



Department for
Communities and
Local Government

Updating the English Indices of Deprivation

Report for Consultation Technical Annex



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Section 1 Denominators

- 1.1.1 Denominators represent an integral component of almost all indicators proposed for inclusion in the Indices of Deprivation. For any given indicator, the chosen denominator should measure the number of people (or households etc.) that are 'at risk' of being defined as deprived (i.e. at risk of being included in the numerator). As such, the denominator for any given indicator should be expressed in the same measurement units as the numerator (e.g. persons, households, properties etc.), be on the same geographical scale as the numerator (e.g. Lower-Super Output Areas or local authority areas etc.) and should, ideally, be measured at the same time point as the numerator.
- 1.1.2 The majority of the indicators in the Indices of Deprivation are measured as 'proportions' or 'rates' of the population that are deprived, and therefore use denominators based on population. To give a more accurate measure of the population 'at risk' of being defined as deprived, these population-based denominators are calculated by taking the small area mid-year population estimates from the Office for National Statistics, and removing prison populations (as provided by the Ministry of Justice). This step is undertaken because prisoners are regarded as a special population type who are typically not at risk of being included in the numerator counts for the proposed indicators (for example, individuals who are in prison are not eligible to claim means-tested out-of-work benefits).
- 1.1.3 Some of the indicators use other denominators. For example, some indicators draw denominators from within the same dataset as the numerator (such as pupil attainment datasets), some are expressed as the proportion of deprived households rather than people, and some incorporate special adjustments to better reflect the population at risk.
- 1.1.4 Details of the exact denominators that will be used for each numerator are provided in the domain sections below.

Constructing summary measures at higher level geographies

- 1.1.5 Although the Indices of Deprivation are produced at Lower-layer Super Output Area level, summary measures are produced for higher level geographies. These summary measures take account of both the deprivation and population size in each Lower-layer Super Output Area. The population denominators used for the construction of the higher level geographies will be the mid-2012 Lower-layer Super Output Area population estimates, minus any prison populations.

Section 2 Income Deprivation Domain

2.1 Overview of the domain

2.1.1 As described in the Report for Consultation, the Income Deprivation Domain measures the proportion of the population in an area experiencing deprivation relating to low income. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, except for an enhancement to the Working Tax Credit/Child Tax Credit indicator:

- Adults and children in Income Support families (source: Department for Work and Pensions, HM Revenue & Customs, August 2012)
- Adults and children in income-based Jobseeker's Allowance families (source: Department for Work and Pensions, HM Revenue & Customs, August 2012)
- Adults and children in income-based Employment and Support Allowance families (source: Department for Work and Pensions, HM Revenue & Customs, August 2012)
- Adults and children in Pension Credit (Guarantee) families (source: Department for Work and Pensions, HM Revenue & Customs, August 2012)
- Adults and children in Working Tax Credit and Child Tax Credit families not already counted, that is those who are not in receipt of Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance or Pension Credit (Guarantee) and whose equivalised income (excluding housing benefits) is below 60 per cent of the median before housing costs (source: HM Revenue & Customs, August 2012) [*MODIFIED*]
- Asylum seekers in England in receipt of subsistence support, accommodation support, or both (source: Home Office, August 2012)

2.2 Further detail on indicators and denominators

Adults and children in Income Support families

Adults and children in income-based Jobseeker's Allowance families

Adults and children in income-based Employment and Support Allowance families

Adults and children in Pension Credit (Guarantee) families

2.2.1 These four indicators will comprise a non-overlapping count of the number of adults and children in a Lower-layer Super Output Area living in families claiming Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance or Pension Credit (Guarantee), in August 2012. The data will be sourced from databases held by the Department for Work and Pensions and HM Revenue & Customs.

2.2.2 Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance and Pension Credit (Guarantee) are means-

tested social security benefits. The benefits are mutually exclusive so there is no double counting involved. To be eligible for these benefits, claimants must be able to demonstrate that their income and savings are below specified thresholds. The Lower-layer Super Output Area level count will be constructed by selecting relevant claimants from the Department for Work and Pensions' Unified Publication Database, matching in information on dependent partners (within the Department for Work and Pensions) and dependent children (within HM Revenue & Customs), then aggregating to Lower-layer Super Output Area level. The administrative records used to construct the indicators are the same as those used to produce published National Statistics.

Adults and children in Working Tax Credit and Child Tax Credit families **[MODIFIED]**

- 2.2.3 The Child Tax Credit component of this indicator will be constructed as the number of adults and children in a Lower-layer Super Output Area living in Child Tax Credit families (who are not claiming Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance or Pension Credit (Guarantee)) and whose equivalised income (excluding housing benefits) is below 60% of the national median before housing costs, for August 2012. The data will be sourced from a database held by HM Revenue & Customs.
- 2.2.4 Child Tax Credit is payable to families with children who are either:
- Claiming out-of-work benefits
 - In work and claiming Working Tax Credit
 - Claiming neither out-of-work benefits nor Working Tax Credit but whose household income does not exceed the Child Tax Credit income threshold.
- 2.2.5 The Working Tax Credit component of this indicator is constructed as the number of adults in a Lower-layer Super Output Area in receipt of Working Tax Credit (not claiming Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance or Pension Credit (Guarantee) and not counted by virtue of paragraph 2.2.3 above) and whose equivalised income (excluding housing benefits) is below 60% of the national median before housing costs, for August 2012. The data will be sourced from a database held by HM Revenue & Customs.
- 2.2.6 Working Tax Credit is payable to people who:
- are aged from 16 to 24 and have a child or a qualifying disability, or are aged 25 or over (with or without children); and
 - work at least the specified number of hours; and
 - have an income below the means tested level.
- 2.2.7 Income equalisation is a way of taking into account variations in household size and/or composition when making income comparisons between households. The modified Organisation for Economic Co-operation and Development's equivalence scale is used to equalise household income in this indicator. The official low income threshold is 60% of median household equivalised income. The

Department for Work and Pensions' Households Below Average Income team provides a version of the 60% of median threshold which is at assessment unit level (claimant, partner and dependent children) and which takes into account only income that is required for the Working Tax Credit/Child Tax Credit calculation¹.

Asylum seekers in England in receipt of subsistence support, accommodation support, or both

- 2.2.8 The indicator is the number of asylum seekers (adults and children) in a Lower-layer Super Output Area who were in receipt of subsistence support, accommodation support or both, for August 2012. The data will be supplied by the Home Office.
- 2.2.9 Asylum is protection given to someone fleeing persecution in their own country under the 1951 United Nations Convention Relating to the Status of Refugees. In the UK asylum seekers who are homeless or without money to buy food and other essentials ('destitute') can apply for subsistence and accommodation support while their application is being considered².

2.3 Combining the indicators to create the domain

- 2.3.1 The indicator counts for each of these indicators at Lower-layer Super Output Area level will be summed to produce a non-overlapping overall count of income deprived individuals. This overall count will then be expressed as a proportion of the total population of the Lower-layer Super Output Area for mid-2012 (from the Office for National Statistics) less the prison population (from the Ministry of Justice). Shrinkage will be applied to construct the overall domain score³.

2.4 Other issues explored

- 2.4.1 *Seasonal variation in benefits.* Seasonal variation in benefit claims has previously been taken into account in the Employment Deprivation Domain, but not the Income Deprivation Domain. While it may now be possible using data from the Department for Work and Pensions to capture claimants at more than one time point in the year, it is unfortunately not practicable to obtain corresponding data for this update of the Indices from HM Revenue & Customs.
- 2.4.2 *Adjusting benefits/tax credit data for geographical variations in take-up.* If benefits or tax credit take-up varies geographically, it would be desirable to adjust the administrative data in the Income Deprivation Domain to take that into account. Two recent reports on take-up have been published, one in respect of income-

¹ This is a special analysis of the Households Below Average Income dataset undertaken by the Department for Work and Pensions using the same income definitions as used for tax credits, and undertaken at assessment unit level rather than household level.

² www.ukba.homeoffice.gov.uk/asylum/

³ Shrinkage is a statistical method used to 'borrow strength' from larger areas (the local authority district) to reduce the impact of unreliable small area data. This is described in Section 4.2 of the Report for Consultation.

related benefits and published by the Department for Work and Pensions⁴ and another in respect of tax credits published by HM Revenue & Customs⁵. Both reports have sections on geographical variation of take-up.

- 2.4.3 In respect of the Department for Work and Pensions' income related benefits there is a clear injunction in the report against reliance on regional estimates of take-up: "Due to the complexities of the methodology it is not possible to produce reliable estimates at geographies below Great Britain so when using the figures it should always be considered that effects seen are an amalgamation of changes throughout the country rather than one geographical area" (paragraph 1.9.5, p 9).
- 2.4.4 As regards adjusting tax credit data, the take-up estimates are given by HM Revenue & Customs as a range and in almost all cases the ranges overlap between regions. There is also no indication of how take-up rates vary for deprived areas within the regions.
- 2.4.5 Having regard to these reports there is no adequate evidence to support geographical adjustments of the administrative data.
- 2.4.6 *Adjusting benefits data to include people affected by sanctions.* New sanctions regulations were introduced in 2012 for claimants of Jobseeker's Allowance and Employment and Support Allowance⁶. The effect of a sanction is that the benefit is stopped or reduced for a period of time. Those adults and their families affected by sanctions, but who otherwise would be eligible for income-based Jobseeker's Allowance or income-based Employment and Support Allowance, will not be counted in the domain despite meeting the low income criteria. Although it would enhance the Income Deprivation Domain to include those affected by sanctions, unfortunately no suitable data is available to do this. The data required would be a count of those sanctioned at any given point in time.
- 2.4.7 Data on sanctions is available from the Department for Work and Pensions' Decision Makers and Appeals System. However, data is only available on sanctions decisions taken during a particular month.
- 2.4.8 Unfortunately data is not available on the total number of people subject to sanctions at a particular time point, nor is it possible to derive this from the available data on sanctions decisions. There are a number of reasons for this relating to variability of the amount of time people remain sanctioned both within and between the old and new sanction regimes; the variability in the actual amount

⁴ Department for Work and Pensions (2012). Income Related Benefits: Estimates of Take-up in 2009-10. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/222915/tkup_full_report_0910.pdf

⁵ HM Revenue & Customs (2013). Child Benefit, Child Tax Credit and Working Tax Credit Take-up rates. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265488/cwtcchb-take-up2011-12_fin.pdf

⁶ See Department for Work and Pensions Jobseeker's Allowance and Employment and Support Allowance sanctions statistics for further details: <https://www.gov.uk/government/collections/jobseekers-allowance-sanctions>. For an overview of the rules see <https://www.gov.uk/government/publications/jobseekers-allowance-overview-of-sanctions-rules> and <https://www.gov.uk/government/publications/employment-and-support-allowance-sanctions-amendment-regulations-2012--2>

of time spent on sanctions irrespective of the period of sanction; and the review/appeal process impacting on decisions. This means that an adjustment to the Income Deprivation Domain to take into account those subject to sanctions is not possible within the timeframe of this update of the Indices.

