

Measuring Deprivation

Index to Deprivation Indices and Area Classifications included

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1. Introduction

There are a variety of deprivation indices currently in existence, which were developed to meet different objectives. There has been much discussion on their relative merits, but a clear consensus regarding the best selection of indicators or methods of construction has yet to be achieved. This paper begins by discussing the general concept of deprivation indices. It then presents brief summaries of the common measures and highlights some of the discussion that has surrounded their use. Detailed descriptions of each index are given in the annex.

2. Deprivation Indices

In general, deprivation indices ‘measure the proportion of households in a defined small geographical unit with a combination of circumstances indicating low living standards or a high need for services, or both’ (Bartley and Blane 1994). An important note to be made about all ecological measures of deprivation – that is measures based on geographic areas, rather than individual circumstances – is that ‘not all deprived people live in deprived wards, just as not everybody in a ward ranked as deprived are themselves deprived’ (Townsend *et al* 1988, p.36-37). This point is reiterated by Sloggett and Joshi (1994) who note ‘deprivation indices may be gainfully used to identify areas of relative concentration of disadvantage, in the absence of data at the personal level, or where the fact of geographic concentration is pertinent...but disadvantaged people also live elsewhere and could be excluded in large numbers if interventions were planned purely on the basis of a local, census based, deprivation score (Sloggett and Joshi, 1994, p.1474) They go on to note that ‘for maximum effectiveness, health policy needs to target people as well as places’ (Sloggett and Joshi, 1994, p.1474).

In interpreting deprivation scores it is important to remember that many deprivation scores are relative measures, that is the score for any one area is standardised by reference to the mean for the total of all

areas included in the calculation. For example, scores derived for all the wards in one Local Authority cannot be compared to scores derived separately for all the wards in another Local Authority, because the scores for each set of wards are relative to the mean for the respective Local Authority.

3. Measures of Deprivation in Common Use

There are many different measures of deprivation that are in common use. Probably the most commonly used being the Jarman Underprivileged Area Score, the Townsend Index, The Carstairs Index and the Department of Environment's Index of Local Conditions. More recently (in August 2000) the Department of Environment has developed the Index of Multiple Deprivation.

In a study comparing how the use of different measures of deprivation may influence resource allocation decisions Mackenzie *et al* (1998) highlighted that different organisations have preferences for different measures. For example, they state that the Townsend Material Deprivation Score is favoured by Health Authorities, whereas Local Authorities have tended to use the Department of the Environment, Transport and the Regions (DETR) Index of Local Deprivation (now called the Indices of Deprivation 2000). The Department of Environment's Index of Local Conditions is also well used. The Jarman Underprivileged Area Score is used by the Department of Health for making additional payments to general practitioners. A less widely used index; The Breadline Britain Score, has been used by the media to estimate the percentage of poor households in a particular area.

The Townsend Index and the Carstairs Index (which is a very similar measure that was developed specifically for the analysis of Scottish health data) were both developed as measures of material deprivation¹. They tend to be commonly used in epidemiological analyses, for example the recent publication by the Office for National Statistics on Trends in Cancer Survival (Coleman *et al*, 1999). The Jarman Underprivileged Area Score was not originally constructed to measure deprivation but as a measure of General Practice workload. The Jarman Score was derived to take account of geographic variations in the demand for primary care based on a survey of GPs subjective expressions of the social factors among their patients that most affected their workload.

The series of indices that have been produced by the Department of the Environment (DoE), and its successor the Department of the Environment, Transport and the Regions (DETR), were designed as general measures used to identify areas of greatest need in order to assist central government when allocating resources to Local Authorities. In August 2000 the Indices of Deprivation 2000 were published by DETR. This is the most up to date and detailed analysis of deprivation in England ever produced. The Indices combine a number of indicators, chosen to cover a range of economic, social and housing issues into a single deprivation score for each ward (there are 8414 wards in England). The new indices replace previous indices: the 1998 Index of Local Deprivation and the 1991 Index of Local Conditions.

Annex A – Detailed descriptions of measures of deprivation and area classifications in common use

4. Department of the Environment, Transport and the Regions' Indices of Deprivation 2000

In December 1998, the Department of the Environment, Transport and the Regions (DETR) (now the Department for Transport, Local Government and the Regions) commissioned the Department of Social Policy and Social Work at the University of Oxford to review and update the 1998 Index of Local Deprivation (see para.5). There were criticisms of the 1998 Index of Local Deprivation (ILD) and the 1991 Index of Local Conditions (ILC) (see para.6) that it updated - the sub-district level indicators were out of date and the chi-squared method needed to be reviewed (the 1998 ILD and 1991 ILC are described briefly below). Also better small area data at the sub district level was about to come on stream for the first time.

