-499	203
500-699	290
700-999	20
≥1000	2
Total	573

*Mean (SD; range) population = 496.8 (145.6; 0-1124).

†Enumeration districts corresponding to areas undergoing redevelopment or large rural areas.

TABLE III—Underprivileged area scores for family practitioner committee areas (n=98) in England and Wales¹²

Family practitioner committee area	Underprivileged area score
City and East London	53.05
Camden and Islington	41.31
Lambeth, Southwark, and Lewisham	39.76
Manchester	37.73
Bradford	34.60
Kensington, Chelsea, and Westminster	33.95
Rochdale	26.45
Birmingham	25.65
Liverpool	25.61
Oldham	22.05

TABLE IV—Percentage of population living in areas classified as deprived in various family practitioner committees

Percentage of population living in areas classified as deprived	Family practitioner committee
>40%	Camden and Islington; City and East London; Lambeth, Southwark, and Lewisham
20-40%	Birmingham; Bradford; Cleveland; Coventry; Ealing; Hammersmith and Hounslow; Kensington, Chelsea, and Westminster; Leeds; Liverpool; Manchester; Newcastle upon Tyne; Rochdale; Wolverhampton
10-20%	Bolton; Brent and Harrow; Bury; Calderdale; Enfield and Haringey; Gateshead; Greenwich and Bexley; Kirklees; Lancashire; Leicestershire; Oldham; Salford; Sheffield; South Tyneside; Stockport; Walsall; Wirral
5-10%	Bedfordshire; Derbyshire; East Sussex; Humberside; North Tyneside; Nottinghamshire; Redbridge and Waltham Forest; Rotherham; Sandwell; St Helens and Knowsley; Sunderland; Tameside
0-01-5%	Avon; Barking and Havering; Berkshire; Bromley; Buckinghamshire; Cambridgeshire; Cheshire; Clwyd; Devon; Dorset; Durham; Gwent; Gwynedd; Hampshire; Hereford and Worcester; Kent; Lincolnshire; Norfolk; Northamptonshire; Northumberland; Sefton; Shropshire; Somerset; South Glamorgan; Staffordshire; Suffolk; West Glamorgan; Wiltshire
0	Barnet; Barnsley; Cornwall and Isles of Scilly; Croydon; Cumbria; Doncaster; Dudley; Dyfed; Essex; Gloucestershire; Hertfordshire; Hillingdon; Isle of Wight; Kingston and Richmond; Merton, Sutton and Wandsworth; Mid Glamorgan; North Yorkshire; Oxfordshire; Powys; Solihull; Surrey; Trafford; Wakefield; Warwickshire; West Sussex; Wigan

outdated census material from 1981. The validity of its construction has also been criticised¹⁸ in that a measure of general practitioner workload has been applied to a wider concept—namely, that of deprivation or under-privilege. This has led to Townsend *et al* utilising different indicators in their studies of health and deprivation (box).

Townsend *et al* have presented alternative indices and their relation to indicators of poor health.¹⁴ Though there is a positive correlation between the Jarman index and other measures of deprivation and mortality, there is evidence that deprivation scores add little more to standardised mortality ratio values in explaining demand for health care as measured by bed days used in general hospitals.¹⁹

Hutchinson *et al*²⁰ compared Jarman's index with that of Townsend *et al*.¹³ If the scores of Townsend *et al* for material deprivation were used for the allocation of financial resources to doctors in deprived areas some regions (for example, Northern and Mersey regions) would gain over 50% of their allocation, whereas other regions (such as East Anglia, Oxford, and South West Thames) would lose over 30%.

Deprivation indices

Much attention has been given to the Jarman index by health authorities and local government. Though designed to measure the workload of doctors, the Jarman index has also been used as a general deprivation measure. For example, Coopers and Lybrand in their review of the Resource Allocation Working Party formula for their allocation of hospital and community services resources to regional health authorities selected the Jarman index rather than any other index of deprivation as their proposed formula.²¹ In *Working for Patients* the Department of Health moved away from that proposal by a commitment to a funding arrangement for health authorities on a capitation basis, weighted to reflect the health and age distribution of the population. Though not adopted for health authorities, it is interesting that the Jarman index was chosen to delimit areas for deprivation payments for general practitioners instead of other indices that might seem to be more appropriate.

Since the passage of the National Health Service and Community Care Act 1990 family practitioner committees have been abolished and replaced by family health services authorities, and previous open ended funding arrangements for ancillary staff and improvements in surgery have been replaced by cash limited budgets. Amid these structural changes another process, on a smaller scale than the reallocation of funds for hospital and community services—namely, that of the equalisation and compensation of resources for family practitioner committees in 1987⁶—has been lost owing to opposition from some family practitioner committees (communication to administrators of family practitioner committees from Society of Family Practitioner Committees, 1987). It is unclear what formulas will be used by regional health authorities in their allocation of funds to family health services authorities from April 1991.