2.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

- 2.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.
- 2.5.2 *Housing Benefit and Council Tax Benefit.* Housing Benefit is payable to people living on low incomes who are liable to pay rent. Council Tax Benefit was payable (until April 2013) to provide assistance to those on low incomes liable for Council Tax (local councils are now able to design their own Council Tax support schemes). Eligibility for Housing Benefit, and, before it was withdrawn, Council Tax Benefit, is assessed by reference to an applicant's income, and also to local area rent levels and the Local Housing Allowance rental rate (and before April 2013, Council Tax). In addition, there is local variability in terms of the level of income which carries eligibility to the benefit(s). Finally, there are technical difficulties in avoiding double counting when combining this data with other benefits in the domain. For these reasons these benefits are unsuitable as indicators for inclusion in the domain.

Section 3 Employment Deprivation Domain

3.1 Overview of the domain

3.1.1 The Employment Deprivation Domain measures the proportion of the working age population in an area involuntarily excluded from the labour market. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, except for the proposed new indicator on claimants of Carer's Allowance and the removal of indicators based on New Deal claimants. The domain will comprise the following indicators:

- Claimants of Jobseeker's Allowance (both contribution-based and income-based), women aged 18 to 59 and men aged 18 to 64 (source: Department for Work and Pensions, four quarters from May 2012 to February 2013)
- Claimants of Employment and Support Allowance, women aged 18 to 59 and men aged 18 to 64 (source: Department for Work and Pensions, four quarters from May 2012 to February 2013)
- Claimants of Incapacity Benefit, women aged 18 to 59 and men aged 18 to 64 (source: Department for Work and Pensions, four quarters from May 2012 to February 2013)
- Claimants of Severe Disablement Allowance, women aged 18 to 59 and men aged 18 to 64 (source: Department for Work and Pensions, four quarters from May 2012 to February 2013)
- Claimants of Carer's Allowance, women aged 18 to 59 and men aged 18 to 64 (source: Department for Work and Pensions, four quarters from May 2012 to February 2013) [NEW]

3.2 Further detail on indicators and denominators

Claimants of Jobseeker's Allowance

Claimants of Employment and Support Allowance

Claimants of Incapacity Benefit

Claimants of Severe Disablement Allowance

3.2.1 Jobseeker's Allowance is paid to individuals who are out of work, available for work and actively seeking work. It is the primary measure of unemployment levels for small areas.

3.2.2 Employment and Support Allowance, Incapacity Benefit and Severe Disablement Allowance are paid to individuals who are unable to work due to limiting illness or disability. Incapacity Benefit and Severe Disablement Allowance are no longer available for new claimants: Incapacity Benefit replaced Severe Disablement Allowance for new claimants in April 2001 and Employment and Support Allowance replaced Incapacity Benefit and Income Support paid because of an illness or disability for new claimants from October 2008. However, there still are a number

of long-term sickness benefit claimants receiving Severe Disablement Allowance and Incapacity Benefit⁷.

- 3.2.3 The data will be provided by the Department for Work and Pensions, constructed from administrative records of benefit claimants. The administrative records used to construct the indicators will be the same as those used to produce published National Statistics.

Claimants of Carer's Allowance [NEW]

- 3.2.4 To include adults who are involuntarily excluded from the labour market due to caring responsibilities, a new Carers Allowance indicator is proposed for the Employment Deprivation Domain. Carer's Allowance is payable to people aged 16 and over who a) provide unpaid care for at least 35 hours a week to someone who is in receipt of disability or social care benefits⁸, b) are not in full-time education or studying for more than 21 hours a week and c) earn less than £102 a week⁹. The indicator proposed for the Employment Deprivation Domain would be a count of claimants of Carer's Allowance of working age (18-59 for females and 18-64 for males). The indicator would be constructed in such a way that it can be combined with the existing indicators in the domain whilst ensuring that no double counting takes place (see below).
- 3.2.5 The data would be provided by the Department for Work and Pensions, constructed from administrative records of benefit receipt. The administrative records used to construct the indicators would be the same as those used to produce published National Statistics.

3.3 Combining the indicators to create the domain

- 3.3.1 A separate non-overlapping count of claimants of each of the benefits will be created for the following four time points: May 2012, August 2012, November 2012 and February 2013 (to account for seasonal variations in employment deprivation)¹⁰. The counts of Jobseeker's Allowance, Employment and Support Allowance, Incapacity Benefit and Severe Disablement Allowance are non-overlapping because the benefits system does not permit an individual to claim more than one of the above benefits at the same time. If the proposed new Claimants of Carer's Allowance indicator was to be included, a count of such claimants not receiving Jobseeker's Allowance, Employment and Support

⁷ As of February 2013 there were approximately 170,000 Severe Disablement Allowance claimants across England as a whole (an average of just over 5 claimants per Lower-layer Super Output Area) and 582,000 Incapacity Benefit claimants (just under 18 claimants per Lower-layer Super Output Area).

⁸ The social care benefits comprise: Personal Independence Payment daily living component, Disability Living Allowance - the middle or highest care rate, Attendance Allowance, Constant Attendance Allowance at or above the normal maximum rate with an Industrial Injuries Disablement Benefit, or basic (full day) rate with a War Disablement Pension or Armed Forces Independence Payment.

⁹ These are earnings after the deduction of taxes, care costs while at work and 50% of pension contributions.

¹⁰ These time points are consistent with the Income Deprivation Domain. Also, using later time points would mean that a subset of claimants would have migrated on to Universal Credit, which has different eligibility criteria to the existing Employment Deprivation Domain benefits.

Allowance, Incapacity Benefit and Severe Disablement Allowance would be added to the domain numerator to provide a non-overlapping count. This would be achieved by the Department for Work and Pensions through the use of a unique person identifier.

- 3.3.2 A quarterly averaged count of claimants/participants will then be calculated for each of the indicators to create the Employment Deprivation Domain numerator, calculated as the seasonally-adjusted count of employment deprived people per Lower-layer Super Output Area.
- 3.3.3 The denominator will be the working age population (women aged 18 to 59 and men aged 18 to 64), derived from mid-year population estimates (from the Office of National Statistics), with the prison population (from the Ministry of Justice) subtracted. In order to provide a time point which closely matches the numerator, 2012 and 2013 mid-year population estimates will be used, with a weight of 0.75 applied to the 2012 count and a weight of 0.25 applied to the 2013 count¹¹.
- 3.3.4 The Employment Deprivation Domain numerator will be expressed as a proportion of the Employment Deprivation Domain denominator to form the Employment Deprivation Domain score. Shrinkage will be applied to construct the final domain score.

3.4 Other issues explored

- 3.4.1 *Adjusting benefits/tax credit data for geographical variations in take-up.* If benefits take-up varies geographically it would be desirable to adjust the administrative data in the Employment Deprivation Domain to take that into account. In the most recent report published by the Department for Work and Pensions on take-up in respect of income related benefits¹², there is a clear injunction in the report against reliance on regional estimates of take-up: "Due to the complexities of the methodology it is not possible to produce reliable estimates at geographies below Great Britain so when using the figures it should always be considered that effects seen are an amalgamation of changes throughout the country rather than one geographical area" (paragraph 1.9.5, p 9). Having regard to this report there is no adequate evidence to support geographical adjustments of the administrative data.
- 3.4.2 *Additional weight to long-term claimants.* The possibility of providing an additional weight to those who are long-term unemployed and incapacitated would fail to pick up 'cyclers' (i.e. people who repeatedly move in and out of employment, for example because of seasonal work). For example, many people who are 'seasonally' employed might otherwise be long-term unemployed. Their brief periods of employment may not raise the likelihood of their return to more permanent employment and yet they are not counted among those who are long-

¹¹ A ratio of 3:1 between 2012 and 2013 has been adopted for the denominator to match the numerator which uses three time points from 2012 and one from 2013.

¹² Department for Work and Pensions (2012). Income Related Benefits: Estimates of Take-up in 2009-10. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/222915/tkup_full_report_0910.pdf

term unemployed. Another reason for rejecting this adjustment is that including it would fundamentally alter the structure of the domain, which could no longer be interpreted as a straightforward proportion of people experiencing employment deprivation.

- 3.4.3 *Inclusion of 16 and 17 year olds.* The 16 and 17 year old age group have been excluded from the English Indices of Deprivation from 2004 onwards. The primary reason for removing the 16 and 17 year old age group from the Employment Deprivation Domain in the Indices of Deprivation 2004 was because the overwhelming majority of this age group are in either school or training, neither of which could be considered a deprivation. The recent increase in school leaving age¹³ provides further weight to the decision not to include 16 and 17 olds in this domain.
- 3.4.4 *Employment deprived females aged 60 to 64.* From 2010, the State Pension age has been gradually increased for females, and females aged 60 to 64 are now eligible for some of the benefits included in the Employment Deprivation Domain. However, by the mid-point of the Employment Deprivation Domain quarterly time points (September 2012) only a small cohort of females aged 60 to 64 were eligible for working age benefits (those born between April 1950 and June 1951). As a result the number of females aged 60 to 64 receiving out-of-work benefits was significantly smaller than the number aged 55 to 59¹⁴. The decision is therefore to retain the age band used in previous Indices (18 to 59 for females and 18 to 64 for males).
- 3.4.5 *Adjusting benefits data to include people affected by sanctions.* As indicated in Section 2 in respect of the Income Deprivation Domain, new sanctions regulations were introduced in 2012 for claimants of Jobseeker's Allowance and Employment and Support Allowance¹⁵. The effect of a sanction is that the benefit is stopped or reduced for a period of time. Those adults affected by sanctions, but who otherwise would be eligible for Jobseeker's Allowance or Employment and Support Allowance, will not be counted in the domain despite meeting the criteria for inclusion in this domain. Although it would enhance the Employment Deprivation Domain to include those affected by sanctions, unfortunately no suitable data is available to do this. The data required is a count of those sanctioned at any given point in time.
- 3.4.6 Data on sanctions is available from the Department for Work and Pensions' Decision Makers and Appeals System. However, data is only available on sanctions decisions taken during a particular month.

¹³ Children born on or after 1 September 1997 must stay in some form of education or training until their 18th birthday.

¹⁴ Less than 210,000 employment deprived females in England aged 60-64, compared with more than 1,840,000 aged 55-59.