In August 2000, following extensive consultation, DETR published the Indices of Deprivation 2000 (ID 2000). This index is more complex than all of the other more commonly used indices.

The ID 2000 is made up of:

¹ Material deprivation is the lack of goods, services, resources, amenities and physical environment. This is in contrast to social deprivation which is non-participation in the roles, relationships, customs, functions, rights and responsibilities implied by member of a society and its sub-groups. Such deprivation may be attributed to the affects of racism, sexism and ageism etc (Townsend *et al*, 1988, p.36).

- Six Domain Indices at ward level (Income, Employment, Health Deprivation and Disability, Education Skills and Training, Housing and Geographical Access to Services).
- An overall ward level Index of Multiple Deprivation 2000 (IMD 2000).
- A supplementary Child Poverty ward level Index.
- Six summaries at the local authority district level of the overall IMD 2000.

The new IMD 2000 is an innovative and detailed ward level Index with local authority level presentations. It is based on six separate 'domains' of deprivation:

- Income (25%).
- Employment (25%).
- Health Deprivation and Disability (15%).
- Education, Skills and Training (15%).
- Housing (10%).
- Geographical Access to Services (10%).

A child poverty index is also available. This was constructed by combining the indicators within the income domain, for children aged under 16 only.

These each contain information essential to local authorities and others about their areas and the nationwide picture. The IMD 2000 uses mostly 1998 information from 33 indicators to describe deprivation at ward level. This includes information from previously untapped data sources, such as Department of Social Security (DSS) benefits data and University and Colleges Admissions Service (UCAS) data. Most of the indicators can be updated regularly, and so form the basis for a dynamic Index. In addition to the Domain Indices, the overall ward level Index of Multiple Deprivation brings this substantial amount of knowledge and information together for the first time.

Drawing together these indicators for the first time gives the IMD 2000 a major advantage over previous indices; the range of indicators at ward level enables a focus on deprivation at a small geographical level that was not possible before. This is an improvement on the 1998 ILD which was able to present very little information at ward level, and the information that was included was based on the 1991 Census and therefore was increasingly out of date. In addition, the ward-level information allows the new Index to be presented in six ways to represent overall deprivation and pockets of deprivation at local authority level.

The information from the Indices of Deprivation 2000 has been aggregated up to enable local authority districts to be ranked according to how deprived they are relative to other districts using 6 measures. All of the 6 measures are equally valid and they should not be used in isolation from each other. There is not one overall set of rankings. Patterns of deprivation are complex – in some places the entire district may be generally deprived - but with no very severe areas. Elsewhere deprivation may be concentrated in very severe pockets that co-exist alongside generally affluent areas. The indices have to attempt to reflect these different patterns through 6 different measures that reflect the differing mosaic of area deprivation in different areas.

The 6 measures are:

- The **local concentration** measure tells us how severe deprivation is in each authorities 'hot spots' of deprivation;
- The **extent** measure is the percentage of each districts population that live in one of the 10per cent most deprived wards in England
- The '**average – scores**' measure is the average level of deprivation across the entire district.
- The '**average – ranks**' also measures is the average level of deprivation across the entire district.
- The **income scale** measures how many people suffer from income deprivation.

- The **employment scale** measure how many people suffer from employment deprivation.

As all the rankings are based on the same data, there is not one measure that can be used as an overall ranking. Some Authorities may be ranked poorly on some measures, but less so on others.

The Neighbourhood Renewal Unit of the Department for Transport, Local Government and the Regions offers an advice role in relation to the appropriate use of the Indices of Deprivation 2000 in the allocation of resources.

The data and further details about the Indices of Deprivation 2000 can be found on the Department for Transport, Local Government and the Regions website at:

<http://www.regeneration.dtlr.gov.uk/research/id2000/index.htm>

4.1 Indices of Deprivation 2000 for Health Authorities and Primary Care Groups

The Department of Health commissioned the University of Oxford to produce the Indices of Deprivation 2000 for Health Authorities and Primary Care Groups (PCG's). These were received in May 2001.

The indices are presented in a similar way to those produced for Local Authorities and Wards.

The Health Authority and Primary Care Group indices are presented in two separate files. In each there are separate worksheets for each of the six Domain Indices (i.e. Income, Housing, etc) and for the overall Index of Multiple Deprivation. Each Domain and the overall index are presented by the summary measures as listed on the previous page (except 'Scale' is only available by the income and employment domains).

For each Domain Index and the overall Index of Multiple Deprivation, every Health Authority/PCG is awarded a score (in red) and a rank (in blue) for each of the summary measures.