The study of indicators of urban deprivation has received much attention by geographers and social scientists during the past 20 years.^{22,23} Government policies have long favoured some form of targeting of resources into areas of concentrated urban deprivation. As Church and Hall explain in their commentary on central government policies for intervention in regeneration of urban areas, the selection of deserving areas is "broadly systematic and 'objective'."²⁴ In a period of limited public resources, when distribution of scarce resources is socially controlled²⁵ and the struggle for these resources generates conflict,²⁶ the selection and analysis of "objective" indicators become important factors when applied to the allocation of funds and allowances from the Department of Health. Though there is a lobbying procedure for allocation of funds, and this has been recognised in other areas of urban policy such as allocations of regional funding,²⁴ the use of any statistical measure that gives advantage to any area at expense of another is worthy of attention.

As service factors were removed from the original Jarman study there is a danger that problems of health related services themselves are not identified as issues affecting underprivileged areas. By concentrating on "social" factors alone²⁷ this suggests a shift in the rationale underpinning underprivilege and deprivation away from institutional malfunctioning and maldistribution of resources and opportunities to that of cycles of poverty and deprivation.

Conclusions

Use of the Jarman index as a measure of deprivation leads to a counterintuitive distribution of "deprived"

Deprivation variables utilised by Townsend, *et al*¹⁴

- (1) Percentage of economically active residents aged 16-59 or 16-64 who are unemployed
- (2) Percentage of private households that do not possess a car
- (3) Percentage of private households that are not owner occupied
- (4) Percentage of private households with >1 person per room

Measures of 1-4 were combined to form an overall deprivation index.

Other measures included:

- (5) Percentage of 17 year olds not in full time education
- (6) Percentage of private households without exclusive use of bath and toilet
- (7) Percentage of private households with at least one single parent family with dependent child(ren) aged 0-15 years
- (8) Percentage of households in which the economic head is in social class IV or V

areas. In particular, there is a strong bias towards London in the proportion of the population classified as deprived. The index fails to recognise the nature of deprivation in the north of England, and, utilising Jarman's index, any resource allocation exercise would benefit the Thames regions at the expense of peripheral regions. Also, the Jarman index has been used outside its original domain of application—namely, that of general practitioners' workload—to guide the allocation of both health care and other resources. This raises the issue of how a statistical index develops a life of its own.

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Rectal examination in patients with pain in the right lower quadrant of the abdomen

J M Dixon, R A Elton, J B Rainey, D A D Macleod

Abstract

Objective—To determine whether rectal examination provides any diagnostic information in patients admitted to hospital with pain in the right lower quadrant of the abdomen.

Design—Casualty officer or surgical registrar recorded symptoms and signs on admission on detailed forms. Final diagnosis was noted on discharge from hospital.

Setting—District general hospital.

Patients—1204 consecutive patients admitted to hospital with pain in the right lower quadrant of the abdomen as their major complaint; 1028 had a rectal examination on admission.

Main outcome measures—Odds ratio for each symptom and sign related to final diagnosis. Results of multiple logistic regression analysis for acute appendicitis.

Results—Right sided rectal tenderness, present in 309 of those examined, was more common in patients with acute appendicitis (odds ratio 1.34, $p < 0.05$). This odds ratio was considerably less than that for other clinical signs—namely, tenderness in the right lower quadrant (odds ratio 5.09), rebound tenderness (3.34), guarding (3.07), and muscular rigidity in the abdomen (5.03). In the logistic regression analysis of patients with acute appendicitis, when allowance was made for the presence or absence of rebound tenderness, rectal tenderness on the right lost its significance. Six patients had masses palpable rectally, of which three were palpable on abdominal examination; the other three patients had acute appendicitis. No other unexpected diagnoses were established, and no useful additional

diagnostic information was obtained by routine rectal examination.

Conclusion—If patients presenting with pain in the right lower quadrant of the abdomen are tested for rebound tenderness then rectal examination does not give any further diagnostic information.

Introduction

The diagnosis of the cause of pain in the right lower quadrant of the abdomen rests largely on the clinical history and results of clinical examination. Rectal examination is considered to be essential in this evaluation,^{1,2} but it is unpleasant for the patient, particularly when it is repeated by different doctors, and there is scant evidence that it provides any information of diagnostic value.^{3,5} We aimed to assess whether rectal examination is valuable in determining the diagnosis in patients admitted to hospital with pain in the right lower quadrant of the abdomen.

Patients and methods

We studied 1204 consecutive patients admitted to Bangour General Hospital between September 1983 and June 1989 with pain in the right lower quadrant of the abdomen as their main presenting complaint. At the time of admission a casualty officer or surgical registrar recorded on to a detailed form the patient's age, sex, and symptoms and the findings on clinical examination; these data were then entered and stored in a BBC microcomputer. Rectal examination was recorded as having been performed at admission in 1028 (85%) patients, and rectal tenderness, if present,

University Department of Surgery, Royal Infirmary of Edinburgh, Edinburgh EH3 9YW

J M Dixon, FRCS, lecturer in surgery

Medical Statistics Unit, Medical School, Edinburgh R A Elton, PHD, senior lecturer

Department of Surgery, St John's Hospital at Howden, Livingston, West Lothian J B Rainey, FRCS, consultant surgeon

D A D Macleod, FRCS, consultant surgeon

Correspondence and requests for reprints to: Mr Dixon.

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