¹⁵ See Department for Work and Pensions Jobseeker's Allowance and Employment and Support Allowance sanctions statistics for further details: <https://www.gov.uk/government/collections/jobseekers-allowance-sanctions>. For an overview of the rules see <https://www.gov.uk/government/publications/jobseekers-allowance-overview-of-sanctions-rules> and <https://www.gov.uk/government/publications/employment-and-support-allowance-sanctions-amendment-regulations-2012--2>

3.4.7 Unfortunately data is not available on the total number of people subject to sanctions at a particular time point, nor is it possible to derive this from the available data on sanctions decisions. There are a number of reasons for this relating to variability of the amount of time people remain sanctioned both within and between the old and new sanction regimes; the variability in the actual amount of time spent on sanctions irrespective of the period of sanction; and the review/appeal process impacting on decisions. This means that an adjustment to the Employment Deprivation Domain to take into account those subject to sanctions is not possible within the timeframe of this update.

3.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

3.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.

3.5.2 *Hidden unemployment and under-employment.* The Employment Deprivation Domain aims to capture those who are involuntarily excluded from the labour market whether they are actively seeking work or not. As well as those receiving Jobseeker's Allowance, the domain includes those out of work due to ill health. However, wider definitions of hidden unemployment also include groups such as mothers who are not working due to restrictive child care costs but would otherwise like to work, those who have given up hope of looking for work, those who are not signed on for receipt of Jobseeker's Allowance but who are available for work, and those under-employed who want full-time work but have had to settle for part-time hours. However, despite wide ranging data exploration, it has not been possible to identify any suitable data sources for the construction of such an indicator.

3.5.3 *Lone parents receiving Income Support.* Lone parents have traditionally been regarded as 'economically inactive', while the Employment Deprivation Domain is concerned with capturing those who are involuntarily out of employment. Recent changes have led to those lone parents with children aged 5 or over shifting from receipt of Income Support, to receipt of Jobseeker's Allowance. So a large proportion of lone parents will now be included in the Employment Deprivation Domain. However, there remains the question of whether lone parents with children aged under 5 should be treated as voluntarily or involuntarily out of employment. If the former, they fall outside the definition for this domain. If the latter, they should be counted. As there is no information as to whether this group is voluntarily or involuntarily out of employment, this indicator will not be pursued further for this update of the Indices.

3.5.4 *Zero-hours contracts.* Zero-hours contracts are considered as part of a wider definition of worklessness which includes the issue of under-employment. There are two main sources of data on zero-hours contracts: the Office for National Statistics business survey and the Labour Force Survey. Unfortunately, neither survey provides a sufficient sample size to provide robust estimates at Lower-layer Super Output Area level. In addition, there is no clear and agreed definition of 'zero-hours contracts', so, different groups and bodies will not only measure the

number of such contracts in different ways, they will also have different perceptions of what should be included as 'zero-hours contracts'. Significantly, the perceptions of employers and employees on what constitutes a particular type of contract will differ.

Section 4 Education, Skills and Training Deprivation Domain

4.1 Overview of the domain

4.1.1 The Education, Skills and Training Domain measures the lack of attainment and skills in the local population. The indicators fall into two sub-domains: one relating to children and young people and one relating to adults. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, except for the removal of the Key Stage 3 attainment indicator, the proposed addition of the indicator on English language proficiency, and the proposed change in the upper age band of the adult skills indicator.

Children and Young People sub-domain

- Key Stage 2 attainment: The average points score of pupils taking English and mathematics Key Stage 2 exams¹⁶ (source: Department for Education, 2010/11-2012/13)
- Key Stage 4 attainment: The average capped points score of pupils taking Key Stage 4 (GCSE or equivalent) exams (source: Department for Education, 2010/11-2012/13)
- Secondary school absence: The proportion of authorised and unauthorised absences from secondary school (source: Department for Education, 2010/11-2012/13)
- Staying on in education post 16: The proportion of young people not staying on in school or non-advanced education above age 16 (source: HM Revenue & Customs, 2010-2012)
- Entry to higher education: The proportion of young people aged under 21 not entering higher education (source: Higher Education Statistics Agency, 2009/10-2012/13)

Adult Skills sub-domain

- Adult skills: The proportion of working age adults with no or low qualifications, women aged 25 to 59 and men aged 25 to 64 (source: Census 2011) [MODIFIED]
- English language proficiency: The proportion of working age adults who cannot speak English or cannot speak English well, women aged 25 to 59 and men aged 25 to 64 (source: Census 2011) [NEW]

¹⁶ In 2012/13 the reading and writing components of English were assessed separately.

4.2 Further detail on indicators and denominators

Key Stage 2 attainment

- 4.2.1 The indicator will be the average points score for pupils at Key Stage 2. The numerator will be the total score of pupils taking English and mathematics in 2010/11 and 2011/12, and reading, writing and mathematics in 2012/13, in a Lower-layer Super Output Area. The denominator will be the total number of subjects (exams) taken by pupils for the same years as the numerator.
- 4.2.2 The data is for pupils in state-funded schools¹⁷ and will be supplied by the Department for Education from the National Pupil Database. Data is based on the Lower-layer Super Output Area of pupil residence. Three years of data will be used to reduce issues due to fluctuations between year-groups (two years were used in the Indices of Deprivation 2010).
- 4.2.3 Since the Indices of Deprivation 2010, there have been changes in the way in which average points scores are constructed:
- In 2010/11, students sat separate English and maths National Curriculum Tests, with the average points score calculated from these two tests and with level 5 (point score 33)¹⁸ being the maximum achievable grade.
 - In 2011/12, the writing element of the English exam was changed to be based on teacher assessment of a mixture of tests and coursework, with only partial external moderation¹⁹. The reading element was still assessed externally with a National Curriculum Test. In addition, a new level 6 test was introduced with a point score of 39 (the previous maximum point score was 33).
 - In 2012/13 reading and writing marks were no longer combined; rather there were separate point scores for reading and writing. The writing element was entirely based on the teacher's internal assessment of work for the year²⁰.
- 4.2.4 Changes to the grading scheme and teacher assessments (outlined above) have not been implemented consistently over the three years used to construct this indicator. Therefore, standardisation and shrinkage will be applied separately to each year of data before combining into a single indicator using factor analysis.

Key Stage 4 attainment

- 4.2.5 The indicator will be the average capped points score for pupils at Key Stage 4 (GCSE or equivalent). The numerator will be the total capped score of pupils taking Key Stage 4 in 2010/11, 2011/12 and 2012/13 in a Lower-layer Super Output Area. The denominator will be the total number of pupils in the area who took Key Stage 4 exams, for the same years as the numerator.

¹⁷ The state-funded schools comprise: academies, free schools and City Technology Colleges, and schools maintained by a local authority (Community, Foundation, Voluntary Aided, Voluntary Controlled, Community Special and Foundation Special).

¹⁸ http://www.education.gov.uk/schools/performance/2011/primary_11/PointsScoreAllocation2011.pdf p.1

¹⁹ <http://dera.ioe.ac.uk/12366/1/assessment%20and%20reporting%20arrangements%20-%20key%20stage%202.pdf> p.5 and 6.

²⁰ <http://www.naldic.org.uk/Resources/NALDIC/Teaching%20and%20Learning/ARA2013.pdf> p.6.

4.2.6 The data is for pupils in state-funded schools and will be supplied by the Department for Education from the National Pupil Database. Data will be based on the Lower-layer Super Output Area of pupil residence. Three years of data will be used to reduce issues due to fluctuations between year-groups (two years were used in the Indices of Deprivation 2010). Shrinkage will be applied to the indicator.

Secondary school absence

4.2.7 The indicator will be the proportion of authorised and unauthorised absences from secondary school. The numerator will be the number of half days missed by pupils living in a Lower-layer Super Output Area due to authorised and unauthorised absences for 2010/11, 2011/12 and 2012/13. The denominator will be the total number of possible sessions for 2010/11, 2011/12 and 2012/13 (one session is a half-day).

4.2.8 The data is for pupils in state-funded schools and will be supplied by the Department for Education from the National Pupil Database. Data will be based on the Lower-layer Super Output Area of pupil residence. Three years of data will be used to reduce issues due to fluctuations between year-groups (two years were used in the Indices of Deprivation 2010). Shrinkage will be applied to the indicator.

Staying on in education post 16

4.2.9 The indicator will measure the proportion of young people not staying on in school or non-advanced education above age 16. The numerator will be the number of people in a Lower-layer Super Output Area aged 17 receiving Child Benefit in 2010, 2011 and 2012. The denominator will be the number of people in the area aged 15 receiving Child Benefit in 2008, 2009 and 2010.

4.2.10 Child Benefit is a tax-free payment that most parents can claim for their child(ren). To qualify a child must be under 16, or between 16 and 19 and in relevant education or training, or registered for work, education or training with an approved body.

4.2.11 The data will be supplied by HM Revenue & Customs. Shrinkage will be applied to the indicator. The indicator will be calculated in a positive form as the proportion of children staying on in school or non-advanced education. This figure is then subtracted from 1 to produce the proportion not staying in education.

4.2.12 A recognised limitation of this indicator is the necessary assumption that the group of young people aged 17 in a Lower-layer Super Output Area in a given year is identical to the group aged 15 two years previously. Many of these areas will have seen both in-migration and out-migration of young people in this age cohort between the two time points. However, it is considered important that the numerator and the denominator are derived from the same source.

Entry to higher education

4.2.13 The indicator will be the proportion of young people aged under 21 not entering higher education. The numerator will be the number of successful entrants under 21 to higher education in a Lower-layer Super Output Area. Data from the Higher

Education Statistics Agency will be used for the numerator, with four years of data – 2009/10 to 2012/13 – used to reduce the problems of small numbers and year-on-year fluctuation. The denominator will be the Lower-layer Super Output Area population in the Lower-layer Super Output Area aged 14-17 for 2008/09 to 2011/12.

- 4.2.14 The indicator is calculated in a positive form as the proportion of those aged 21 entering higher education. This figure is then subtracted from 1 to produce the proportion not entering higher education.
- 4.2.15 The indicator includes those aged under 21 who successfully applied from a domestic postcode in England to a higher education institution anywhere in the UK²¹. Data will be restricted to first degree, first year, full-time students. Age will be as at 31 August each year.

Adult skills [*MODIFIED*]

- 4.2.16 It is proposed to change the upper age threshold, from 54 in the Indices of Deprivation 2010, to 59 for women and 64 for men. This would reflect that the majority of people aged 55 to retirement age are economically active. This indicator would also be consistent with indicators in the Employment Deprivation Domain.
- 4.2.17 The modified indicator would be the proportion of working age adults (women aged 25 to 59 and men aged 25 to 64) with no or low qualifications. The numerator would be the number of working age adults in the Lower-layer Super Output Area with no qualifications or with qualifications below NVQ Level 2, while the denominator would be the number of working age adults in the same area.
- 4.2.18 Both numerator and denominator would be taken from the 2011 Census. Shrinkage would be applied to the indicator.