The indices for Health Authorities and PCG's are based on their boundaries as at 1st April 1999. At that time there were 99 Health Authorities and 481 PCG's.

5. Department of the Environment, Transport and the Regions' Index of Local Deprivation (1998) – now superseded by Indices of Deprivation 2000

In June 1998, following consultation, the Department of the Environment, Transport and the Regions (DETR) published an updated version of the 1991 ILC. The 1998 Index of Local Deprivation (ILD), based mainly on data for 1996, was calculated for all 354 Local Authority Districts as they stood at April 1998. The ward and ED level indexes are based on the 1991 Census Area definitions. There are 12 indicators in the district level ILD which relate to different dimensions of deprivation – income, health, education, environment, crime and housing.

The indicators, their measures and their sources (briefly) were:

1. Unemployment (1997)
2. Dependent children of income support recipients (1996)
3. Overcrowding (1991 Census)
4. Housing lacking basic amenities (1991 Census)
5. Non income support recipients in receipt of council tax benefit (1996)
6. Educational participation (1991 Census)
7. Long-term unemployment (1997)
8. Income support (1996)
9. Low educational attainment (1996)
10. Standardised mortality ratios (1996)
11. Derelict land (1993)
12. Home insurance weightings (1996)

There are two main differences in the methodology between the 1991 and 1998 Indexes. Firstly, in 1991 the values for the indicators were simply added together, whereas in 1998 only the positive values (those where the actual count exceeded that expected) have been added together to produce the overall index score. Secondly, in the 1991 Index no weightings were attached to any of the indicators. However, in the

1998 Index the values for the standardised mortality ratio and insurance premium indicators “have been multiplied by two to give them a similar level of influence in the overall index” (DETR 1998, p.13).

6. Department of the Environment’s Index of Local Conditions (1991) – superseded by later DETR Indices of Deprivation

In 1995 the Department of Environment commissioned a team of researchers to produce an ‘Index of Local Conditions’. This was to provide a general index of urban deprivation in order to inform policy and planning initiatives. The main purpose of the index was to identify those areas that experience the greatest levels of multiple deprivation so that regeneration programmes could be targeted.

The Index of Local Conditions (ILC) comprised 13 variables, seven census variables and six non-census variables (all 1991 except where stated):

Census variables

1. Unemployment
2. Children in low-earner households
3. Overcrowding
4. Housing lacking basic amenities
5. No car
6. Children in unsuitable accommodation
7. Educational participation

Non-census variables (Sources and dates)

1. Long-term unemployment
2. Income support
3. Low educational attainment
4. Standardised mortality ratios
5. Derelict land
6. Home insurance weightings

The index of local conditions is an unweighted summation of the selected indicators using their log-transformed signed chi-square values². The actual number of persons which have each selected variable are compared to the numbers that would be expected if average English rates applied. The difference between the actual and expected numbers is squared and then divided by the expected number after which the value of 1 is added. A log transformation is then applied and those scores where the actual rate was below the expected rate are given negative signs. Summed scores greater than zero indicate greater levels of material deprivation.

This index differs from those previously described in using actual numbers rather than percentage rates as the input into the calculations. This has the effect of giving lower weights to those areas where the actual counts are small - and hence statistically less reliable (i.e. an area where 3 out of 10 persons are unemployed will have a lower score than one where unemployment is 30 out of 100).

7. Jarman Underprivileged Area Score

The Jarman Underprivileged Area Score was not originally constructed to measure deprivation but as a measure of General Practice workload (Jarman, 1983). The Jarman Score was derived to take account of geographic variations in the demand for primary care based on a survey of GPs subjective expressions of the social factors among their patients that most affected their workload. The variant of the score in most common use – the UPA8 score – comprises eight variables which were individually weighted by a sample of London GPs (Carr-Hill 1988).

1. ***Unemployment*** – (3.34) residents unemployed as a percentage of economically active
2. ***Overcrowding*** – (2.88) % of residents in overcrowded households (more than one person per room)
3. ***Lone parents*** – (3.01) % of residents in ‘lone parent’ households

² The standardisation and transformation “has the merits of: taking account of the small size of the denominators of many of the observations; using an interpretable value of zero; and using values which approximate the normal curve” (DoE 1995, p.86)

4. **Under 5s** – (4.64) % of residents aged under 5 years
5. **Elderly living alone** – (6.62) % of elderly persons living alone
6. **Ethnicity** – (2.50) % of households headed by a person born outside the United Kingdom
7. **Low social class** – (3.74) % of residents where household head is unskilled (social class V)
8. **Residential mobility** – (2.68) % of residents who changed address in the previous year

Each variable is based on the percentage of all residents in households, with the exceptions of unemployment, which is based on the percentage of the economically active population which is unemployed, and residential mobility where the denominator is the total resident population. Each variable is firstly expressed as a proportion (between 0 and 1). The proportions are then transformed by first calculating the square root and then finding the equivalent arc sine (asin). The variables are expressed as Z scores³ and multiplied by their respective weighting factors. The final score is obtained by summing the variables (after statistically reworking). Higher scores indicate greater levels of GP workload.