English language proficiency [*NEW*]

- 4.2.19 In order to include those adults who experience barriers to learning and disadvantage in the labour market as a result of lack of proficiency in English, a new English language proficiency indicator is proposed for the Adult Skills sub-domain.
- 4.2.20 This indicator would measure the proportion of the working age population (women aged 25 to 59 and men aged 25 to 64) who cannot speak English or cannot speak English 'well'. If included, the indicator would be combined with the adults skills indicator to provide a non-overlapping count of adults with no or low qualifications and/or lack of English language proficiency.
- 4.2.21 The Lower-layer Super Output Area level data would be obtained from the 2011 Census. Shrinkage would be applied to the indicator.

²¹ For the purpose of the Higher Education Statistics Agency's data collection, 'higher education' refers to courses for which the level of instruction is above that of level 3 of the Qualifications and Curriculum Authority National Qualifications Framework (e.g. courses at the level of Certificate of Higher Education and above).

4.3 Combining the indicators to create the domain

- 4.3.1 The indicators within the Children and Young People sub-domain will be standardised by ranking and transforming to a normal distribution. The maximum likelihood factor analysis technique is used to generate the weights to combine the indicators into the sub-domain score.
- 4.3.2 The Adult Skills sub-domain numerators will be combined together to provide a non-overlapping count of adults with no or low qualifications or lack of English language proficiency. This numerator will be expressed as a proportion of the working age population (women aged 25 to 59 and men aged 25 to 64) in the Lower-layer Super Output Area. Shrinkage will be applied to the combined indicator.
- 4.3.3 The sub-domains will then be standardised by ranking, transformed to an exponential distribution and combined with equal weights to create the overall domain score.

4.4 Other issues explored

- 4.4.1 *Cross border student flows.* Some English-resident students attend schools in Wales or Scotland, and vice versa. Pupils attending Welsh or Scottish schools have been excluded as the point scoring system in schools differs between these administrations. Welsh and Scottish resident pupils who attend schools in England have also been removed from the dataset.

4.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

- 4.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.
- 4.5.2 *Average test score of pupils at Key Stage 1.* The Key Stage 1 average test score indicator is constructed in the same way as the Key Stage 2 indicator and held in the National Pupil Database linked to each pupil's postcode of residence. Each pupil is awarded a level for the four Key Stage exams. Values are assigned to the levels achieved in the examinations, and these values summed for each pupil. However, unlike Key Stage 2 assessments, not all Key Stage 1 results are externally moderated, with only 25% of local authority schools receiving external moderation visits each year. Informed by user engagement and given only partial external moderation this indicator will not be pursued further for this update of the Indices.
- 4.5.3 *Average test score of pupils at Key Stage 3.* The Key Stage 3 attainment indicator included in the Indices of Deprivation 2010 will be removed from the Children and Young People sub-domain, as statutory tests were abolished and Key Stage 3 assessments became teacher assessment only from 2008/9.

- 4.5.4 *Adult literacy and numeracy.* Small area level estimates of adults lacking literacy, numeracy and other skills are published based on the Skills for Life Survey²². This survey is based on a sample of 7,230 respondents, across 1,516 (of 6,781) Middle layer Super Output Areas. The data is modelled to neighbourhood level using small area estimation techniques. This produces an estimate at neighbourhood level which is not sufficiently robust to use in the Indices of Deprivation and which moreover uses area effects in the modelling process which draw directly from data published from the Indices of Deprivation 2010.
- 4.5.5 *Pupils with Special Educational Needs.* Special Educational Needs levels are a good predictor of individual level pupil performance, and of variation between schools. However, there are some surprising differences between local authority areas, which may reflect policy differences rather than actual differences in educational needs²³.
- 4.5.6 *Achieving a good level of development in the Early Years Foundation Stage.* The Early Years Foundation Stage is a series of assessments measuring children's progress in terms of Personal, Social and Emotional Development and Communication, Language and Literacy. This indicator was considered for inclusion because it would introduce an element of early child development (aged 5) into the domain. The data is based on practitioners' observations over the course of the year against standard criteria, with local authorities responsible for carrying out moderation visits to ensure that assessment standards are consistent. However for the time point of mid-2012, this external moderation was only extended to 25% of early years settings in the local authority area. Given the level of external moderation and views expressed by users, this indicator will not be pursued further for the update of the Indices.
- 4.5.7 *Exclusions from school.* Data on exclusions is collected via the School Census, with approximately 304,000 temporary and 5,000 permanent exclusions recorded in 2012. However, there is likely to be variability in how different schools apply exclusions, which could lead to differences in numbers being attributable to local policy differences as well as differences in educational deprivation levels.

²² Department for Business Innovation and Skills (2012). 2011 Skills for Life Survey: Small Area Estimation Technical Report. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/36077/12-1318-2011-skills-for-life-small-area-estimation-technical.pdf

²³ Mooney, A., et al. (2010). Special Educational Needs and Disability: Understanding Local Variation in Prevalence, Service Provision and Support, published by Department for Children, Schools and Families. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221970/DCSF-RB211ES.pdf

Section 5 Health Deprivation and Disability Domain

5.1 Overview of the domain

5.1.1 The Health Deprivation and Disability Domain measures the risk of premature death and the impairment of quality of life through poor health. The indicators in the domain will remain the same as in the Indices of Deprivation 2010:

- Years of potential life lost: An age and sex standardised measure of premature death (source: Office of National Statistics, 2008-2012)
- Comparative illness and disability ratio: An age and sex standardised morbidity/disability ratio (source: Department for Work and Pensions, 2013)
- Acute morbidity: An age and sex standardised rate of emergency admission to hospital (source: Health and Social Care Information Centre, Hospital Episode Statistics, 2011/12-2012/13)
- Mood and anxiety disorders: A composite based on the rate of adults suffering from mood and anxiety disorders (source: Health and Social Care Information Centre, 2013), hospital episodes data (source: Health and Social Care Information Centre, Hospital Episode Statistics, 2011/12-2012/13), suicide mortality data (source: Office of National Statistics, 2008-2012) and health benefits data (source: Department for Work and Pensions, 2013)

5.2 Further detail on indicators and denominators

Years of potential life lost

5.2.1 The years of potential life lost indicator measures 'premature death', defined as death before the age of 75 from any cause (the commonly used measure of premature death). This includes death due to disease as well as external causes such as accidents, unlawful killing and deaths in combat.

5.2.2 The indicator will be based on data covering the period 2008 to 2012, and will be directly age and sex standardised in five year age-sex bands; comparing the actual number of deaths in an area to what would be expected given the area's age and gender structure. Shrinkage will be applied to the indicator.

5.2.3 The level of unexpected mortality will be weighted by the age of the individual who has died. The unexpected death of a younger person therefore will have a greater impact on the overall score than someone who is older, even if their death is also unexpected.

Comparative illness and disability ratio

5.2.4 The comparative illness and disability ratio is an indicator of work limiting morbidity and disability, based on those receiving benefits due to inability to work through ill health.

- 5.2.5 The benefits paid to people who are unable to work due to ill health are Disability Living Allowance, Employment and Support Allowance, Attendance Allowance, the disability premium of Income Support, Incapacity Benefit, and Severe Disablement Allowance (these last two benefits are not available for new claimants, but there are groups still receiving them). Individuals cannot receive more than one of these benefits at the same time, so the numbers of people receiving them can be straightforwardly summed to produce an indicator.
- 5.2.6 The indicator will be based on data from 2013, and will be directly age and sex standardised in five year age-sex bands; comparing the actual number of benefit recipients in an area to what would be expected given the area's age and gender structure. Shrinkage will be applied to the indicator.

Acute morbidity

- 5.2.7 The acute morbidity indicator measures the level of emergency admissions to hospital, based on administrative records of inpatient admissions.
- 5.2.8 The indicator will be based on data from the period 2011/12 to 2012/13, using the number of hospital spells starting with admission in an emergency and lasting more than one calendar day. The indicator will be directly age and sex standardised in five year age-sex bands, and shrinkage applied.

Mood and anxiety disorders

- 5.2.9 The mood and anxiety disorders indicator is a broad measure of levels of mental ill health in the local population. The indicator will be a modelled estimate based on four separate sources outlined in the table below: prescribing data; hospital episodes data; suicide mortality data; and health benefits data.

Mood and anxiety disorders components	Description
Prescribing data Health and Social Care Information Centre	The number of patients within a particular GP practice with mental health problems will be estimated using information on the conditions for which particular drugs are prescribed and their typical dosages ²⁴ . Prescription data is not available at individual level, therefore the number of people will be estimated based on the assumption that those with mental ill health take the national Average Daily Quantity of a specific drug on every day of the year ²⁵ . This estimate for each GP practice will then be distributed indirectly to Lower-layer

²⁴ Based on prescription medication use for anxiolytics (British National Formulary Section 4.1.2) and anti-depressants (British National Formulary Section 4.3)

²⁵ While this assumption may not fit very well in individual cases, it is more likely to hold across the 'average' for the practice population. For information on the Average Daily Quantity, see the Prescribing Support Unit, www.hscic.gov.uk/prescribing.

	Super Output Area level using the GP Attribution Dataset ²⁶ .
Hospital episode data Health and Social Care Information Centre	Hospital episode data will be used to estimate the proportion of the population suffering severe mental health problems relating to depression and anxiety, based on all those who have had an inpatient spell for reason of mental ill health. The indicator will be an annual count of those suffering at least one severe mental health inpatient spell during the year, an 'annual incidence of hospitalisation'. A simple (not standardised) rate will be calculated, and shrinkage applied.
Suicide mortality data ONS	Although suicide is not a direct measure of mental ill health, it is highly associated with depression where it is implicated in a majority of cases ²⁷ . A simple (not standardised) rate will be calculated, and shrinkage applied.
Health benefits data Department for Work and Pensions	The rate of long-term sickness and disability in an area, including for mental health reasons, can be measured using information on receipt of particular benefits. Incapacity Benefit, Severe Disablement Allowance and Employment Support Allowance benefits are paid to individuals of working age who are unable to work because of ill health, with these datasets coded for medical conditions. A simple (not standardised) rate will be calculated, and shrinkage applied.

- 5.2.10 Although none of the four sources on their own provide a comprehensive measure of mood and anxiety disorders, used in combination they represent a large proportion of all those suffering mental ill health.
- 5.2.11 The four independent administrative data sources will be combined to reduce the influence of under- or over-recording on any one source, using weights generated by factor analysis. Using the four component indicators minimises the impact of any variation in the organisation and practice of local services, where individuals with identical mental health needs may receive different types of treatment; the combined indicator should therefore be a more precise measure of the underlying 'true' rate of mental health than any single indicator on its own.
- 5.2.12 Unlike the other indicators in this domain, the mood and anxiety disorders indicator will not be age and sex standardised. Although there are particular ages when a person is at higher risk of suffering from these mental health disorders, and females are at greater risk than males, the distribution of mood and anxiety

²⁶ The GP Attribution Dataset contains information about populations registered with GP practices, and is maintained by the Health and Social Care Information Centre. Data is published at Strategic Health Authority and Primary Care Organisation, with more detailed Lower-layer Super Output Area data made available to registered researchers.