The index has been criticised as “being better at defining inner-city deprivation because it includes factors like overcrowding and ethnicity” (Davies 1998). Talbot (1991) has extended this criticism by stating that “in particular, there is a strong bias towards London in the proportion of the population classified as deprived”. He goes on to state that “the index fails to recognise the nature of deprivation in the north of England...benefit[ing] the Thames regions at the expense of peripheral regions (Talbot, 1991, p. 386).

8. Townsend Material Deprivation Score

The Townsend Score is based on just four variables originally taken from the 1981 Census that were selected to represent material deprivation: unemployment (lack of material resources and insecurity), overcrowding (material living conditions), lack of owner occupied accommodation (a proxy indicator of wealth) and lack of car ownership (a proxy indicator of income). It was developed for the Northern Regional Health Authority in order to address material aspects of deprivation, partly as a result of criticism of the Jarman index. The Townsend Score is a summation of the standardised scores (Z scores) for each variable (scores greater than zero indicate greater levels of material deprivation). Two of the variables – those relating to unemployment and overcrowding – are firstly transformed using the log transformation $y = \ln(x + 1)$ to produce more normal distributions. The Townsend score was considered the best indicator of material deprivation available (until the release of the Indices of Deprivation 2000 (ID 2000) in August 2000, although the ID 2000 only covers England, not Wales - unlike Townsend scores). The four variables that make up the Townsend Score are combined together in an overall deprivation index, with each variable being given an equal weight. The units of measurement of the four indicators are:

1. **Unemployment** – % of economically active residents aged 16-59/64 who are unemployed.
2. **Car ownership** – % of private households who do not possess a car.
3. **Home ownership** – % of private households not owner occupied.
4. **Overcrowding** – % of private households with more than one person per room.

The variables selected are direct indicators of deprivation, that is they represent the condition or state of deprivation. In contrast, indirect indicators of deprivation represent the victims of those conditions or states, for example, the elderly, ethnic minorities and single parents. Townsend *et al* (1988) highlighted that ‘even if many among these minorities are deprived, some are not, and the point is to find out how many are deprived rather than operate as if all are in that condition. It is the form which their deprivation takes and not their status which has to be measured’ (Townsend *et al* 1988, p.35).

³ Z scores express each variable in terms of its mean value in the population and its standard error. If this were not done then variables with longer scales would have more weight than variables with shorter scales in the overall score. For example, the number of children in a household could vary from 0 to 10, while the number of cars could range from 0 to 3. Simply adding these together would give children more weight than cars – standardisation is intended to avoid this problem (Bartley and Blane, 1994).

Townsend scores can be recalculated using the equivalent variables extracted for areas from the 1991 Census. However, it should be noted that the change in variable scores for any one area between 1981 and 1991 cannot be taken as indicative of reducing or increasing relative deprivation - primarily because of exogenous changes in the social characteristics of car and home ownership. Hence, explanatory models calibrated using 1981 Townsend scores should not be applied to 1991 scores without recalibration.

This index has been the most widely used, and has been considered one of the best indexes available (Nelder and Maconachie, 1997).

9. Carstairs and Morris Scottish Deprivation Score (also called Scotdep)

The index was constructed by Carstairs and Morris for the analysis of Scottish health data (Carstairs and Morris, 1989a). It was developed as an alternative to the Townsend index but incorporating different indicators to reflect specific characteristics of the Scottish highlands (i.e. lower female activity rates and higher social housing rates). However it has also been used as a discriminator of health status in England. Like Townsend, the index is based on four variables originally taken from the 1981 Census which were judged to represent, or be determinants of, material disadvantage. Three of the indicators are the same as those used in Townsend, the fourth, to do with social class, is used in place of housing tenure. The authors state "we do not find Townsend's reasons for excluding social class convincing since we believe that being in a low social class, equally with being unemployed, places families in a position of poor access to material resources..." (Carstairs and Morris, 1989b, p211). The authors considered housing tenure to be "less relevant in Scotland as a much higher proportion of housing stock is in the public sector and the variable would not have acted as a discriminator between large sections of the population" (Morris and Carstairs, 1991, p325). The units of measurement of the four indicators are:

1. **Overcrowding** – persons in private households living at a density of more than one person per room as a proportion of all persons in private households.
2. **Male unemployment** – proportion of economically active males who are seeking work.
3. **Social class IV or V** – proportion of all persons in private households with head of household in social class IV or V.
4. **No car** – proportion of all persons in private households with no car.

The deprivation measure is an unweighted combination of the four standardised variables.

10. Arbuthnott Index

This index has been developed by the Scottish Health Board and was used in their report 'Fair Shares for All'. Their analysis suggests that there are four key indicators of morbidity and deprivation that are closely associated with the use of health services, and these indicators have been combined into a single index (the 'Arbuthnott index'). Essentially the Arbuthnott includes 4 variables put together as z scores.

The 4 key indicators in the 'Arbuthnott Index' are:

- mortality rates among people under 6 years of age (SMR's)
- unemployment rates
- the proportion of elderly people claiming income support
- households with two or more indicators of deprivation (unemployed or permanently sick head of household; low socio-economic head of household; overcrowding, large households, lone parent family and all elderly household).

This index is not a direct measure of healthcare needs; it is a measure of factors that influence these needs. Areas of the country in which there are high mortality rates among people under 65, high levels of unemployment, a high proportion of elderly people claiming income support, and a relatively high proportion of households with multiple deprivation are areas in which the population generally will tend to have relatively high needs for healthcare. Further details can be found on the following website:

<http://www.scotland.gov.uk/fairshares/docs/fsfg-00.asp>

11. MATDEP and SOCDEP

MATDEP (a material deprivation index) and SOCDEP (a social deprivation index) are both indices of deprivation that were developed by Forrest and Gordon (1993) following the 1991 Census. The distinction between material and social deprivation has been explicitly stated by Townsend. 'Material deprivation entails the lack of goods, services, resources, amenities and physical environment which are customary, or a least widely approved in the society under consideration. Social deprivation, on the other hand, is non-participation in the roles, relationships, customs, functions, rights and responsibilities implied by membership of a society and its sub-groups. Such deprivation may be attributed to the affects of racism, sexism and ageism...' (Townsend *et al*, 1998, p. 36). The distinction between material and social deprivation has two conceptual forms: 'the argument between the use of direct and indirect measures and the different dimensions of deprivation when taking a social (roles and relationships) and a material (goods and services) perspective (Lee et al, 1995, p. 25).

Indicators used in MATDEP

1. ***Overcrowding***: % households with more than 1 person per room
2. ***Lack amenity***: % households lacking or sharing use of a bath/shower and/or inside WC
3. ***No central heating***: % households with no central heating
4. ***No car***: % households with no access to a car

Indicators used in SOCDEP

1. ***Unemployment***: % economically active population unemployed
2. ***Youth unemployed***: % economically active 16-24 year olds unemployed
3. ***Lone parents***: lone parent households as a proportion of all households
4. ***Elderly***: % households containing a single pensioner
5. ***Long-term illness***: % households containing a person with limiting long-term illness
6. ***Dependent only***: households containing dependents only (e.g. single pensioners with long-term illness) as a percentage of all households

MATDEP and SOCDEP scores are the summation of the unweighted standardised scores for each variable. Each variable is standardised by dividing the percentage value for each indicator in a particular geographic area by the maximum value for each indicator in all areas to give a value between 0 and 1. This means that the maximum score for SOCDEP is 6 and the maximum score for MATDEP is 4 (the minimum score for both indices is 0). Higher scores indicate greater levels of deprivation.

12. Breadline Britain Score

The Breadline Britain Score is the result of two surveys carried out by MORI for London Weekend Television and the Joseph Rowntree Foundation in 1983 and 1990. The 1983 study pioneered the use of the 'consensual' or 'perceived' deprivation approach to measuring poverty. The approach set out to determine whether there are some people whose standard of living is below the minimum acceptable to society. The minimum standard of living was determined by interviewing a quota sample (based on age, sex and working status) of 1,174 adults in 1983 and 1,831 adults in 1990. Aggregated data were weighted by age, household type, household tenure and ACORN housing type (see below) to be representative of the population of Great Britain. In order to ensure a large sample of people living in deprived areas over-sampling was conducted in ACORN areas known to contain poor households.