²⁷ See for example Inskip, H., Harris, E. and Barraclough, B. (1998), Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia, *The British Journal of Psychiatry*, 172, p.35-37.
<http://bjp.rcpsych.org/content/172/1/35.abstract>

disorders does not follow a clear distribution over the lifespan so age and sex will not be controlled for.

5.3 Combining the indicators to create the domain

5.3.1 The indicators within the domain will be standardised by ranking and transforming to a normal distribution. Factor analysis will be used to generate the weights to combine the indicators into the final domain score.

5.4 Other issues explored

5.4.1 *Emergency admissions.* The Acute Morbidity indicator is based on emergency admissions to hospital lasting more than one day. Some concerns have been raised over the possibility of practices by particular hospitals affecting the robustness of this indicator. Analysis as part of this update shows that at Lower-layer Super Output Area level, the distribution of short stay emergency admissions is consistent with stays of all lengths.

5.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

5.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.

5.5.2 *Healthy lifestyle indicators.* The domain only includes direct measures of health deprivation, and does not include aspects of behaviour or environment that may be predictive of future health deprivation. Therefore healthy lifestyle indicators such as smoking, alcohol consumption and participation in sports are not appropriate to include in the domain, even where robust data is available at small area level.

5.5.3 *Obesity indicators.* Obesity is an increasing public health concern, with 23% of adults, and 19% of Year 6 children, classified as obese²⁸. Assessment of school pupils is now routinely carried out for Reception and Year 6 pupils, however similar data is not collected for adults.

5.5.4 *Census 2011 indicators on limiting long-term illness and general health.* The 2011 Census contained questions on limiting long-term illness and on general health status. However, the comparative illness and disability ratio indicator (derived from health benefits data made available by the Department for Work and Pensions) is highly correlated with the 2011 Census health indicators and therefore adequately captures this element of health deprivation.

5.5.5 *Cancer incidence.* Information is collected about all new cases of cancer, of which there are around 140,000 per year. To adjust for variation in the age profile of the

²⁸ Sport England (2012), Active People Survey, http://archive.sportengland.org/research/active_people_survey/active_people_survey_7.aspx
Health and Social Care Information Centre (2012/13), National Child Measurement Programme, <http://www.hscic.gov.uk/ncmp>

population, age and sex standardised cancer incidence rates are needed. Lower-layer Super Output Area level age and sex standardised estimates are unlikely to be sufficiently reliable to enable meaningful comparisons between areas, even when based on aggregate data over several years.

- 5.5.6 *People receiving publicly-funded residential care.* People living in publicly funded residential or nursing homes are not eligible for the care components of Disability Living Allowance or Attendance Allowance but meet the same qualifying conditions. This data is held by local authorities, however is not collected nationally at individual or small area level. As sufficiently robust data is not readily available to produce this indicator, developing this indicator would be outside the scope of this update.
- 5.5.7 *Low birth weight.* Low birth weight is linked to both increased mortality and morbidity in infancy, and an increased risk of cardio-vascular disease in later life. The indicator was considered as a potential indicator in the Indices of Deprivation 2000, and is used in the Welsh Indices of Deprivation. However, respondents to a previous consultation were concerned that certain ethnic groups have different distributions of birth weight, and that the ethnic composition of an area will therefore bias this indicator. As a result this indicator will not be used in the English Indices.
- 5.5.8 *Infant mortality ratio.* The infant mortality ratio has previously been included in measures of deprivation such as the 1998 Index of Local Deprivation, on the basis that this represents particularly premature death, and that areas with high infant death rates would not necessarily correspond to those in which mortality levels are high at other ages. However, the numbers of infant deaths are small (nationally only around 4.7 per 1,000 live births) and, even when aggregating figures for several years, Lower-layer Super Output Area level estimates would not be sufficiently reliable to enable meaningful comparisons between areas. Also the mortality indicator (years of potential life lost) included in the domain is age standardised, giving high weightings to deaths among infants.

Section 6 Crime Domain

6.1 Overview of the domain

6.1.1 The Crime Domain measures the risk of personal and material victimisation at local level. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, with four indicators based upon individual event-level police recorded crime data:

- Violence: The rate of violence (17 recorded crime types) per 1000 at risk population (source: Association of Chief Police Officers, 2012/13 and 2013/14)
- Burglary: The rate of burglary (4 recorded crime types) per 1000 at risk properties (source: Association of Chief Police Officers, 2012/13 and 2013/14)
- Theft: The rate of theft (5 recorded crime types) per 1000 at risk population (source: Association of Chief Police Officers, 2012/13 and 2013/14)
- Criminal Damage: The rate of criminal damage (8 recorded crime types) per 1000 at risk population (source: Association of Chief Police Officers, 2012/13 and 2013/14)²⁹

6.2 Further detail on indicators and denominators

Violence

6.2.1 In the Indices of Deprivation 2010 the violence indicator consisted of 21 notifiable offence categories. Following the most recent revisions to the Home Office Counting Rules, this indicator will be based on 17 notifiable offence categories to maximise comparability with the Indices of Deprivation 2010.

6.2.2 Recorded crime data will be made available via the Association of Chief Police Officers and the Home Office for 2012/13 and 2013/14.

6.2.3 Lower-layer Super Output Area level counts of violence will be constructed by aggregating the individual event-level geocoded crime data using a bespoke mapping application. Separate violence counts will be constructed for each of the two separate years of crime data.

6.2.4 The Lower-layer Super Output Area level counts of violence will then be constrained to independently sourced aggregate counts of crime (for an equivalent set of notifiable offence categories) at Community Safety Partnership level obtained from the Home Office.

6.2.5 The constrained Lower-layer Super Output Area violence counts for 2012/13 and 2013/14 will be summed and divided by two to produce the average crime count per annum. The per-annum crime count is then expressed as a crime rate per 1000 'at risk' population, using a special population-based denominator. This denominator consists of the total Lower-layer Super Output Area mid-year

²⁹ Note, the number of recorded crime types included under each of the four indicators may change slightly, to ensure indicator definitions are consistent with the Indices of Deprivation 2010.

population estimate (minus prison population) plus non-resident workplace population from the 2011 Census. The resident population component of this denominator is calculated by taking the average of the mid-2012 and mid-2013 Lower-layer Super Output Area population estimates (minus the average of the mid-2012 and mid-2013 prison population counts).

- 6.2.6 Finally, shrinkage will be applied to the Lower-layer Super Output Area level violence rate to produce the violence indicator score.

Burglary

- 6.2.7 In the Indices of Deprivation 2010 the burglary indicator consisted of four notifiable offence categories. Following the most recent revisions to the Home Office Counting Rules, this indicator will again be based on four notifiable offence categories to maximise comparability with the Indices of Deprivation 2010.
- 6.2.8 Recorded crime data will be made available via the Association of Chief Police Officers and the Home Office for 2012/13 and 2013/14.
- 6.2.9 Lower-layer Super Output Area counts of burglary will be constructed by aggregating the individual event-level geocoded crime data using a bespoke mapping application. Separate burglary counts will be constructed for each of the two separate years of crime data.
- 6.2.10 The Lower-layer Super Output Area level counts of burglary will then be constrained to independently sourced aggregate counts of crime (for an equivalent set of notifiable offence categories) at Community Safety Partnership level obtained from the Home Office.
- 6.2.11 The constrained burglary counts for Lower-layer Super Output Areas for 2012/13 and 2013/14 will be summed and divided by two to produce the average crime count per annum. The per-annum crime count is then expressed as a crime rate per 1000 'at risk' properties, using a special property-based denominator. This denominator consists of residential dwellings at Lower-layer Super Output Area level from the 2011 Census plus business properties at the same level from Ordnance Survey Address Base Premium.
- 6.2.12 Finally, shrinkage will be applied to the Lower-layer Super Output Area level burglary rate to produce the burglary indicator score.

Theft

- 6.2.13 In the Indices of Deprivation 2010 the theft indicator consisted of five notifiable offence categories. Following the most recent revisions to the Home Office Counting Rules, this indicator will again be based on five notifiable offence categories to maximise comparability with the Indices of Deprivation 2010.
- 6.2.14 Recorded crime data will be made available via the Association of Chief Police Officers and the Home Office for 2012/13 and 2013/14.
- 6.2.15 Lower-layer Super Output Area counts of theft will be constructed by aggregating the individual event-level geocoded crime data using a bespoke mapping

application. Separate theft counts will be constructed for each of the two separate years of crime data.

- 6.2.16 The Lower-layer Super Output Area level counts of theft will then be constrained to independently sourced aggregate counts of crime (for an equivalent set of notifiable offence categories) at Community Safety Partnership level (obtained from the Home Office).
- 6.2.17 The constrained Lower-layer Super Output Area theft counts for 2012/13 and 2013/14 will be summed and divided by two to produce the average crime count per annum. The per-annum crime count is then expressed as a crime rate per 1000 'at risk' population, using a special population-based denominator. This denominator consists of the total Lower-layer Super Output Area mid-year population estimate (minus prison population) plus non-resident workplace population from the 2011 Census. The resident population component of this denominator is calculated by taking the average of the mid-2012 and mid-2013 Lower-layer Super Output Area population estimates (minus the average of the mid-2012 and mid-2013 prison population counts).
- 6.2.18 Finally, shrinkage will be applied to the Lower-layer Super Output Area level theft rate to produce the theft indicator score.

Criminal Damage

- 6.2.19 In the Indices of Deprivation 2010 the criminal damage indicator consisted of 11 notifiable offence categories. Following the most recent revisions to the Home Office Counting Rules, this indicator will be based on eight notifiable offence categories to maximise comparability with the Indices of Deprivation 2010.
- 6.2.20 Recorded crime data will be made available via the Association of Chief Police Officers and the Home Office for 2012/13 and 2013/14.
- 6.2.21 Lower-layer Super Output Area counts of criminal damage will be constructed by aggregating the individual event-level geocoded crime data using a bespoke mapping application. Separate criminal damage counts will be constructed for each of the two separate years of crime data.
- 6.2.22 The Lower-layer Super Output Area level counts of criminal damage will then be constrained to independently sourced aggregate counts of crime (for an equivalent set of notifiable offence categories) at Community Safety Partnership level obtained from the Home Office.
- 6.2.23 The constrained Lower-layer Super Output Area criminal damage counts for 2012/13 and 2013/14 will be summed and divided by two to produce the average crime count per annum. The per-annum crime count is then expressed as a crime rate per 1000 'at risk' population, using a special population-based denominator. This denominator consists of the total Lower-layer Super Output Area mid-year population estimate (minus prison population) plus non-resident workplace population from the 2011 Census. The resident population component of this denominator is calculated by taking the average of the mid-2012 and mid-2013

Lower-layer Super Output Area population estimates (minus the average of the mid-2012 and mid-2013 prison population counts).

- 6.2.24 Finally, shrinkage will be applied to the Lower-layer Super Output Area level criminal damage theft rate to produce the criminal damage indicator score.

6.3 Combining the indicators to create the domain

- 6.3.1 The four composite shrunk indicators will be standardised by ranking and transforming to a normal distribution. Factor analysis will be used to generate the weights to combine the indicators into the domain score.

6.4 Other issues explored

- 6.4.1 *Scrutiny of police recorded crime datasets.* The Crime Domain has been included since the 2004 Indices based on indicators using police recorded crime datasets. The department recognises these datasets are currently under scrutiny in efforts to improve their quality. The Public Administration Select Committee³⁰ and Her Majesty's Inspectorate of Constabulary³¹ have identified concerns with crimes being under-recorded and/or miscategorised. In its interim report³², Her Majesty's Inspectorate of Constabulary highlights that if the findings for the first set of forces are representative across all forces and all crime types, this implies that 20 percent of crimes may be going unrecorded. The report acknowledges that there is variation in the level of recording between police forces, but it is not possible to infer how this applies at lower geographical levels or between more or less deprived neighbourhoods. Therefore geographical adjustments cannot be made to the police recorded crime data used in the Indices to take under-recording into account.
- 6.4.2 For the purposes of updating the Indices of Deprivation, the project team are being provided secure access to event-level police recorded crime data from police.uk. In addition to the quality assurance checks already performed by the Association of Chief Police Officers and the Home Office in producing the police.uk open data source, the project team will carry out additional exploration of the event-level data relevant to the Crime Domain. This includes comparing event-level data to published aggregate crime statistics, and using techniques to improve the geographical coding of events.
- 6.4.3 Taking into account the findings of the interim report from Her Majesty's Inspectorate of Constabulary and the data exploration being undertaken by the project team, the department intends to continue to use police recorded crime data for the Crime Domain, acknowledging that this is the best available source of information on crime levels at small area level.

³⁰ <http://www.parliament.uk/business/committees/committees-a-z/commons-select/public-administration-select-committee/inquiries/parliament-2010/crime-statistics/>

³¹ <https://www.justiceinspectorates.gov.uk/hmic/our-work/crime-data-integrity/>

³² Her Majesty's Inspectorate of Constabulary (2014), Crime recording: A matter of fact – interim report, www.justiceinspectorates.gov.uk/hmic/publication/crime-recording-a-matter-of-fact-interim-report/

6.4.4 *Errors in police geocoding accuracy.* The grid reference and/or postcode associated with each recorded crime should relate to the location of crime occurrence. A series of methodological checks and adjustments were applied in previous Indices of Deprivation to correct for obvious errors in police geocoding (e.g. where crimes were located many miles outside a police force's geographical boundary). After the Indices of Deprivation 2010 were published, it became apparent that one police force had adopted a methodology of geo-referencing crimes to the centroid of a police beat if the true geographical location was either not known or had not been adequately recorded. A set of additional methodological checks will be undertaken for the Indices of Deprivation 2015 in an attempt to identify any such systematic misallocation of crimes by police forces during the crime recording process. Where such cases occur, appropriate adjustments will be made to account for these errors in the underlying data.

6.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

6.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.

6.5.2 *Police Anti-Social Behaviour incident data.* In addition to collating data on recorded crime, each police force in England is also required to collate data on reported incidents of Anti-Social Behaviour. Geocoded data is provided by each police force to the Home Office on a monthly basis in the same way as the recorded crime data is provided. The Anti-Social Behaviour data have been deemed unsuitable for inclusion in the Indices of Deprivation 2015 due to known issues in relation to double-counting of crimes and Anti-Social Behaviour incidents³³ in a number of police forces.

6.5.3 *Fire Service deliberate fires data.* These are official statistics collated by the Department for Communities and Local Government (Fire Statistics Monitor). Geocoded deliberate fire data is available from 2009/10 onwards. However, many of the deliberate fires recorded by the regional fire authorities across England will also be captured as 'arson' in the police recorded crime data. As such, including fire service data alongside police recorded crime data would result in double-counting of many events.

6.5.4 *Shoplifting.* Shoplifting was rejected because it is often concentrated in large retail centres and because its reporting is often dependent upon the offender being caught in the act.

6.5.5 *Drug-related crime.* Drug-related crime was not deemed suitable for inclusion in the updated Indices since it could be argued that possession of an illegal drug is not in itself a form of deprivation. Certainly, drug-motivated crime (e.g. violence or

³³ See Data Quality, Known Issues, Double counting of ASB and Crime at: <http://data.police.uk/about/#columns>

burglary/theft) should be captured in a measure of deprivation, but these crimes types are already included in the Crime Domain.

- 6.5.6 *Sexual offences*. Sexual offence data was not previously pursued due to a number of reasons, including: sensitivity/disclosure issues; the particularly low reporting of these crimes; the way in which reporting is influenced by the relationship of the victim to the offender; and the difficulty of ascertaining the incidence.
- 6.5.7 *Domestic violence*. Domestic violence was not included as an indicator in its own right because violent offences against same-household members are already included in the composite violence indicator where these crimes are reported to the Police.
- 6.5.8 *Cycle thefts*. Cycle thefts were excluded because they are often concentrated in public areas (such as bike parks at train stations).
- 6.5.9 *Fraud*. Fraud was excluded because it is extremely difficult to locate geographically.
- 6.5.10 *Total crime*. A measure of total crime was not included because it would include the indicators described above, as well as other categories that are not relevant to deprivation.

Section 7 Barriers to Housing and Services Domain

7.1 Overview of the domain

- 7.1.1 The Barriers to Housing and Services Domain measures the physical and financial accessibility of housing and local services. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, apart from the proposed changes to the housing affordability indicator.
- 7.1.2 The indicators fall into two sub-domains: 'geographical barriers', which relate to the physical proximity of local services, and 'wider barriers' which includes issues relating to access to housing such as affordability.

Geographical Barriers sub-domain

- Road distance to a post office: A measure of the mean distance to the closest post office for people living in the Lower-layer Super Output Area (source: Post Office Ltd, March 2014)
- Road distance to a primary school: A measure of the mean distance to the closest primary school for people living in the Lower-layer Super Output Area (source: Edubase, July 2014)
- Road distance to a general stores or supermarket: A measure of the mean distance to the closest supermarket or general store for people living in the Lower-layer Super Output Area (source: Ordnance Survey, March 2014)
- Road distance to a GP surgery: A measure of the mean distance to the closest GP surgery for people living in the Lower-layer Super Output Area (source: Health and Social Care Information Centre, May 2014).

Wider Barriers sub-domain

- Household overcrowding: The proportion of all households in a Lower-layer Super Output Area which are judged to have insufficient space to meet the household's needs (source: Census 2011)
- Homelessness: Local authority district level rate of acceptances for housing assistance under the homelessness provisions of the 1996 Housing Act, assigned to the constituent Lower-layer Super Output Areas (source: Department for Communities and Local Government, average of 2011/12, 2012/13 and 2013/14)
- Housing affordability: Difficulty of access to owner-occupation or the private rental market, expressed as the inability to afford to enter owner occupation or the private rental market (source: modelled estimate based on range of sources, 2012) [*MODIFIED*]

7.2 Further detail on indicators and denominators

Road distance to a post office

Road distance to a primary school

Road distance to a general stores or supermarket

Road distance to a GP surgery

- 7.2.1 The four road distance indicators were chosen for the Indices of Deprivation 2000 and retained in each subsequent update, as they relate to key services that are important for people's day-to-day life and to which people need to have good geographical access. All road distance indicators are constructed in the same way.
- 7.2.2 The indicators are defined as an average road distance measured in kilometres and calculated initially at Output Area level³⁴.
- 7.2.3 The postcodes of GP premises will be obtained from the Health and Social Care Information Centre (May 2014 release). The postcodes will then be geocoded using Code-Point Open (May 2014 version), the National Statistics Postcode Directory (May 2014 version) and a small number of manual assignments. The dataset of GPs used to construct the indicator is a list of all active medical practices and prescribing cost centres (approximately 8,200). It does not capture the size of a practice, which varies from that of a single practitioner to a large surgery with many GPs and additional health care professionals.
- 7.2.4 The grid referenced locations of food shops will be obtained from the Ordnance Survey Points of Interest dataset (for March 2014). The definition of food shop includes supermarket chains, convenience stores and independent supermarkets. This includes concessions such as food shops within petrol stations, but administrative offices are removed.
- 7.2.5 The postcoded locations of primary schools will be obtained from the Department for Education's Edubase system (July 2014). The postcodes will then be geocoded using Code-Point Open (May 2014 version) and the National Statistics Postcode Directory (May 2014 version). All schools classified as 'open' or 'open but proposed to close', that are also 'primary' or 'all through', will be included. In terms of the type of establishment, schools will be included that are classified as local authority maintained schools, academies or free schools.
- 7.2.6 The grid referenced locations of Post Offices will be supplied by Post Office Ltd (for March 2014). All Post Office branches are included.
- 7.2.7 Because healthcare and education are a responsibility for the devolved administrations, only GPs and primary schools located in England will be taken into account when constructing the English Indices of Deprivation. However, food

³⁴ For more information about Output Areas see:
www.neighbourhood.statistics.gov.uk/dissemination/Info.do?page=nessgeography/neighbourhoodstatisticsgeographyglossary/neighbourhood-statistics-geography-glossary.htm#O

shops and post offices in the mainland UK will be included so that account could be taken of services just within the Scottish or Welsh borders.

- 7.2.8 A bespoke geographic information system application will be used to calculate the road distance to the closest service from the population weighted centroid of each Output Area. To create an average road distance for the Lower-layer Super Output Area, a population-weighted mean of the Output Area road distances will be used. Each Output Area score will be weighted according to the proportion of the Lower-layer Super Output Area population that is within the Output Area, and the weighted scores summed. The Output Area level population estimates used for population-weighting will be obtained from the 2011 Census³⁵.

Household overcrowding

- 7.2.9 The indicator will be the proportion of households in a Lower-layer Super Output Area that are classed as overcrowded according to the definition below. The numerator will be the number of overcrowded households in the Lower-layer Super Output Area, while the denominator will be the number of occupied households in the same area. Both will be taken from the 2011 Census. Shrinkage will be applied to the indicator.
- 7.2.10 The Census 2011 'occupancy rating' provides a measure of whether a household's accommodation is overcrowded or under occupied. There are two measures of occupancy rating, one based on the total number of rooms in a household's accommodation, and one based only on the number of bedrooms. As for the Indices of Deprivation 2010, the household overcrowding indicator will use the occupancy rating based on rooms. This relates the actual number of rooms in a dwelling to the number of rooms required by the household, taking account of the ages of, and relationships between, household members.
- 7.2.11 The room requirement³⁶ used in the occupancy rating states that every household needs a minimum of two common rooms, excluding bathrooms, with bedroom requirements that reflect the composition of the household. The occupancy rating of a dwelling is expressed as a positive or negative figure, reflecting the number of rooms in a dwelling that exceed the household's requirements, or by which the home falls short of its occupants' needs.
- 7.2.12 All statistics derived from the 2011 Census are classified as National Statistics and comply fully with the National Statistics Code of Practice.