In the 1990 Survey respondents were presented with a set of 44 cards onto each of which was written the name of a different item covering a range of possessions and activities that relate to standards of living. For example, a television, a night out once a fortnight and a warm waterproof coat. Respondents were asked to place the 44 cards into one of two boxes. Box A was for items which they considered necessary; those items which all adults should be able to afford and which they should not have to do without. Box B was for items which they considered to be desirable but not necessary. They were also asked if they felt differently about any of the items in the case of families with children. An item was deemed to be a socially perceived necessity if more than 50 per cent of respondents put it into Box A. Later in the interview the respondents were asked to assign one of the following 5 options to each of the 44 items:

1. Have and couldn't do without
2. Have and could do without
3. Don't have and don't want
4. Don't have and can't afford
5. Not applicable/don't know

Respondents (and their households) were assigned a deprivation index score each time they answered 'don't have and can't afford' to an item that was considered to be a necessity by more than 50 per cent of respondents (Gordon and Pantazis, 1997).

13. Low Income Scheme Index (LISI) – a deprivation scale based on prescribing in general practice

The indices listed so far are calculated for area populations – and hence their values may not be reliable when attributed to the registered lists of General Practitioners, if the persons registering with a particular practice do not represent an unbiased sample of the population of their area of residence. An alternative direct measure of practice list deprivation has been derived from prescription data. More than 80 per cent of items dispensed from prescriptions issued by NHS GPs in England are exempt from the prescription charge. Most of those exempt (54.6% of items) are so on the basis of age (because the patient is under 16 or over 60). An additional number of items (6.6%) are exempt because of what is termed FHSA exemption – this is mainly pregnancy but also includes a small number of specific diseases. However, 12.1% of items are exempt because of low income (categories H, I, J, K and L on the back of form FP10C). The low income scheme covers recipients (and their dependants) of family credit and income support and others who qualify on grounds of low income. The Low Income Scheme Index calculates the proportion of total cost in a practice going to patients who are exempt for these reasons.

When the index was originally devised there was a problem where the prescription was dispensed to a dispensing patient but this ceased to be a problem in October 2000 when such prescriptions were included in the sampling process (only 5% of prescriptions are used for the analysis of exemption data). Current versions of the index therefore do not include practices where there are a large number of dispensing patients but the PSU intend to produce a complete set early in 2002. However a small number of practices will still be excluded because they have very few patients or very low prescribing activity.

The index needs to be used in conjunction with some measure of age as a high proportion of patients who are exempt because of age may depress the proportion who are exempt because of low income.

14. Area Classifications

In addition to the measures of deprivation that have been discussed above there are various area classifications which 'cluster [geographically distance] places together on the basis of various socio-economic commonalities' (Burrows and Rhodes, 1998, p.1).

15. The ONS classification of Local and Health Authorities of Great Britain: revised for authorities in 1999 and further revised for Health Authorities in 2001

ONS recalculated the ONS Area Classification to Local Authority boundaries as at 1 April 1998 and Health Authority boundaries as at 1 April 1999 reflecting the post-reorganisation areas for both Local and Health Authorities. In June 2001 ONS produced a revision of the Area Classification for Health Authorities to take account of the boundary changes that occurred on 1st April 2001. On that date the number of Health Authorities in England was reduced from 99 to 95 (The original 1991 classification was also released at ward level using the same methodology and census variables. However, this was a separate classification and has not been revised).

The revised version is not a new classification scheme. It has been compiled using the same methodology and approach as the original 1991 version, and the same 37 component variables from the 1991 Census. None of the data have been updated. ONS have simply attempted to recast the classification to reflect the new Local and Health Authority areas. The revision has, however, produced a slightly different classification solution because of the effect of the boundary changes. The 'clusters' of similar authorities and the average characteristics for these clusters have necessarily changed as the Local and Health Authorities have changed. There is therefore little direct comparability with the results of the original classification. However, ONS have, where possible and where appropriate, retained some of the same

names for the Families, Groups and Clusters within the classification (Bailey *et al*, 1999a and Bailey *et al*, 1999b, p29).

16. ONS Area Classification (1991)

The Office for National Statistics (ONS) Area Classification provided a general purpose summary indicator of the characteristics of each Local Authority District and Health Authority in Great Britain. Using information collected at the 1991 Census it classified each authority into one of 6 Families, 12 Groups and 34 Clusters (Health Authorities are only categorised into Families and Groups) on the basis of 37 separate socio-demographic variables. The general choice of variables for the classification was determined by inclusion of:

1. variables to represent the main dimensions of the 1991 Census data (demographic; employment and socio-economic; household composition and housing) bearing in mind the general-purpose use of the classification.
2. variables used in one or both of the 1971 or 1981 Office of Population Censuses and Surveys (OPCS) area classifications, *or* nearest equivalent variables, *or* a replacement which improves the classification process.
3. variables available for the first time from a Census, such as ethnic group or limiting long-term illness, with potential significance for area classification.

The classification is based on Local Authorities as they existed on Census Day in 1991 and on Health Authorities at 1 April 1994.

The ONS Area Classification is not actually an index of deprivation but an indicator of 'socio-economic similarity and difference between areas' (Wallace and Denham, 1996). However, the term 'deprivation' is used as a general descriptive term to refer to the values for a group of five variables which form part of the classification and which characterise generally poor socio-economic circumstances. These variables, and their units of measurement, are: the standardised rate of limiting long-term illness; the percentage of children with a single parent; the percentage of dependents with a lone carer; the unemployment rate; and the percentage of households without a car. Authorities with high values for these variables are deemed to be the more socio-economically deprived.

The ONS Area Classification is used extensively for resource allocation and performance management purposes by the NHS/DH.

17. New ONS measure of social exclusion/disadvantage and Classification of Household Disadvantage

ONS are producing a new Census based measure of disadvantage / social exclusion based on 2001 Census data. It is intended that the new measure will be available in June 2003. A classification of Household Disadvantage derived from the 2001 Census is also being created.

18. Geo-Demographic Classifications

Geo-demographic classifications are not measures of deprivation but they are used extensively for marketing purposes to target customer groups. The assumption is made that those households within a defined neighbourhood are likely to have similar lifestyles and buying habits. Like area classifications, they group geographically disparate places together on the basis of certain characteristics that distinguish customer groups. Traditional forms of social classification used for market research were based on the occupation of the head of the household in which they were categorised. Geo-demographics takes this concept further, and can be expressed as, the classification of people by the neighbourhood in which they live and have a similar pattern in terms of their ability to consume, behave or purchase.

19. ACORN – A Classification of Residential Neighbourhoods

ACORN is a geo-demographic classification developed by the market analysis company CACI. The classification is built entirely using Census data and includes information on age, sex, marital status occupation, economic position, education, home ownership and car ownership. Like the ONS Area Classification, ACORN is based on a three tier system which classifies people living in Great Britain into

one of 6 Categories, 17 Groups or 54 Types (plus one unclassified in each case). Although not a true measure of deprivation there are Groups and Types which relate to areas which have such characteristics as high unemployment, a high percentage of elderly with health problems, a high percentage of lone parents and severe overcrowding.

20. Super Profiles

Super Profiles is another geo-demographic system, similar to ACORN, available from the market analysis company CLARITAS. It categorises households in Great Britain according to the characteristics of the neighbourhood in which they are located. The classification is derived from numerous data sources including the 1991 Census, the electoral roll, credit information and market research data. The classification is again based on a three tier system. At the most detailed level there are 160 different Super Profiles Clusters which are ranked in order of affluence. Each Cluster relates to one of 40 Market Groups, which in turn relate to one of 10 Lifestyles.

21. Deprivation Index using the ONS Longitudinal Study

Using data from the ONS Longitudinal Study, a deprivation index has been calculated based on individual characteristics. This index was used to compare trends in regional deprivation and mortality (Reid and Harding, 2000).

The ONS Longitudinal Study is a record linkage study of an approximately one per cent representative sample of the population of England and Wales (about 550,000 people). The initial sample, drawn from the 1971 Census, is continually updated to include new members through birth and immigration. Subsequent census and vital event information is linked to the records of study members through the National Health Service Central Register.

For the calculation of this index, the 1981 cohort was used. They were classified by their place of residence in 1981, and, for those who survived the first 10 years of follow-up by their place of residence in 1991. Follow-up for this study extended from Census day 1981 to the end of 1997. Using a similar approach to that of Townsend and Carstairs, a deprivation index based on individual characteristics was created for women and men of working age (26-59 and 26-64 years) in both time periods. Those aged under 26 years were excluded from the study to minimise the effects of ageing of the cohort. An index was created dependent upon study members being in Social Class IV and V (partly skilled or unskilled) or I, II and III (professional, managerial and skilled non manual and skilled manual), living in rented or owner occupied housing, with or without household access to a car and being unemployed or employed. This was based on information provided at the 1981 and 1991 censuses. The index took four values:

- 1 (least deprived) – being social class I, II or III, in owner occupied housing, with car access and employed
- 2 – having one disadvantageous and three advantageous characteristics, e.g. being employed, but living in owner occupied accommodation, with access to a car and being social class I, II or III
- 3 – having two disadvantageous characteristics and two advantageous characteristics. e.g. being unemployed and living in rented accommodation, but having access to a car and being social class I, II or III
- 4 (most deprived) – having at least three disadvantageous characteristics.