Homelessness

- 7.2.13 This local authority level indicator will be expressed as the rate of acceptances for housing assistance under the homelessness provisions of housing legislation (as

³⁵ Each road distance indicator will use the total population for population-weighting, with the exception of the road distance to a primary school where the population of children aged 4 to 11 will be used.

³⁶ For worked examples of how the room requirement is calculated, see: <http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-user-guide/quality-and-methods/quality/quality-notes-and-clarifications/index.html>

defined below). Although the Indices of Deprivation 2010 indicator used data for a single year, the updated indicator will be constructed from the average of data for three years (2011/12, 2012/13 and 2013/14). This is in order to increase the robustness of the indicator. The homelessness data to be used in the numerator is published by the Department for Communities and Local Government. The denominator will be the local authority district count of occupied households from the 2011 Census, which is the latest date for which this data is available.

- 7.2.14 Homelessness is defined as applications made to local housing authorities under the homelessness provisions of housing legislation where a decision has been made and the applicant has been found to be eligible for assistance (acceptances). It therefore excludes any households found to be ineligible.
- 7.2.15 Local authority district rates will be assigned to the constituent Lower-layer Super Output Areas, with each such area in a district given the same rate. As this data is available at local authority district level, shrinkage will not be applied to this indicator.
- 7.2.16 The raw data used to construct the indicator will be the same as those used to produce published National Statistics.

Housing affordability [*MODIFIED*]

- 7.2.17 This indicator is a measure of the inability to afford to enter owner occupation or the private rental market. The indicator will be made up of two components relating to housing affordability: one component which measures difficulty of access to owner-occupation, and one component which measures difficulty of access to the private rental market. The private rental component will consider whether people can afford to rent in the market without assistance from Housing Benefit. The two components will be constructed separately.
- 7.2.18 The indicator is a modelled estimate based on house prices and rents in the relevant Housing Market Area and modelled incomes at Lower-layer Super Output Area level with a 2012 time point. The main data sources will be the Family Resources Survey and/or Understanding Society Survey for household incomes and composition, the Regulated Mortgage Survey/Land Registry for house prices, and the Valuation Office Agency for market rents. Other sources include a range of Census and other published data at Lower-layer Super Output Area level, and indicators at local authority district level including the Annual Population Survey and the Annual Survey of Hours and Earnings.
- 7.2.19 The target group is households aged up to 40, which aims to capture the cohort of households entering the housing market based on the recognition that most first time buyers are in the younger adult age group. To increase the robustness of the indicator, the age cut-off is changed, from 35 to 40, resulting in a larger number of cases in the relevant surveys upon which to produce modelled estimates.
- 7.2.20 This indicator will be produced by Heriot-Watt University. Affordability criteria are broadly the same as for the Indices of Deprivation 2010. The threshold house prices and rents will be based on the lower quartile of all sale prices/rents within

size groups (1, 2, 3 and 4 or more bedrooms) at Housing Market Area level³⁷. The lower tier of Housing Market Areas will be used, with local authority level price and rent data apportioned to Housing Market Areas. Income levels will be estimated in stages, following similar lines to a study by Bramley and Watkins³⁸ for the Improvement Service for Scottish local government, which estimated income and poverty measures for Scottish Datazones. Individual-level predictive regression models will be developed based on income levels for individuals and households in the surveys (Family Resources Survey or Understanding Society Survey), applied to small areas using equivalent variables from Census and other sources at Lower-layer Super Output Area level; and constrained using the Office for National Statistics' 'groups' of similar Lower-layer Super Output Areas in stronger or weaker markets.

- 7.2.21 In order to combine the two components into a single indicator, each component will be standardised by ranking and transformed to a normal distribution. The two components will then be combined with equal weights to create the housing affordability indicator. This combined indicator will then be treated in the same way as it was in the Indices of Deprivation 2010, i.e. it will be ranked and transformed to a normal distribution, and then combined with equal weights with the other two indicators in the sub-domain, as described below.

7.3 Combining the indicators to create the domain

- 7.3.1 The relevant indicators within each of the sub-domains will be standardised by ranking and transformed to a normal distribution, and combined using equal weights. The sub-domains will then be standardised by ranking, transformed to an exponential distribution and combined with equal weights to create the overall domain score.

7.4 Other issues explored

- 7.4.1 *Travel times to services.* As part of data exploration, the possibility of switching the indicators in the Geographical Barriers to Services sub-domain from measures of *road distance* to services, to measures of *travel time* to services, was considered. The Department for Transport produces accessibility statistics at Lower-layer Super Output Area level in the form of measures of travel time to certain key services. Travel times are provided for travel by car, travel by public transport/walking, and travel by bicycle to key services³⁹. The latest data release is for 2013. Although the release includes travel times to primary schools, GPs and

³⁷ Jones, Coombes and Wong (2010) The Geography of Housing Market Areas in England, undertaken for the former National Housing and Planning Advice Unit and published by the Department for Local Government and Communities <https://www.gov.uk/government/publications/housing-market-areas>

³⁸ Bramley, G. and Watkins, D. (2013) Local Incomes and Poverty in Scotland: developing local and small area estimates and exploring patterns of income distribution, poverty and deprivation, Report of Research for the Improvement Service on behalf of four Local Authorities (Edinburgh, Falkirk, Fife and Highland) and the Scottish Government

³⁹ <http://www.improvementservice.org.uk/library/download-document/3838-local-incomes-and-poverty-in-scotland/>
<https://www.gov.uk/government/statistics/accessibility-statistics-2012>

food shops, travel times to post offices are not currently produced. Site locations are for England only, whereas the Indices of Deprivation 2010's indicators for road distance to food shops and post offices take into account services beyond England's borders.

- 7.4.2 Travel time by car was not pursued as a potential indicator, as most Lower-layer Super Output Areas (97-99%) were assigned the minimum score of less than 5 minutes for primary schools, GPs and food shops. The Lower-layer Super Output Area scores for travel time by public transport/walking did not correlate highly with the equivalent road distance indicators of the Indices of Deprivation 2010. After careful consideration the decision was made to retain the road distance measures as these require fewer assumptions than travel time measures, which would need to take account of issues such as the time of day travelled, and (in the case of public transport) frequency of service and transport connections.

7.5 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

- 7.5.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.
- 7.5.2 *Access to childcare.* The use of childcare is a complex issue: it depends on cost, flexibility, type and location. For example, some people prefer to use childcare nearer the workplace than close to the home. However, the number of childcare places in a district has been demonstrated to relate to the rate at which lone parents enter work in that area (Evans, Noble et al, 2002). For previous Indices, an option was explored to model a local authority level ratio of pre-school children to pre-school childcare places, using a combination of Child Benefit data and Ofsted childcare places. However this was seen as a complex development, with significant time needed to develop a robust indicator. As sufficiently robust data is not readily available to produce this indicator without significant extra work, developing this indicator would be outside the scope of this update.
- 7.5.3 *Households lacking the required number of bedrooms.* Paragraphs 7.2.9 to 7.2.12 describe the household overcrowding indicator which will be used in the Indices of Deprivation 2015. An alternative measure was explored, also based on Census 2011 data, which considers the number of bedrooms required by the household (rather than the number of rooms). However, this measure only counts rooms as bedrooms if they were built as such or if they have been permanently converted into a bedroom. Given that many modern houses/apartments have rooms that can be used in different ways, the indicator as described in paragraphs 7.2.9 to 7.2.12 will be used.
- 7.5.4 *Digital services access.* Ofcom publishes data on broadband speeds, including both 'actual broadband speed' (based on real connections and measured speeds) and 'availability of superfast broadband' (download speeds of at least 30 Megabits

per second)⁴⁰. Actual speed is dependent on broadband packages obtained by users, so is in large part based on user choices (which may or may not be driven by questions of affordability), rather than an indicator of accessibility. The availability of superfast broadband is very high, and rapidly increasing; based on the most recent published data (2013), 76% of England's premises have superfast availability⁴¹, and in 46% of English Lower-layer Super Output Areas, *all* postcodes have superfast availability. As indicators should measure major features of deprivation, not conditions just experienced by a small number of people or areas, this indicator will not be included in this update of the Indices.

⁴⁰ <http://data.gov.uk/dataset/broadband-coverage>

⁴¹ Ofcom (2013) Infrastructure Report: 2013 Update. <http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/broadband-speeds/infrastructure-report-2013/>

Section 8 Living Environment Deprivation Domain

8.1 Overview of the domain

- 8.1.1 The Living Environment Domain measures the quality of the local environment. The indicators in the domain will remain the same as in the Indices of Deprivation 2010, apart from the proposed changes to the housing in poor condition indicator.
- 8.1.2 The indicators fall into two sub-domains. The 'indoors' living environment measures the quality of housing; while the 'outdoors' living environment contains measures of air quality and road traffic accidents.

Indoors sub-domain

- Houses without central heating: The proportion of houses that do not have central heating (source: Census 2011).
- Housing in poor condition: The proportion of social and private homes that fail to meet the Decent Homes standard (source: modelled English Housing Survey estimates produced by the Buildings Research Establishment, 2010-2012 average) [*MODIFIED*]

Outdoors sub-domain

- Air quality: A measure of air quality based on emissions rates for four pollutants (source: modelled National Atmospheric Emissions Inventory estimates produced by Staffordshire University, 2012)
- Road traffic accidents involving injury to pedestrians and cyclists: A measure of road traffic accidents involving injury to pedestrians and cyclists among the resident and workplace population (source: Department for Transport, 2010-2012 average, smoothed to Lower-layer Super Output Area level).

8.2 Further detail on indicators and denominators

Houses without central heating

- 8.2.1 The houses without central heating indicator is used as a measure of housing which is expensive to heat. Unlike fuel poverty (see section 8.4 below), the indicator is based simply on heating type, and not on household income.
- 8.2.2 Data will be taken from the Census 2011 (the previous indicator was based on Census 2001 data), and identifies the proportion of houses in each Lower-layer Super Output Area that do not have central heating in any room⁴². Shrinkage will be applied to the indicator.

⁴² The Census 2011 definition of central heating used includes gas, oil or solid fuel central heating, night storage heaters, warm air heating and underfloor heating.

Housing in poor condition [*MODIFIED*]

8.2.3 The housing in poor condition indicator identifies the proportion of social and private homes that fail to meet the Decent Homes standard. The data will be modelled from the English Housing Survey at national level, in combination with a commercial dataset that provides information on the age, type, tenure and occupant characteristics of the housing stock at individual dwelling level.