22. Health Action Zones (HAZs)

More than 20 indicators of deprivation were used for the selection of HAZs. These included the 1998 DETR Index of Deprivation, Jarman Scores, Townsend and Poor Household indices, Rough sleepers, Psychiatric needs factor, Community needs factor, Unemployment, School exclusion, SMRs and OHN weighted total for health. The analysis showed that the DETR index was highly correlated with most of the other indicators. But data on other indicators helped to look closely at the characteristics of any particular area. Most of the data used was by LAs, with some by HAs.

Health Action Zones (HAZs) are seven-year multi-agency programmes between the NHS, local government, the voluntary and private sectors, and community groups. The principal aim of HAZs is to

tackle inequalities in health in the most deprived areas of England through health and social care service modernisation programmes with opportunities to address other interdependent and wider determinants of health such as housing, education and employment.

With a first wave at April 1998 and second at April 1999, 26 HAZs were selected across England having passed a need threshold based on a basket of health, health care and deprivation indicators. HAZs cover more than 50% of the population living in deprived areas in England. In total, HAZs include 34 Health Authorities, 73 Local Authorities and over 13 million people. HAZs differ in complexity and size, covering single to multiple Authorities with population ranging from just under 200,000 to 1.4 million. HAZs also vary in their local characteristics; consequently different health as well as service priorities are addressed within each HAZ.

23. Health Poverty Index (HPI)

The NHS plan commits the Department of Health to developing a health poverty index that combines data about health status, access to health services, uptake of preventive services and the opportunities to pursue and maintain good health. The Department of Health commissioned a scoping exercise to explore options for its development. The project was undertaken by a team based at University of Oxford working in collaboration with the South East Public Health Observatory and had four main components:

- **Consultation workshops** – To discuss the health poverty index concept with a broad spectrum of people from statutory and voluntary agencies across England.
- **Review** – To produce an outline of what has already been used, when measuring health inequalities and its determinants, in England, the UK and across Europe.
- **Conceptual development** – To develop principles to inform the development of a health poverty index. These reflected both the uses to which the index will be put and the characteristics of the data which the index will be comprised of.
- **Examination of potential forms of a health poverty index** – To recommend next steps for its development in the short-term and its refinement in the medium and long-term.

Feedback from consultation exercise:

Ten regional consultation meetings were held. In summary, the main themes to emerge from the workshops included:

- Support for the regular production of an “index”, with the provision of the constituent sub data for the component variables of the index
- General enthusiasm for work in the area of accessing and improving information about ‘health poverty’ to facilitate local action
- Desire to have data at ‘buildable’ levels to use locally and in changing geographies
- Necessity of including determinants of health within the index, alongside the more traditional measures of health
- The need for a strategy for review and update of the index

The scoping report was made available on the SE Public Health Observatory web-site in November 2001: <http://www.sepho.org.uk/projects/poverty.htm>

Consultation with Task Force:

The Inequalities and Public Health Task Force and Regional Directors of Public Health were also approached for comment. The Task Force was generally supportive, however, the index was seen as something that should be used at different levels (for example, individual or community level), be easy to understand, and aim at awareness raising.

The Task Force questioned the advantages (and difficulties) of producing a “single summary index” and argued for emphasis to be given to a single purpose for the index, namely awareness raising, rather than also trying to meet a variety of other purposes such as performance management or resource allocation.

The Task Force also commented on the importance of the name, suggesting that there would be benefit in a positive (encouraging) name.

Developing a prototype index:

In response to the feedback, further work is being taken forward on developing a prototype index which would stimulate and promote attention to changes in health equity profile and encourage and reinforce progress. It will therefore provide clear information on key differences in the determinants of health and health outcomes between various groupings of society and allow these differences to be monitored over time. This work is being taken forward by Oxford University and the SEPHO over a three-year period 2002-2004 and will include development of graphical presentational styles and further consultation. It is intended that that data will be available by an interactive web-based tool. The intention of the first year pilot phase is to have a health poverty index produced for a limited set of groups and levels. Work in the following 2 years plans to focus on producing the health poverty index for all groups of interest.

24. Other Indices

There are also other less well known measures of deprivation that have been produced, mostly at local rather than national level. For example 'Bradford' is a measure of social stress that was developed by Bradford Metropolitan Borough Council in 1993. Another measure is 'Oxford'; this is an index developed by a team of researchers at Oxford University using a predictive model of low income (reference Noble et al (1994)). Both these indices and others are referenced in the proceedings of a one-day seminar "Deprivation Indices: Targeting Areas for Policy", held on 24th November 1995 at the University of Birmingham.

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