8.2.4 In order to enhance the housing in poor condition indicator from the previous Indices of Deprivation 2010 indicator, the following changes are proposed:

- the four components of the Decent Homes standard will be modelled separately to improve accuracy⁴³
- the statistical model will be created at dwelling-level, rather than the Output Area level measure created previously
- to reflect policy changes since the indicator was last produced, the Housing Health and Safety Rating System will be used instead of the previous fitness standard

8.2.5 Failure to meet any one of the four separate components in the Decent Homes Standard⁴⁴ means that a property fails the standard:

Component of the Decent Homes Standard	Description
Housing Health and Safety Rating System	Dwellings which fail to meet this criterion are those containing one or more hazards assessed as serious ('Category 1'). The system includes 29 hazards in the home categorised into Category 1 (serious) or Category 2 (other).
Disrepair	A dwelling is said to be in disrepair if: at least one of the key building components is old and needs replacing or major repair due to its condition; or more than one of the other building components are old and need replacing or major repair due to their condition.
Modernisation	A dwelling is said to fail this criterion if it lacks three or more of the following: a reasonably modern kitchen (20 years old or less); a kitchen with adequate space and layout; a reasonably modern bathroom (30 years old or less); an appropriately located bathroom and WC; adequate insulation against external noise (where such noise is a problem); or adequate size and layout of common areas for blocks of flats.
Thermal comfort	A dwelling fails this criterion if it does not have effective insulation and efficient heating.

⁴³ The four components are: Housing Health and Safety Rating System; Disrepair; Modernisation; and Thermal comfort.

⁴⁴ See 'A Decent Home: Definition and guidance for implementation' published in June 2006 for details of the Decent Homes standard. <https://www.gov.uk/government/publications/a-decent-home-definition-and-guidance>

Air quality

- 8.2.6 The indicator will be an estimate of the concentration of four pollutants; nitrogen dioxide, benzene, sulphur dioxide and particulates. Indicators for each of the pollutants will be based on air quality data published by the UK Air Information Resource for 1km grid-squares⁴⁵, which will be modelled to Lower-layer Super Output Area level using the point-in-polygon method.
- 8.2.7 For each pollutant, the atmospheric concentration will be compared to a national standard value⁴⁶ – with the concentrations in each Lower-layer Super Output Area divided by the appropriate national standard – before summing to produce a single indicator. In theory, values for the combined indicator range from zero to infinity. However, in practice values are unlikely to exceed 4, the equivalent of a site where concentrations of all four pollutants are at their respective thresholds.
- 8.2.8 Due to changes in the national targets⁴⁷, the particulate matter component of the air quality indicator will be based on particles less than 2.5 micrometres in diameter, rather than the 10 micrometres previously used.
- 8.2.9 Additional pollutants (arsenic, cadmium, nickel and benzoapyrene) are also the subject of a new air quality directive⁴⁸. However the overwhelming majority of the country has better-than-target values for these pollutants so they have not been included in the measure.

Road traffic accidents involving injury to pedestrians and cyclists

- 8.2.10 The indicator will be based on reported accidents that involve death or personal injury to a pedestrian or cyclist⁴⁹. The indicator will use data for 2011 to 2013 published by the Department for Transport.
- 8.2.11 The denominator will use the non-resident workplace population as well as the resident population, to take into account the number of people in the local area during the day.

8.3 Combining the indicators to create the domain

- 8.3.1 The indicators within each of the sub-domains will be standardised by ranking and transforming to a normal distribution, and combined using equal weights to create the sub-domains. The sub-domains will then be standardised by ranking and transformed to an exponential distribution.

⁴⁵ <http://uk-air.defra.gov.uk/>

⁴⁶ The annual mean standards of nitrogen dioxide, benzene and particulates are defined by the UK's National Air Quality Strategy while the safe guideline for sulphur dioxide is set by the World Health Organisation.

⁴⁷ <http://uk-air.defra.gov.uk/air-pollution/uk-eu-policy-context>

⁴⁸ See Air Quality Standards Regulations 2010, http://www.legislation.gov.uk/ukSI/2010/1001/pdfs/uksi_20101001_en.pdf

⁴⁹ Only accidents that involve at least one 'mechanically propelled' vehicle are included in the dataset. Accidents involving personal injury are counted, including deliberate acts of violence but not confirmed cases of suicide. Injuries sustained on private roads and in car parks are not included. See www.gov.uk/government/collections/road-accidents-and-safety-statistics for details.

8.3.2 The domain will be created by summing the two sub-domains, weighted according to patterns of ‘indoors’ and ‘outdoors’ time use⁵⁰. As done in the Indices of Deprivation 2010, the Indoors Living Environment sub-domain will be given two thirds of the domain’s weight, and the Outdoors Living Environment sub-domain, one-third.

8.4 Indicators explored that are unsuitable for inclusion in the Indices of Deprivation 2015

8.4.1 The following section describes those indicators which were explored but not found suitable for inclusion in the Indices of Deprivation 2015.

8.4.2 *Flood risk areas*. A measure of flood risk is used in the Welsh Indices of Deprivation, based on the proportion of people living in an area with a significant, moderate or low risk of flooding (risk was based on frequency rather than level of flooding damage). For England, flood risk data is available from the Environment Agency. However, the data measures *risk* of flooding, rather than *actual* flooding, and was not supported by members of the Advisory Group and Project Board as an indicator for this update of the Indices of Deprivation.

8.4.3 *Graffiti*. An indicator on graffiti is not proposed because recorded crime data for graffiti is not available separately from data on criminal damage as a whole. Moreover, some commentators have argued that graffiti may be variably reported.

8.4.4 *Households in fuel poverty*. The fuel poverty dataset published by the Department of Energy and Climate Change, which includes modelled estimates to Lower-layer Super Output Area level, is based on households with above average fuel costs that are pushed below the income poverty threshold once fuel costs are taken into account. In the July user survey and previous consultations there has been support from users for introducing a measure of fuel poverty into the Living Environment Deprivation Domain. However, discussion with the Fuel Poverty team at the Department of Energy and Climate Change has identified that the methodology used to produce the sub-regional estimates of fuel poverty does not produce robust estimates at very low level geographies, and should not be used to compare between Lower-layer Super Output Areas⁵¹. A fuel poverty indicator will not therefore be incorporated into this update of the Indices, but any improvement in methods may mean that the indicator could be further considered in future.

8.4.5 *Households lacking basic amenities*. The 2001 Census collected data on the number of households without exclusive use of a bathroom and inside toilet, but less than 1 per cent of households in England were lacking these amenities. The indicator would therefore not measure a significant aspect of deprivation at small area level. Furthermore, this indicator was not updated as part of the 2011 Census, so up-to-date data would not be available to produce this indicator.

⁵⁰ UK 2000 Time Use Survey, <http://discover.ukdataservice.ac.uk/catalogue?sn=4504>

⁵¹ 2014 review by the Department of Energy and Climate Change and Office for National Statistics statisticians, unpublished.

- 8.4.6 *Households not connected to the gas network.* It is now possible in principle to construct an indicator of households not connected to the gas network, as a proxy for high costs for heating. This would be based on comparing the number of domestic gas meters in each Lower-layer Super Output Area to the number of households. However, in 13,597 Lower-layer Super Output Areas (41% of all such areas in England), *all* households were identified as being connected to the gas network. As indicators should measure major features of deprivation, not conditions just experienced by a small number of people or areas, this indicator will not be included in the updated Indices.
- 8.4.7 *Housing (or population) density.* The July user survey and a previous consultation suggested using a measure of high density housing in the Living Environment Deprivation Domain, to reflect the impact of housing on traffic congestion and pollution, and limited open space. However, housing (or population) density is only a proxy for these impacts and is not a deprivation in its own right, as a high density living is not always seen as undesirable.
- 8.4.8 *Land use and derelict land.* The current method for measuring derelict land is the National Land Use Database, which is assembled from data collected by local authorities. However, the database is not comprehensive enough to give a sufficiently robust measure of derelict land at small area level for the whole of England, even if such an indicator was desirable.
- 8.4.9 *Noise pollution.* The Department for Environment, Food and Rural Affairs has estimated local environmental noise levels due to road, rail and air traffic and from industry⁵². Although this data potentially provides an additional indicator for the Outdoors sub-domain, data is only available for major urban areas, and for major roads and railways outside the major urban areas. There is therefore not sufficient geographic coverage to include in this update of the Indices of Deprivation.
- 8.4.10 *Older cars.* The possibility of using data on older cars as a possible indicator of pollution was considered, as old cars create more fumes than more recent models. Although data is not currently available, the Driver and Vehicle Licensing Agency are exploring making car registration data openly available. It may be possible to include an indicator based on the number of cars aged 10 years or older in the future. However, this data would only ever provide a proxy measure of pollution, and the Indices already contain direct estimates of air quality.
- 8.4.11 *Proximity to green spaces.* There is a range of research outlining the benefits of access to green spaces including reduced pollution, improved physical and psychological wellbeing and factors which encourage healthy lifestyle behaviours. Several location datasets could be used in a composite indicator of proximity to green spaces, including local nature reserves, woodland, local open spaces, coastal beaches and Areas of Outstanding Natural Beauty⁵³. There may be value

⁵² Online maps are available for major urban areas, with PDF maps available for major roads and railways outside the major urban areas. See <http://services.defra.gov.uk/wps/portal/noise> for maps and background.

⁵³ For a summary, see Environment Agency (2008) working towards a better quality of life: Environmental Justice in South Yorkshire.

in exploring the development of such an indicator for a future update. As sufficiently robust data is not readily available to produce this indicator without significant extra work, developing this indicator would be outside the scope of this update.

- 8.4.12 *Proximity to waste and landfill sites.* The most recent Welsh Index of Multiple Deprivation contained an indicator of proximity to waste and landfill sites, which ranks Lower-layer Super Output Areas based on the proportion of the population living within a 1km zone of each Pollution Prevention Control site and active landfill site. However, this indicator will not be pursued further for the Indices of Deprivation 2015, as the impact of poor air quality resulting from proximity to waste and landfill sites is already captured as part of the air quality indicator. In addition, a systematic review of studies into the health impacts of people living in the vicinity of waste and landfill sites was unable to find sufficient evidence to establish a causal link between negative health effects and living in close proximity to waste and landfill sites⁵⁴.
- 8.4.13 *Vacant dwellings and low demand.* DCLG publishes data on empty homes⁵⁵ at local authority district level. As this data is not available at small area level, it is not considered suitable for use in a new indicator. It may be possible in future to model empty homes at small area level to provide a candidate indicator for the 'Outdoors' sub-domain, but this would be outside the scope of this update of the Indices.

www.staffs.ac.uk/schools/sciences/geography/links/IESR/downloads/EnvJusticeinSouthYorksGENE0608BODZ-e-e.pdf

⁵⁴ For example, see www.gov.uk/government/publications/exposure-assessment-of-landfill-sites

⁵⁵ <https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants>