

Welsh Government

Consultation Document

Proposed indicators for the Welsh Index of Multiple Deprivation 2014

Date of issue: **28 November 2013**

Action required: Responses by **27 February 2014**

Overview	This consultation is about proposed indicators for the Welsh Index of Multiple Deprivation 2014.
How to respond	<p>Responses to this consultation should be e-mailed/posted to the address below to arrive by 27 February.</p> <p>A consultation document and response form can be accessed from the Welsh Government's website at www.wales.gov.uk/consultations</p> <p>A GoTo Consultation Webinar (online consultation seminar) will be held on 16 and 17 December. For further registration details please go to: http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/consultation-webinar/?lang=en</p>
Further information and related documents	<p>Large print, Braille and alternate language versions of this document are available on request.</p> <p>Information on the Welsh Index of Multiple Deprivation can be accessed at: http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/?lang=en</p> <p>To sign up for the Welsh Index of Multiple Deprivation newsletter please contact: stats.inclusion@wales.gsi.gov.uk</p>
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Data protection

Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government staff to help them plan future consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

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1 Introduction

The Welsh Index of Multiple Deprivation (WIMD) is the Welsh Government's official measure of relative deprivation for small areas in Wales. It is designed to identify those small areas where there are the highest concentrations of several different types of deprivation. It is a National Statistics and is produced by statisticians at the Welsh Government.

The latest index was published in 2011. Information on WIMD 2011 is available on the Welsh Government website:

www.wales.gov.uk/statistics

An updated index will be published in late 2014, using more up-to-date data and improved indicators based on lessons learnt from the production of previous indexes.

The purpose of this consultation is to expose the current proposals for the domains and indicators for WIMD 2014 to critical review. We are consulting at this stage to allow time for consultation responses to be acted upon, where possible, prior to finalising the details for WIMD 2014. This document details our current thinking on which domains will be included for 2014 as well as the indicators for each domain.

The consultation is open to all individuals and organisations.

A summary of responses received to this consultation will be published in spring 2014.

The consultation exercise begins on 28 November 2013 and **27 February 2014 is the deadline for responses.**

2 Summary

The aim of this consultation is to seek user views on proposals for WIMD 2014 indicators. In order to develop the indicator proposals, statisticians at the Welsh Government worked with seven expert topic groups to review indicators used in WIMD 2011 and to consider potential new indicators. Issues raised in previous consultations were also considered. Wherever possible the proposed indicators conform to a list of indicator criteria. Further information on the process for developing these proposals is outlined in Section 4.

Full details of the proposed indicators for WIMD 2014 are listed in Section 5. Details of indicators considered but rejected for whatever reason (e.g. inappropriate, lack of data etc.) are also given. For some domains, this document highlights on-going work to determine the suitability of indicators for WIMD 2014. In some cases, this document outlines a preferred approach for an indicator, together with a secondary approach if the preferred approach is not possible. We welcome user views on all these indicator proposals.

In 2011, a separate Child Index of Multiple Deprivation was published. This consultation outlines a proposal to publish a Child Index of Multiple Deprivation in early 2015, in the same format to the 2011 Child Index. Further detail on this proposal is provided in Section 6. We welcome user views on this proposal.

The consultation questions are summarised on the next page. The questions are also listed at the appropriate point within the consultation document.

A response form can be accessed from the Welsh Government's website at www.wales.gov.uk/consultations
Respondents are not required to answer all questions.

A consultation webinar (online consultation seminar) will be held on 16 December in English, and 17 December in Welsh. This will include a presentation on the proposals together with an opportunity to ask questions. For further details on the webinars and to register, please go to: <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/consultation-webinar/?lang=en>

2.1 Questions proposed in this document

2.1.1 Domain Proposals (see Section 5)

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

Income

1. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Employment

2. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Health

3. Subject to adequate data developments and quality, would you agree with the proposal to include an indicator on diagnosed chronic diseases?
4. Subject to further investigation, would you agree with the inclusion of an indicator on “proportion of unpaid carers”?
5. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Education

6. Do you agree with proposals to drop Key Stage 3 Average Points Score?
7. Do you agree with proposals for two Key Stage 4 attainment indicators?
8. What are your views on changing the Overall Absenteeism indicators to one based on repeat absentees?
9. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Access to Services

10. Do you agree with the changes, additions to and exclusions from the proposed list of services for WIMD 2014?
11. Do you agree with proposals for combining public and private transport?
12. What are your views on the selected calculation of travel times method?

13. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Community Safety

14. Do you agree with the preferred approach of including anti-social behaviour incidents (if data are robust) with the alternative being use of offender location data (as for previous WIMDs)?

15. What are your views on the use of all road accidents as a new indicator, assuming number of pedestrian and cyclist casualties are not robust enough for WIMD?

16. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Physical Environment

17. Do you have any comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Housing

18. Is it appropriate for this domain to contain only one (overcrowding) indicator if that is all that is available?

19. Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

Child Index (see Section 6)

20. Please describe your uses of the Child index in its current format

21. In the longer term, should analyses of underlying WIMD data (including by age when possible) be prioritised over producing a Child Index in its current form?

Next steps (see Section 7)

22. Do you have any other comments on proposals for WIMD 2014 (not already covered) or future work on WIMD?

3 Welsh Index of Multiple Deprivation (WIMD) Background

3.1 What does WIMD measure?

WIMD is the Welsh Government's official measure of relative deprivation for small areas in Wales. It is designed to identify those small areas where there are the highest concentrations of several different types of deprivation. As such, WIMD is a measure of multiple deprivation that is both an area-based measure and a measure of relative deprivation. These key terms are defined more fully below.

WIMD is currently made up of eight separate domains (or types) of deprivation:

- a) Income
- b) Employment
- c) Health
- d) Education
- e) Geographical Access to Services
- f) Community Safety
- g) Physical Environment
- h) Housing

Each domain is compiled from a range of different indicators. Further information on the methods used in compiling the index are provided in Annex A.

Deprivation is the lack of access to opportunities and resources which we might expect in our society. The domains listed above relate to both material and social aspects of deprivation. Material deprivation is having insufficient physical resources - food, shelter, and clothing – necessary to sustain a certain standard of life. Social deprivation refers to the ability of an individual to participate in the normal social life of the community.

Multiple Deprivation refers to more than one type of deprivation. An area is multiply deprived if, for more than one of these domains, the area has a concentration of people experiencing that type of deprivation. Generally speaking, the greater the number of domains for which there are high concentrations of deprivation then the greater the overall deprivation in an area. This does not necessarily mean that the *same* people suffer multiple types of deprivation in the area, although we would expect there to be significant overlap.

Area-based measure: WIMD is calculated for all Lower layer Super Output Areas (LSOAs) in Wales. Following the 2011 Census, 1909 LSOAs were defined in Wales and they have an average population of 1600 people. Further information on LSOAs are provided in Annex B, including information on their revision following the 2011 Census. WIMD is based on indicators that consider the aggregate characteristics of the people living in the area as well as in some cases the characteristics of the area itself (for example the physical environment domain).

Relative measure: The Index provides a way of identifying areas in the order of least to most deprived. It does not provide a measure of the level of deprivation in an area but rather whether an area is more or less deprived relative to all other areas in Wales; so we can know which areas are more (or less) deprived than others, but not by how much. The

reason for taking such an approach is that this allows the different domains to be combined together.

Index: An index is a group of separate measurements which are combined into a single number. They are designed to show changes in a complicated variable like industrial output, prices or in this case deprivation. An index then allows comparisons between different values – in the case of WIMD, the comparison is between LSOAs.

3.2 How the Index is constructed

The Index has three main components:

- The Index itself, which is a set of ranks;
- The ranks of the eight types of deprivation, or domains, from which the overall Index is constructed; and
- The underlying indicators, which are directly measurable, and which are combined to create the domain ranks. Many, but not all, of the indicators are produced as rates. The units depend on what is being measured.

All of these components are calculated for each of the LSOAs in Wales. The overall 2011 WIMD ranks and the ranks of the eight domains of deprivation are published on the StatsWales website (www.statswales.wales.gov.uk). Where available, the underlying indicator data is now published annually on StatsWales. This indicator data can be used to monitor change over time. More detailed information on the methodology can be found in Annex A.

3.3 What can WIMD be used for?

WIMD can be used for:

- Comparing overall deprivation ranks for all LSOAs or for a group of them (like those in a Local Authority), so that the LSOAs can be put in order from the most deprived to the least;
- Comparing ranks within the separate domains of deprivation for LSOAs;
- Comparing two or more local authorities (or other groups of aggregated LSOAs) by looking at the proportion of the LSOAs in the Local Authority in the most deprived (say) 10% in all of Wales;
- Although a ranking system such as WIMD cannot be used for monitoring change over time, it is possible to analyse change over time by looking at the underlying indicator data (published on StatsWales).

Examples of the use of WIMD within the Welsh Government:

- Development and monitoring of the Communities First programme;
- Calculation of school families and as a contextual factor in annual school value added calculations, which now feed into secondary school banding;
- The underlying indicator data has been used in identifying areas in which to put Flying Start services;
- WIMD deprivation deciles have been used extensively to measure health inequalities, for example in the Public Health Wales Observatory publication on trends in mortality and life expectancy in 2011 and the earlier profile of alcohol and health in Wales;

- The index, its domains and indicators are used to identify and understand deprivation in the Welsh Government's Strategic Regeneration Areas.

Examples of the use of WIMD amongst local government and other public bodies:

- Local Government needs assessments for health, social care & wellbeing; Children & Young People's Partnership and Community Safety Partnership;
- To create area profiles;
- To support bids for European funding, targeting local services and in analysis of the links between localised deprivation and various problems including health issues;
- For public health research, assisting the understanding of wider social and environmental determinants of health and illness;
- To plan neighbourhood police resourcing.

3.4 Limitations of WIMD

It is important to remember that WIMD is not the only way to measure deprivation. WIMD has been developed for a particular purpose which is to measure concentrations of deprivation at a small area level.

Deprived individuals: There can be individuals in deprived areas that would not be considered deprived; and there can also be individuals that would be considered deprived in the least deprived areas. Around 1 in 5 of the people in income benefit households live in the most deprived 10% of areas in Wales. This means that although it is true to say that deprivation is much more concentrated in some areas than others, 4 out of 5 people in income benefit households live outside these areas.

Individuals who are multiply deprived: WIMD does not identify individuals who are multiply deprived, rather, it identifies areas where there are concentrations of several different types of deprivation. At present, we are not able to link the data included in the Index at an individual person level in order to understand the extent of multiple deprivation for individuals.

Absolute deprivation: WIMD doesn't give a measure of the amount of deprivation in an area, for example it does not allow for statements such as "area A is twice as deprived as area B". The ranks and scores can only be used to say "area A is more deprived than area B". This also means that even if an area's rank remains the same in successive WIMD publications, the level of deprivation in that area could have gone up or down but just not enough to affect the comparison with other areas. However, the analysis of the individual indicators within WIMD does allow for such comparisons between areas and over time.

Poverty: Poverty usually means a lack of money, whereas deprivation includes a lack of the opportunities and resources to which we might expect to have access in our society, for example, good health or a safe living environment.

Affluence: It is important to remember that a lack of deprivation is not the same as affluence. The least-deprived area is not necessarily the most affluent area in Wales. This also means that the ability of WIMD to discriminate effectively between areas is strongest for the most deprived areas and extreme care should be taken in drawing conclusions about the differences between less deprived areas.

Deprivation across the UK: Ranks and Scores are not comparable with the Indices of Multiple Deprivation (IMD) from the other UK countries. Further information on the issue of comparing IMDs across the UK can be found on the Neighbourhood Statistics website¹.

Comparisons over time: As the WIMD is a relative index, it's important not to compare ranks across multiple indices. WIMD indicator data is published annually on StatsWales², where possible, in order to allow comparison over time.

¹ <http://www.neighbourhood.statistics.gov.uk/dissemination/Info.do?page=analysisandguidance/analysisarticles/indices-of-deprivation.htm>

² <https://statswales.wales.gov.uk/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-Indicator-Analysis>

4 Development of Proposals for WIMD 2014

4.1 Reviewing Indicators for WIMD 2014

An internal Welsh Government WIMD Steering group is responsible for overseeing the policy direction, production and dissemination of WIMD 2014. An external advisory group provides expert advice to the steering group. Information on group membership is provided at Annex C.

As a first stage in the process of producing WIMD 2014, a short project was carried out to consider and agree the conceptual basis for WIMD 2014. A Review Group of academics, analysts and Welsh Government policy users was established to:

- clarify the conceptual basis by which we define and measure deprivation within WIMD; and
- re-state and clarify how WIMD was developed and what 'area-based deprivation' means in the context of WIMD.

The outcome of this work (including a definition of deprivation, definitions of domains and criteria for WIMD indicators) has been incorporated throughout this consultation document.

To take forward the task of considering indicators for WIMD 2014, seven separate domain working groups were established:

- Income & Employment
- Education
- Health
- Geographical Access to Services
- Community Safety
- Physical Environment
- Housing

Each domain working group included analytical experts from the Welsh Government, local authorities, other public bodies (e.g. National Resources Wales, Public Health Wales) and academics along with policy representatives from the Welsh Government where appropriate. Full membership is at Annex C.

The domain groups were asked to:

- Review the indicators and data sources used for WIMD 2011 (see Annex D);
- Consider potential new indicators, including reviewing outstanding issues from WIMD 2008 and WIMD 2011 domain group discussions and consultation exercises;
- Discuss and agree proposed indicators for their domain, ensuring that all indicators are tested and signed off as fit-for-purpose;
- Oversee the production of technical guidance about the indicators chosen for inclusion in final reports including appropriate use of the individual indicators and the domain.

The domain groups were asked to ensure that proposed indicators met the indicator criteria list described below wherever possible.

4.2 Indicator Criteria

Indicators included in WIMD should meet a number of criteria to ensure their accuracy and relevance in measuring deprivation.

- a) Each indicator chosen should be relevant to an area based measure of concentrations of deprivation (as defined for the purposes of WIMD). Wherever possible it should relate to an 'enforced lack'³.
- b) Each indicator chosen should be included in one of the agreed domains of deprivation only.
- c) Within domains, wherever possible, indicators should be chosen that represent major features of that form of deprivation rather than deprivation affecting a very small number of people or areas. This allows the degree of deprivation to be identified as opposed to a simple 'present/not present' approach.
- d) Indicator data should be available at small area level and collected on a consistent basis for the whole of Wales.
- e) Indicators should be statistically robust at the small area level. Where cases or incidences are low, aggregates over longer time periods should be included to ensure indicators are not dominated by one-off or uncharacteristic events.
- f) Indicator data should be able to be updated on a regular basis and should be as up-to-date as possible.
- g) Ideally, indicators within each domain should be direct measures of that form of deprivation. Where there are insufficient direct measures, good proxy measures can be used (e.g. although the data from administrative systems are not always direct measures of deprivation, they are often excellent proxies, and have the benefit that they allow the calculation of detailed small area statistics).
- h) Modelled measures should only be used in conjunction with a good range of non-modelled indicators. The form of modelling should try to ensure that changes over time are reflected in the modelled variable.
- i) Indicators should adhere to the expected properties of a good performance indicator e.g. if there are real changes over time, that these are reflected in the indicators; any changes in the indicator can be explained.

³ An enforced lack arises when a person cannot acquire a good or service because they don't have the financial or other means to do so.

5 Domain and Indicator Proposals

The following sections provide a summary of the current proposals for each of the eight domains as well as a list of the consultation questions. We welcome responses to some or all of these questions.

5.1 Income

The income domain focuses on the proportion of people with income below a defined level.

5.1.1 Proposed indicators

The general introduction of Universal Credits will have a significant impact on the measurement of the income domain of WIMD in future. However, pre-Universal Credits rollout data will be available for WIMD 2014.

Given that Universal Credits are likely to mean large scale changes for this domain in future, the proposals for this domain for 2014 are based on a principle of 'minimum change' in the interim period.

Full technical information on the indicators is available in the WIMD 2011 Technical report⁴.

5.1.2 Income Deprivation Indicator

The Income domain consists of a single composite indicator, Income deprivation, calculated from the following three elements.

- (a) Percentage in receipt of income related benefits
- (b) Dependent child receiving tax credits with income less than 60% of the Wales median
- (c) NASS-supported Asylum Seekers

The above are counts of unique individuals (i.e. those who claim multiple benefits are only counted once). The indicators can be summed and expressed as a percentage of the total population for the LSOA.

(a) Percentage in receipt of income related benefits

This indicator is formed by combined count of the yearly (Feb, May, Aug, Nov) average of Income Support (IS) claimants, Income Based Jobseekers Allowance (JSA) claimants, Pension Credit (PC) claimants, Income Based Employment and Support Allowance (ESA) claimants and the number of dependents on claimants of IS, JSA, PC, ESA, all divided by the total population. Data are compiled from the Work and Pensions Longitudinal Study (WPLS).

(b) Dependent child receiving tax credits with income less than 60% of the Wales median (before housing costs)

This is the addition of people claiming the Child Tax Credit and the Adult Tax Credit. This data is sourced from HMRC.

(c) NASS-supported Asylum Seekers

The number of National Asylum Support Service (NASS) supported Asylum seekers at the end of December 2010 are also added to this indicator.

⁴ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

Recent changes to the welfare system mean that eligibility thresholds and criteria for some benefits have already/are about to change. This means that the indicator data will not be strictly comparable with earlier years.

The change proposed, from the WIMD 2011 indicator, is to remove contribution-based Job Seekers Allowance (JSA) from the included benefits. This is because it is not a means tested benefit, and provides consistency with the inclusion of income based Employment and Support Allowance (ESA) benefit claimants. Those who are on contribution-based Job Seekers Allowance (JSA) and another listed benefit will still be included.

5.1.3 Other indicators discussed

Small Area Income Estimates – Small area income estimates are considered a preferred measure for income deprivation, however there is currently no suitable data source. The ONS currently produces Middle-layer Super Output Area (MSOA) modelled household income estimates. However this would require a mechanism for modelling the MSOA data down to LSOA level. The future of this data series is also uncertain⁵.

There are also commercial data sources of LSOA income estimates; however it is not possible to assess the quality of this data as the methods are not publicly available.

Persistent Benefit Claimants – Information on duration of benefit claims is available from the Work and Pensions Longitudinal Study (WPLS). This data are considered to be valuable contextual information and consideration will be given to publishing alongside WIMD indicator data.

5.1.4 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

⁵ <http://www.ons.gov.uk/ons/about-ons/get-involved/consultations/consultations/statistical-products-2013/index.html>

5.2 Employment

The purpose of the employment domain is to capture lack of employment. This covers involuntary exclusion of the working age population from work, including those people who cannot work due to ill-health or who are unemployed but actively seeking work.

5.2.1 Proposed indicators

The general introduction of Universal Credits will have a significant impact on the measurement of the employment domain of WIMD in future. However, pre-Universal Credits rollout data will be available for WIMD 2014.

Given that Universal Credits are likely to mean large scale changes for this domain in future, the proposals for this domain for 2014 are based on a principle of 'minimum change' in the interim period.

Full technical information on the indicators is available in the WIMD 2011 Technical report⁶.

5.2.2 Proportion of population on employment related benefits:

The employment related benefits indicator is calculated from a count of unique individuals (i.e. those who claim multiple benefits are only counted once) entitled to:

- Incapacity benefit (replaced Severe Disablement Allowance);
- Jobseeker's Allowance (JSA); and
- Employment and Support Allowance (ESA).

The indicator is expressed as a percentage of the total population for the LSOA.

Recent changes to the welfare system mean that eligibility thresholds and criteria for some benefits have already/are about to change. This means that the indicator data will not be strictly comparable with earlier years.

The change proposed, from the WIMD 2011 indicator, is to remove the New Deal participants. This programme has been replaced by the Work Programme, which requires a participant to be either a Job Seekers Allowance (JSA) or Employment and Support Allowance (ESA) claimant. Both of these benefits are already included in the indicator.

5.2.3 Other indicators discussed

Persistent Benefit Claimants – Information on duration of benefit claims is available from the Work and Pensions Longitudinal Study (WPLS). This data is considered to be valuable contextual information and consideration will be given to publishing alongside WIMD indicator data.

5.2.4 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

⁶ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

5.3 Health

The purpose of this domain is to measure lack of good health.

Within the Health domain, factor analysis is used to determine the weightings of the constituent indicators. This domain does not contain any sub-domains. Cancer Incidence, All-cause Death Rate and Limiting Long-Term Illness are age-sex standardised (using an indirect standardisation method).

5.3.1 Proposed indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. The proposed indicators are listed below, and are likely to be unchanged from the previous index. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report⁷

Cancer Incidence – Cancer is a common condition and more than two in five⁸ people will develop some form of cancer during their lifetime. This disease can have significant and lasting negative impacts on an individual's health and wellbeing.

This indicator is the number of cancer incidences (all malignancies excluding non melanoma skin cancer) per 100,000 population, and was included in WIMD 2011 (cancer prevalence was disregarded due to the lack of robust data). We considered whether only certain cancers (i.e. those linked to deprivation) should be included in the indicator, but decided against this as the domain should measure lack of health overall and not just health aspects related to deprivation. The data source for this indicator is the Welsh Cancer Intelligence & Surveillance Unit (WCISU).

Long Term Limiting Illness - The number of people per 100,000 with a limiting long-term illness was included in WIMD 2011. The data for this indicator was previously gathered from the 2001 Census but now new data is available from the 2011 Census. A limiting long-term illness covers any long-term illness, health problem or disability that limits daily activities or work. The question on limiting long term illness has changed slightly in that respondents can now state if they are limited a lot or a little. We propose that both those limited a lot and limited a little should be included in the indicator. A further question on general health was included in the 2011 Census, and analysis indicates that there is high correlation between the two measures. Limiting long-term illness is the preferable indicator as the question asked is less subjective. The data source for this indicator is the 2011 Census, Office for National Statistics (ONS).

Low Birth Weight - Percentage of live single births less than 2.5kg was included in WIMD 2011. We considered whether only births of a certain gestation period should be included but decided to include all births, as low birth weight can impact on future health regardless of gestational period. The data source for this indicator is the National Community Health Database and the Office for National Statistics (ONS).

All Cause Death rate – The number of deaths per 100,000 was included in WIMD 2011. This indicator acts as a proxy for morbidity. Poor health manifests itself both through a poorer quality of life but also in lower life expectancy which can be captured through age and sex standardised death rates. In the absence of more appropriate data on chronic disease, this robust indicator will be included. The data source for this indicator is the Office for National Statistics (ONS).

⁷ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

⁸ <http://www.wales.nhs.uk/sites3/Documents/242/11%20AllCancers.pdf>

5.3.2 Other indicators discussed

Prescribing data – Prescribing data is a possible source for producing a mental health indicator (i.e. those being prescribed drugs for conditions such as depression and anxiety). At this time, prescriptions data is unsuitable for inclusion in WIMD as patient post codes are not collected centrally to allow LSOA counts to be produced. This will be revisited for future WIMDs when prescription data may have advanced. However, conceptual issues such as use of such drugs for other purposes e.g. pain relief, and variations in prescribing practices would need to be considered. The data source is the NHS Wales Informatics Service (NWIS).

Emergency Admissions – This indicator has been suggested as a measure for poor primary care and preventative healthcare. We decided against its inclusion on the basis that: it measured lack of supply as opposed to lack of health; and operational variations may exist between and within emergency departments. The data source is NWIS.

Child Obesity – A good potential indicator for WIMD as it indicates not only poor health of the child but also as obesity makes an individual more susceptible to future health problems. However insufficient years of data will be available for WIMD 2014 from the Child Measurement Programme for Wales. The indicator should be reconsidered for future WIMDs. The data source is the Child Measurement Programme for Wales, Public Health Wales (PHW).

Healthy Life Expectancy/Avoidable Mortality – These measures were suggested as possible alternatives to the all cause death rate indicator. Given the ever increasing older population, healthy life expectancy may be of particular importance. Unfortunately, the Office for National Statistics (ONS) has confirmed that numbers are too small at LSOA level for these to be included as indicators. Also, these indicators would probably be highly correlated with all cause death rate and limiting long-term illness which are robust and available for LSOAs. The data at Local Authority level can be sourced from the ONS.

Maternity Indicators – Maternity indicators such as breastfeeding were considered to be desirable for inclusion although insufficient data is available at this time. They will be revisited for future iterations of WIMD. The data source is NWIS.

5.3.3 Outstanding issues

Prevalence of diagnosed chronic diseases

The domain group agreed that an indicator measuring prevalence of diagnosed chronic diseases (e.g. chronic heart disease, diabetes, depression etc.) recorded by GP surgeries would be desirable for inclusion. There is a Data Quality System available to GP practices in Wales, from which aggregated results are sent to a central NHS Wales repository. This may be able to provide numbers with diagnosed chronic diseases by LSOA, based on patient postcode. However a new contract for administering the system is in the process of being awarded, and details of the system's future capabilities will not be available until 2014. We are currently discussing a request for data access with NHS Wales Informatics Service (NWIS).

There are a number of possible issues affecting the completeness, accuracy and access to this data that require investigation⁹:

- The system is non-mandatory (installed in excess of 95% of GP practices) and the weekly return rate for data is usually around 90%;
- The data is primarily used to monitor GP practice performance against their contract, and secondary use should therefore be considered with caution;
- GP practices vary to some extent in their coding and recording, and variations may exist in the data reflecting the priorities and characteristics of individual practices.

Should data access be possible in time for WIMD 2014, and quality assurance alleviate the concerns outlined above, the domain group will consider in more detail which diseases or conditions to count, and how these are aggregated together to provide a single indicator of “prevalence of diagnosed chronic disease”.

Proportion of unpaid carers

It was suggested that we consider including a measure of unpaid care levels from the Census, to capture possible health deprivation of the carer. Census data¹⁰ suggests that the proportion of unpaid carers ranges from 10% to 15% for Welsh local authorities. The overall category can be broken down by number of hours of care (1 to 19/20 to 49/50+). To decide whether to include such an indicator we would need to examine the evidence on the impact of provision of unpaid care on the health and wellbeing of the carer, by the hours of care provided. Data robustness in terms of numbers per LSOA would also be considered. Census data provides analysis by deprivation decile, and the relationship with deprivation is described in the following extract from the ONS analysis:

“Of interest is the lower level of provision of unpaid care in the more deprived deciles for the last two censuses in both England and Wales. This is surprising given that levels of either ‘Very good’ or ‘Good’ general health are lower in the more deprived deciles and rates of activity limitation are higher. A possible explanation for this could be that people in less deprived areas live longer, and therefore their populations are somewhat older and more at risk of surviving into states of dependency, whereas in the most deprived areas the mortality rate is higher... Another potential influence is where care is being provided. Those living in less deprived areas could be providing care for people in more deprived areas, where need is likely to be greater, which would counter any relationship with deprivation.”

5.3.4 Issues for response

Questions that will help shape the development of WIMD 2014 are listed below. They are not exhaustive, nor should they limit responses relevant to this domain.

- Subject to adequate data developments and quality, would you agree with the proposal to include an indicator on diagnosed chronic diseases?
- Subject to further investigation, would you agree with the inclusion of an indicator on “proportion of unpaid carers”?
- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

⁹ For further details on these issues, please refer to section 5.4 of the [Technical Guide](#) to GP Cluster Profiles, Public Health Wales Observatory, 2013

¹⁰ <http://www.ons.gov.uk/ons/rel/census/2011-census-analysis/provision-of-unpaid-care-in-england-and-wales--2011/index.html>

5.4 Education

The purpose of this domain is to capture the extent of deprivation relating to education, training and skills. It is designed to reflect educational disadvantage within an area in terms of lack of qualifications and skills. The proposed indicators capture low attainment among children and young people and the lack of qualifications in adults.

Indicators are combined using factor analysis to determine how much weighting each indicator should have within the domain.

5.4.1 Proposed indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. The proposed indicators are listed below. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report¹¹

Key Stage 2 Average Point Score (three year average) – This indicator was included in WIMD 2011. This indicator is based upon the results of teacher assessments for pupils being taught in the National Curriculum Year Group 6. It is not statutory for independent schools to provide this data so they are not included. At this time it is the most suitable indicator for attainment at primary level and is an early measure of educational deprivation. The data source for this indicator is the Pupil Level Annual School Census (PLASC) and National Data Collection (NDC), Welsh Government.

Key Stage 4 Capped Point Score (three year average) – This is a slight change to the WIMD 2011 indicator (average wider points score). The capped points score is the average points per 15 year old for all qualifications at all grades achieved up to the equivalent of 8 GCSEs (i.e. the 'best 8 GCSEs or equivalent'). All GCSEs and vocational qualifications approved pre-16 are included. This indicator captures attainment across all abilities. A capped points score is proposed as this minimises the impact of school policy on the number of qualification entries. The data source for this indicator is PLASC and the Welsh Examinations Database (WED), Welsh Government.

Key Stage 4 Level 2 Inclusive (three year average) – This is a new indicator and is intended to complement the capped points score indicator. This indicator measures the proportion of 15 year olds achieving the equivalent of 5 A*-C grades at GCSE (including maths and English/Welsh). This indicator is included as a measure of pupils completing compulsory school education with adequate numeracy and literacy skills. The Level 2 Inclusive and capped point score indicators will replace the Key Stage 4 wider point score as they measure complementary aspects of educational deprivation at the end of compulsory education. The data source for this indicator is PLASC and WED, Welsh Government.

Repeat Absenteeism Rate (three year average) – This is a change to the WIMD 2011 indicator (overall absenteeism for primary and secondary pupils separately). There is a recognised link between absenteeism and attainment. The collection of individual pupil absenteeism information means that it is now possible to consider pupils that are repeat absentees – and hence educationally deprived -rather than looking at overall absenteeism

¹¹ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

levels. The Welsh Government's current definition of a 'persistent absentee' is a pupil missing 20% or more of half day school sessions. Analysis has indicated that the number of 'persistent absentees' using the 20% threshold is too low for the purposes of calculating an appropriate indicator at small area level. The number of repeat absentees using a 15% threshold is considerably higher, and research by the Department for Education in England¹² concludes that once a range of pupil characteristics have been controlled for, pupils missing more than 15% of school sessions drop one grade in each of their GCSE, when compared to those that miss less than 15% of school sessions. Analysis has also shown that there is a strong correlation between a repeat absenteeism rate using a 15% definition and the current 20% definition for persistent absentees at small area level in Wales. It is therefore suggested that an indicator on the rate of pupils missing 15% or more of school sessions be used as a proxy for persistent absenteeism for the purposes of WIMD 2014. Data will be based on all pupils of statutory school age attending a maintained school. The data source for this indicator is PLASC, Attendance collection, Welsh Government.

Proportion of people not entering Higher Education aged 18-19 – Whilst a measure of the number of people not in employment, education or training would, conceptually, be a stronger measure of educational deprivation for young people, it is not possible to include this (as detailed on the next page). However, non-continuation to HE may be a reflection of lack of opportunities, and will impact on attainment in higher level qualifications (which is linked to economic activity and salary). Consideration was given to an indicator looking at the proportion entering HE given a level of prior attainment. However, this would require matching data for post-16 learners – the quality of such linked learner data has not yet been assessed at small area level, and it will not be possible to undertake this work prior to WIMD 2014. The data source for this indicator would be Young Participant Rates data from Higher Education Funding Council for England (HEFCE) and would measure those entering during 2005-06 to 2010-11 (academic years).

Number of Adults aged 25-64 with No Qualifications – This indicator was included in WIMD 2011. This is the only measure of educational deprivation amongst the adult population. Due to recent changes to the state pension age, this indicator will look at those aged 25-64. The data source for this indicator is the 2011 Census, Office for National Statistics.

5.4.2 Other indicators discussed

Key Stage 3 Average Point Score – This indicator was included in WIMD 2011. There are 2 proposed indicators for secondary attainment (Level 2 Inclusive and Capped Points Score) which are considered sufficient. Analysis has been undertaken which suggests that the removal of this indicator has little impact on the overall domain. The data source for this indicator would be PLASC and NDC, Welsh Government.

Early Years Indicators – Only two years of data is available for teacher assessments at the end of the Foundation Phase and therefore its suitability for the purposes of WIMD is yet to be determined. It was noted that a 'Start of school' indicator may be desirable although suitable data is not yet available. As the Early Years Development and Assessment Framework develops, the availability of suitable Early Years indicators will increase. This should be monitored for subsequent WIMDs.

¹² DFE-RR171 – A Profile of Pupil Absence in England

National Tests – Initial results from the newly introduced National Reading and Numeracy Tests (for those in years 2-9) were published in August 2013. It is therefore too early to determine the suitability of this data for an area based measure of deprivation in 2014 as a number of years of data is needed to properly assess suitability against the indicator criteria. However, this is potentially a rich source of data for subsequent WIMDs as all school pupils sit the test annually. Consideration will be given to how best to incorporate an indicator from the National Tests in future years.

Young people not in education, employment or training (NEET) – Conceptually, a measure of those not in education, employment or training (NEET) would be a suitable measure of educational deprivation. However, as the number of those who are NEET is collected from a sample survey, and the number of those who are NEET is relatively low, it is not possible to derive an indicator at a small area level. The data, at Local Authority level, can be sourced from the Annual Population Survey.

Adults with Level 4+ Qualifications – It was suggested that adults with degree level qualifications have an impact on the children within an area and could be viewed as leaders within a community. It could be argued that areas with a lack of people with Level 4 qualifications could be deemed deprived in terms of community leadership. However, it was noted that those lacking a degree could not necessarily be deemed deprived, especially due to choice (i.e. someone may have the ability to study at level 4 but choose not to). It was therefore deemed that this indicator would not be a measure of educational deprivation and should not be included. The data source for this indicator would be the 2011 Census, Office for National Statistics.

5.4.3 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you agree with proposals to drop Key Stage 3 Average Points Score?
- Do you agree with proposals for two Key Stage 4 attainment indicators?
- What are your views on changing the Overall Absenteeism indicators to one based on repeat absentees?
- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

5.5 Access to Services

The purpose of this domain is to capture deprivation as a result of a household's inability to access a range of services considered necessary for day-to-day living. This covers both material¹³ deprivation (for example not being able to get food) and social¹⁴ aspects of deprivation (for example not being able to attend afterschool activities).

The current measure of the access to services domain is not, like the other seven domains, a direct measure of deprivation that can be used on its own; rather it is a contributory factor that becomes important as an aspect of multiple deprivation. That is, poor access to services is a factor which can compound other types of deprivation that exist in an area.

As it stands, the domain currently only covers limited service accessibility issues, for example, it doesn't consider whether the journey could be made at any time or whether the service could be accessed without travelling (through the internet, phone, post).

In past WIMDs, the access measured has been the time taken to reach the service by bus and walking, to reflect that not all members of the household will be able to use private motorised transport. However following discussions we are now proposing to expand the modes of public transport covered to include trains (in addition to bus) and to incorporate private transport. Further details and rationale are provided under the Other and Outstanding issues sections below.

Within the Access to Services domain, factor analysis is used to determine the weightings of the constituent indicators.

5.5.1 Proposed indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. The proposed indicators are listed below. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report¹⁵

Food shops – previously included. The shop should be capable of providing basic provisions e.g. bread, milk. These items are required frequently and need to be within a short travel time.

GP Surgeries – previously included. This indicator covers day-to-day needs for primary health care. The points of interest dataset to be used for 2014 includes main doctor's surgeries or practice addresses, we will also consider including data on GP branch surgeries, which may be common in rural areas. In 2011, there were 479 main GP surgeries, and 219 branch surgeries. This is significant enough a number to warrant inclusion in the GP indicator. The data would of course need updating, and can be sourced from the NHS direct website.

(<http://www.nhsdirect.wales.nhs.uk/localservices/searchlocalservices.aspx?s=GPSurgeries>). This dataset includes information on opening times.

¹³ Material deprivation is having insufficient physical resources - food, shelter, and clothing – necessary to sustain a certain standard of life.

¹⁴ Social deprivation refers to the ability of an individual to participate in the normal social life of the community.

¹⁵ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

Primary Schools – previously included. Primary schooling is part of day-to-day living for most 4 to 11 year old children, and their parents/guardians (the indicator excludes nursery, special and independent schools). It is not proposed that the indicator covers school buses provided by local authorities due to the difficulties in including them, and the time restrictions in which they operate (e.g. they would not allow for travel home following after school activities). We propose to amend this indicator by linking to the Pupil Level Annual School Census (PLASC) and thereby restricting calculations to households with children attending non independent and special primary schools, as opposed to the previous approach of including all households. Distance to nearest school(s) would then be calculated and averaged within LSOAs for relevant households only. This approach is currently under investigation.

Secondary Schools - previously included. Secondary schooling is part of day-to-day living for many 11 to 18 year old children (the indicator excludes special and independent schools), and their parents/guardians. Please also see the above section on Primary Schools for details on exclusion of school buses, and the possibility of using PLASC to focus calculations on households with children attending non independent and special secondary schools only.

Post office – previously included. Many people in a community require weekly or more frequent access to a post office. This may include advice, assistance, bill payments, collecting benefits, mail and other services. There are now mobile offices. The data is available from the Post Office website (<http://www.postoffice.co.uk/>). This includes location and opening hours for each stopping point.

Public library – previously included. Libraries offer services in addition to book lending and are another part of the communications network with the public. Libraries will be included. We are currently looking at the feasibility of sourcing a national dataset of mobile library stopping points from the 22 local authorities.

Leisure centre – previously included. This indicator is intended to cover an individual's ability to access facilities important for health and well being. Data on locations will be sourced from the Sports Council for Wales.

Pharmacies – new proposed indicator. Typically used to maintain general health, and required by many for day-to-day living. This is considered a potentially useful addition to the domain since we can also cover dispensing GPs (common in rural areas).

Petrol stations – new proposed indicator. Required to run a car on a day-to-day basis. Would only be included in the calculations for average time by private transport.

5.5.2 Other indicators discussed

NHS Dentist – previously included, now proposing to exclude. Most people would only use every six months or less frequently, and therefore may continue using a non-local service (for example students or young professionals moving away from the parental home). Previously, this indicator has included NHS surgeries regardless of availability of spaces on the register. Most dental surgeries carry out a mixture of private and NHS work (for example children receive free dentistry), and data is not collated centrally on the availability of NHS spaces, which may vary from week to week.

Transport nodes – previously included, now proposing to exclude. Not in general required for day-to-day living. The public transport data will now include access to trains, which, alongside car travel, would be used for long distance travelling.

Access to digital services – The data available would only look at not spots, and may not include mobile broadband.

Accident and Emergency Hospitals – These are likely to have more infrequent use and so be less local than some other healthcare services. Their inclusion would be complicated by the existence of free hospital transport and ambulances, and consideration would need to be given to which category of A&E department to count.

Cash point machines – Cash is not always required for day to day living; other options: card, cheque, etc. are available. Post offices are included as an indicator, which can provide free cash back. The issue of cash is not only from cash machines, but more and more from cash back in retail premises.

Child care facilities – Mostly private provision, and is also highly influenced by the ability to pay for any childcare, rather than location. Therefore it was suggested as more an income or employment domain indicator. Another issue to consider would be where the facility would be i.e. near the home address, or near the work address. We would be unable to effectively identify “informal” childcare, e.g. friends and family.

Employment centres – Data are not readily available, and we wouldn’t be able to link individuals to their employment. More relevant to employment deprivation and there may be some overlap.

Legal and financial services – These were thought not to be local services, nor essential as part of “normal day-to-day” life.

5.5.3 Other issues

Evidence from the 2013-14 National Survey

In the current survey respondents are being asked to identify the method of transport used to access a number of service delivery points. As the survey responses become available from autumn 2013 onward, they will provide useful evidence in finalising the position on a number of currently unresolved matters.

Incorporating private transport

The domain group discussed in some detail the rationale for and against including private transport (by road travel) in the measurement. The preferred option chosen by the WIMD Steering Group is to calculate travel times by road, and combine these with public transport travel times in a weighted average. The rationale for this includes that, within domains, WIMD measures issues relating to the domain topic for the whole population, not just those in income poverty who may be unable to afford private transport. Most journeys in Wales are made by car and therefore this mode of transport cannot be ignored in our Access to Services domain.

We also note that England and Northern Ireland currently use road travel only in their equivalent domains and that Scotland weight together public and private transport with approximately two-thirds weighting on private transport.

Flexible public transport

The existence of other than timetabled public transport services was noted. Bwcabus, hail-and-ride, dial-a-ride and other flexible, yet public transport schemes exist, but a method of including such services has not been established. There are issues with obtaining Wales wide reliable data sets, therefore we will not be including flexible public transport for WIMD 2014.

5.5.4 Outstanding issues

Combining together private and public transport

We are currently investigating the use of 2011 Census data on car ownership to weight the average road travel times together with average public transport travel times. We acknowledge that vehicle ownership at a household level does not tell us whether individuals within the household are able to access the vehicle as and when needed. We will investigate whether we can adjust the car ownership data, for example by comparing number of cars with number of adults aged 17 and above in a household. This issue is discussed further in Annex E.

The first step in the process will be to calculate average travel times for each service by public and private transport separately. Indicators for the services covered are subject to factor analysis so that they can be combined into single numbers (or scores) per LSOA. For each LSOA, we propose to use Census data to determine weights for combining public and private transport measures. The precise order of these calculations is a technical issue currently under consideration, which would be fully detailed in the technical report for WIMD 2014.

Following further investigations and consultation responses, a final decision on whether and how to incorporate private transport will be taken by the WIMD steering group.

Calculating average travel times

We are proposing to update the methodologies used to calculate travel times for the 2013 indicators. These updates reflect the need to streamline the calculation approaches, new sources of data and the availability of automated, online services. The new techniques will be promoted as standardised approaches and as far as is possible, we will make them openly available so that the calculations can be repeated and used in more detailed investigation.

In both cases, we are moving away from calculating every possible journey combination between each household address and multiple service points. This approach was extremely complex, and highly demanding of computational and staff time. The replacement approach introduces the concept of a national map of travel times, showing travel-time contours for the whole country to their nearest facility. Having generated these contours (a 'surface' map on a grid-square basis), we can then simply tabulate the travel time at each household location in Wales. An example of the calculated surface for public transport travel times is shown on page 29 in figure 1.

Detailed explanation of the algorithms to be used in the calculation of the travel-time surfaces for private and public transport are given in Annex F. In each case, there are a number of parameters used in the calculations which can be adjusted. These include:

- Time of day/week for travel by bus/rail (example shown in Annex F used a weekday morning in October, arriving at the school destination at 9 a.m.);
- Averaging household data or using an appropriate LSOA centroid (averaging values for households preferred, as previously);
- Allowance for walking distance at the start or end of a journey (previously maximum walk of 800 metres);
- Buffer areas to catch spillage over the border with England (previously used 30 minutes travel time).

Alternative approach - floating catchment areas

The WISERD team at the universities of Cardiff, South Wales and Swansea have been undertaking research into a refinement of the approach for assessing service accessibility¹⁶. Their work has been to calculate a more generalised service access figure for each household that allows for a higher score where households have potential access to more than one service point. In order to achieve this, an estimate is required of the likely capacity for every service point, based on some known feature for that service (e.g. number of GPs in a practice, number of pupils on a school roll). This capacity figure is used to compute the likely catchment area by counting up the number of households in increasing distance bands away from the service. In this way, many households lie within the catchment of more than one service point. These households will achieve the highest scores.

Work is on-going to evaluate the potential application of this approach, including a detailed evaluation of a trial calculated dataset. A final decision will be made by the end of 2013. Key areas of discussion are around the selection of the capacity figure, and a proposed method of including public as well as private transport.

¹⁶ See article in WISERD News No. 6. Available at <http://www.wiserd.ac.uk/news/wiserd-news-magazine/>

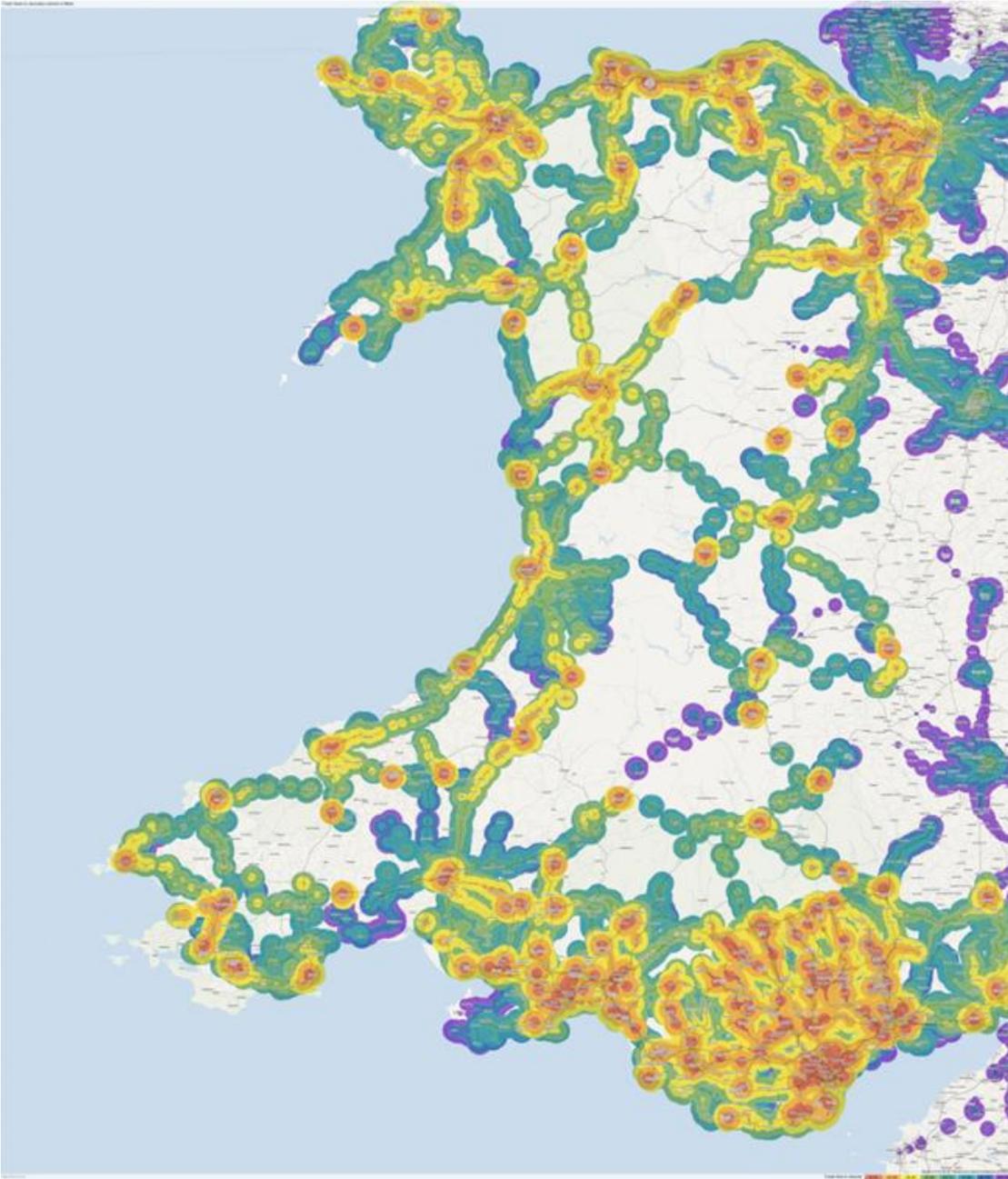


Figure 1 - Example of a travel-time surface for public transport. Red is shorter journeys, blue and purple are the longest.

5.5.5 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you agree with the changes, additions to and exclusions from the proposed list of services for WIMD 2014?
- Do you agree with proposals for combining public and private transport?
- What are your views on the selected calculation of travel times method?
- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

5.6 Community Safety

This domain is intended to consider deprivation relating to living in a safe community. It covers actual experience of crime and fire, as well as perceptions of safety whilst out and about in the local area.

Indicators are combined using factor analysis to determine how much weighting each indicator should have within the domain. This domain does not contain any sub-domains.

5.6.1 Proposed indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report¹⁷.

No changes are suggested for the police recorded crime¹⁸ indicators. Changes are proposed for the fire indicator. We propose to include an Anti Social Behaviour incidents indicator, if the data is good enough quality. If so, we intend to drop the youth and adult offender indicators. The proposed indicators for WIMD 2014 are listed below.

Police recorded burglary (two year average) – this indicator captures actual experience of crime. As in WIMD 2011, the incidents (crimes) are recorded by the four police forces¹⁹ in Wales (North Wales, Dyfed Powys, South Wales and Gwent). The incidents are assigned to the point at which they occurred and allocated to the appropriate lower super output area (LSOA).

Crime codes to be included:

- 28 A,B,C & D Burglary in a Dwelling;
- 29 Aggravated Burglary in a Dwelling;
- 30 A & B Burglary in a Building other than a Dwelling; and
- 31 Aggravated Burglary in a Building other than a Dwelling.

Police recorded criminal damage (two year average) – this indicator captures actual experience of crime. As in WIMD 2011, the incidents (crimes) are recorded by the four police forces¹³ in Wales (North Wales, Dyfed Powys, South Wales and Gwent). The incidents are assigned to the point at which they occurred and allocated to the appropriate lower super output area (LSOA).

Crime codes to be included:

- 56 A & B Arson;
- 58A Criminal Damage to a Dwelling;
- 58B Criminal Damage to a Building other than a Dwelling;
- 58C Criminal Damage to a Vehicle;
- 58D Other Criminal Damage;
- 58E Racially or Religiously Aggravated Criminal Damage to a Dwelling;
- 58F Racially or Religiously Aggravated Criminal Damage to a Building other than a Dwelling;

¹⁷ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

¹⁸ We will monitor the outcomes of HMIC's National Crime Data Integrity Inspection, the Public Administration Select Committee's Inquiry into Crime Statistics, and any other relevant work, and make amendments or caveat data accordingly.

¹⁹ NCRS definitions of police recorded crimes can be found at:

<https://www.gov.uk/government/publications/the-national-standard-for-incident-recording-nsir-counting-rules>

- 58G Racially or Religiously Aggravated Criminal Damage to a Vehicle;
- 58H Racially or Religiously Aggravated Other Criminal Damage; and
- 59 Threat or Possession with Intent to Commit Criminal Damage.

Police recorded theft (two year average) – this indicator captures actual experience of crime. As in WIMD 2011, the incidents (crimes) are recorded by the four police forces¹³ in Wales (North Wales, Dyfed Powys, South Wales and Gwent). The incidents are assigned to the point at which they occurred and allocated to the appropriate lower super output area (LSOA).

Crime codes to be included:

- 37/2 Aggravated Vehicle Taking;
- 39 Theft from the Person;
- 45 Theft from a Vehicle;
- 48 Theft or Unauthorised Taking of a Motor Vehicle; and
- 126 Vehicle Interference and Tampering.

Police recorded violent crime (two year average) – this indicator captures actual experience of crime. As in WIMD 2011, the incidents (crimes) are recorded by the four police forces¹³ in Wales (North Wales, Dyfed Powys, South Wales and Gwent). The incidents are assigned to the point at which they occurred and allocated to the appropriate lower super output area (LSOA).

Crime codes to be included:

- 1 Murder
- 2 Attempted Murder
- 3 A, B & C Threat or Conspiracy to Murder
- 4/1 Manslaughter
- 4/2 Infanticide
- 5 A B & C, Wounding or Other Act Endangering Life
- 6 Endangering a Railway Passenger
- 7 Endangering Life at Sea
- 8F, G & K, Other Wounding
- 8L, 9A Harassment
- 8H & J Racially or Religiously Aggravated Other Wounding
- 8M & 9B Racially or Religiously Aggravated Harassment
- 11 Cruelty to and Neglect of Children
- 12 Abandoning Child Under Two Years
- 37/1 Causing Death by Aggravated Vehicle Taking
- 105A Common Assault
- 105B Racially or Religiously Aggravated Common Assault
- 34A Robbery of Business Property
- 34B Robbery of Personal Property
- 81 Firearms Act 1968 and other Firearms Act

Fire incidence (two year average) – this indicator captures actual experiences of fire. In WIMD 2011, incidents of primary fires with the addition of “derelict vehicle” fires were collected as counts by LSOA. Secondary “derelict vehicle” fires were only included if available at the LSOA level. Given data developments, all fires are now geo-coded, and the domain group propose to include all fire incidents for WIMD 2014.

Primary fires include “all fires in buildings, vehicles and outdoor structures or any fire involving casualties, rescues, or fires attended by five or more appliances”. Secondary fires are “the majority of outdoor fires including grassland and refuse fires unless they involve casualties or rescues, property loss or five or more appliances attend”.

Anti-social behaviour and offenders

An anti-social behaviour incidents indicator has been proposed for inclusion in WIMD, rather than the youth and adult offender indicators (since the latter have previously been included as a proxy for anti-social behaviour in the community). Two options are described below, as the anti-social behaviour data is currently being investigated for suitability.

Preferred option: Anti-social behaviour incidents – this indicator links to experience of anti-social behaviour. An anti-social behaviour indicator has been considered for previous WIMDs, although there were concerns that the data was not comparable across police forces. From 2011-12, a National Standard for Incident Recording (NSIR²⁰) was introduced to align reporting of anti-social behaviour incidents. However, the quality of this data has not yet been assessed. The Office for National Statistics warn that, while incidents are recorded under NSIR in accordance with the same ‘victim focused’ approach that applies for recorded crime, these figures are not accredited National Statistics and are not subject to the same level of quality assurance as the main recorded crime collection. Incident counts should be interpreted as incidents recorded by the police, rather than reflecting the true level of victimisation. Other agencies also deal with anti-social behaviour incidents (for example, local authorities and social landlords); incidents reported to these agencies will not generally be included in police figures. The data for Welsh forces is currently being collected for analysis by the WIMD team, and should it be of sufficient quality, would be the preferred option for inclusion in WIMD 2014.

Alternative option: Inclusion of adult offenders and youth offender indicators

The indicators included would be as for WIMD 2011, and act as a proxy for anti-social behaviour in the local community.

Percentage of adult offenders (two year average) – this indicator links to perceived safety and likelihood of anti-social behaviour.

The offenders included are those dealt with by those offender teams, and are aged 18 and over. Where a person had more than one address during the period each address was counted provided it was in a different LSOA. Where there were multiple offenders at a single address a weight of 2 was applied. Offenders residing in institutions were included in the count if a residential address was provided.

Percentage of youth offenders (two year average) – this indicator links to perceived safety and likelihood of anti-social behaviour. This data is sourced from the Police National Computer (PNC).

Youth offenders are those that have:

- received a conviction, reprimand or warning (so excludes Penalty Notices for Disorders) processed by any regional police force in England or Wales or by British Transport Police (so excludes other prosecuting agencies);

²⁰ <https://www.gov.uk/government/publications/the-national-standard-for-incident-recording-nsir-counting-rules>

- at that time of their conviction, reprimand, or warning were aged between 10 - 17 (so excludes offenders under 18 when they committed the offence but 18 or over at the time of their conviction, reprimand, warning; and also excludes offenders with no valid date of birth);
- a valid address, recorded by the police, in Wales even where the police force or the offence were outside Wales (so excludes offences dealt with by Welsh police forces by offenders who have an address outside Wales or no valid address recorded for that case);
- committed a known Home Office offence code (so excludes occasions where the primary offence was a breach, non England & Wales offence or an unknown offence).

5.6.2 Other indicators discussed

Drug Offences

This indicator was thought to measure policing priorities rather than actual deprivation levels, with noticeable spikes following festivals or similar events. Therefore this was rejected for inclusion in WIMD.

Sexual Offences

The report “Sexual Offending Overview”²¹ examines information from the Crime Survey for England and Wales plus data from the police and Criminal Justice System. According to the Survey (of 16-59 year olds), females from households in the lowest income bracket (under £10,000 per year) showed an increased risk of sexual offences victimisation (3.8% compared to 3% for all females). But only 15% of female victims of the most serious sexual offences (covering all rape, attempted rape and sexual assault offences) said that they had reported the incident to the police, suggesting that Police Recorded Crime would provide only a partial picture of these offences, making the indicator unsuitable for WIMD.

5.6.3 Outstanding Issues

Road accidents

Being involved in a road accident is a negative experience, but the effect of merely living in an area with a high prevalence of accidents may also affect perceptions of safety. The domain group discussed evidence suggesting that pedestrian and cyclist casualties from road accidents were linked to deprivation. Although the initial view was that this data is not suitable for WIMD due to small numbers at LSOA level, further work is required to investigate numbers over several years for the most deprived LSOAs (according to this measure) before ruling this out. We would like to include pedestrian/cyclist casualties only, but since we expect numbers to be too small, would welcome views on whether to include all road accidents as an indication of potential community safety issues for local residents (perhaps removing motorway accidents).

²¹ <https://www.gov.uk/government/publications/an-overview-of-sexual-offending-in-england-and-wales>

5.6.4 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you agree with the preferred approach of including anti-social behaviour incidents (if data are robust) with the alternative being use of offender location data (as for WIMD 2011)?
- What are your views on the use of road accidents as a new indicator, assuming number of pedestrian and cyclist casualties are not robust enough for WIMD?
- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

5.7 Physical Environment

The purpose of this domain is to measure factors in the local area that may impact on the wellbeing or quality of life of those living in an area.

Environmental deprivation is generally not correlated with social or economic deprivation in Wales (ref: Walker et al 2003). This domain does not capture aspects of deprivation such as health inequalities (this is an objective of the Health domain). Indicators were chosen that were judged to indicate an increased potential for reduced quality of life, and that were readily available.

The domain is broken down into 3 sub-domains. Each sub-domain is given an equal (1/3) weighting. The air quality sub-domain contains two indicators (air concentration and air emissions) which are equally weighted within the sub-domain.

5.7.1 Proposed Indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. The proposed indicators are listed below. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report²².

Proportion of Households at Risk of Flooding – A flood risk indicator was included in WIMD 2011. Flood risk measures the proportion of households at risk of flooding from rivers and the sea (but not surface water flooding). The risk is based on predicted frequency rather than the level of damage caused by flooding. The numbers of households at significant risk of flooding are given higher weighting than those at lower risk.

As previously, it is proposed that for WIMD 2014 different levels of risk will be taken into account. The risk assessments will be changing in 2014 to fall in line with insurance company definitions and so risk categories will change from:

- 1 in 75 or fewer
- 1 in 75-200
- 1 in 200+

To:

- 1 in 30 or fewer
- 1 in 30-100
- 1 in 100-1000
- 1 in 1000+

It is proposed that, if available, the new risk categories will be used for WIMD 2014. New weights will need to be agreed in order to combine the 4 risk categories into one indicator. If these are not available in time, then the existing risk categories will be used.

The data source for this indicator is from the National Flood Risk Assessment (NaFRA), Natural Resources Wales.

²² <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

Estimated Air Quality score (two separate indicators on Air Concentrations and Air Emissions) - These were included in WIMD 2011. They are created using measurements of pollutants that could have negative effects on human health and/or the environment based on the best medical and scientific understanding and are proposed as a proxy measure of the quality of the surrounding environment. Poor air quality suggests proximity to certain activities such as traffic, domestic combustion and industrial sites – activities that could have a negative impact on quality of life, the local environment and health.

Minor technical changes to these indicators are proposed as a result of the new Air Quality Regulations. These changes are outlined in Annex G. The data source for the indicators is the National Atmospheric Emissions Inventory via Natural Resources Wales.

The Air Concentrations Indicator is calculated using a combination of concentration data (modelled on air emission data) and Air Quality Management Areas.

Air emissions data provides a good set of complimentary data covering pollutants not included in the Air concentration indicator.

Proximity to waste disposal and industrial sites Score – The Proximity to waste disposal and industrial sites indicator was used in WIMD 2011. No changes are proposed. The data source for this indicator is Natural Resources Wales.

5.7.2 Other indicators discussed

Proximity to a Natural Green Space – Natural Green Space is considered to have a positive influence on people's wellbeing. Consideration was given to an indicator looking at the proportion of households within 300m of an Accessible Natural Green Space (ANGS) excluding private gardens. ANGS maps are currently being developed by Natural Resources Wales – maps of potential ANGS have been produced, and these will be reviewed and amended by local authorities during the next year. As this work is still at an early stage, it is not yet possible to determine the suitability of this data as a potential indicator for WIMD. However, this work will be monitored and consideration given to including a green spaces indicator in subsequent WIMDs.

Noise pollution – This indicator would capture all sources of noise which would deprive people of a good environment in which to live. This indicator was considered for inclusion in previous indices, but rejected on the ground of a lack of an appropriate data source. Whilst progress has been made on the coverage of this data, it is still not complete. Also, there is some overlap with the proximity to waste disposal/industrial sites indicator.

Fly tipping – Fly tipping has a negative impact on the physical environment and deprives people of a good environment in which to live. This indicator was considered for inclusion in previous indices, but rejected on the ground of a lack of an appropriate data source for small areas. This is still the case.

Surface Water Flood Risk - The Environment Agency are currently updating the Flood Map for Surface Water for all of England and Wales. This work is being carried out to support the Lead Local Flood Authorities and to meet mapping requirements within the

Flood Risk Regulations. There are currently no plans to keep this information updated on a regular basis in Wales and so this doesn't meet the required criteria for WIMD. This work should be monitored for inclusion in future WIMDs.

Sewer Flood Risk – An indicator on the proportion of properties at risk of internal sewer flooding was considered. Preliminary assessment of the data has found that the proportion of properties at risk in each LSOA is very small across Wales. This does not meet the required criteria for WIMD and was not considered a suitable indicator for WIMD.

5.7.3 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Do you have any comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

5.8 Housing

Conceptually, the purpose of a housing domain is to capture deprivation through lack of adequate housing, in terms of housing physical condition, living conditions and availability.

However, the lack of appropriate data means that it is not possible to fully measure housing deprivation according to this definition.

5.8.1 Proposed indicators

The indicators used in WIMD 2011 were reviewed, together with those indicators rejected for WIMD 2008 (when the last consultation took place). Potential new indicators were also discussed. The proposed indicators are listed below. Full technical information on the existing indicators is available in the WIMD 2011 Technical Report²³.

Overcrowding - Percentage of the population living in overcrowded households. Households that are overcrowded are considered deprived in terms of access to suitable/quality housing.

This data is available from the 2011 Census at LSOA level. Two occupancy ratings are available: room occupancy and bedroom occupancy. The definitions of overcrowding are fully explained on the ONS website (2011 Census metadata)²⁴. It is proposed that an indicator based on bedroom occupancy data is used for WIMD 2014 –in line with methods used in other household surveys. In the past, all student households were excluded from the overcrowding (rooms) data. Given the definition of overcrowding using bedrooms, excluding all student households is no longer considered necessary. Although the Census is not an ideal source for a WIMD indicator (as it is not regularly updated), there is a shortage of small area level data on housing and therefore it is considered appropriate in this case.

Quality (proxy) – See below under Outstanding Issues.

5.8.2 Other indicators discussed

Lack of Central Heating – This indicator had been included in previous WIMDs. Although data on the lack of central heating is available from the 2011 Census, this is no longer considered a suitable indicator of housing deprivation. Homes may have a central heating system but this does not mean that they are able to afford to run it. Its performance may be inadequate and inefficient. Also, only around 2% of households in Wales now lack central heating.

Homelessness - Homelessness can be considered to be the most extreme form of deprivation in relation to access to housing. This would be a desirable indicator to include however data relating to homelessness is currently only available at Local Authority level. Data suitability will be reassessed for subsequent WIMDs.

²³ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

²⁴ <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>

Housing Affordability - Deprivation in terms of lack of access to adequate housing. This indicator would look at a ratio of income to average housing costs. However, this is not considered an appropriate small area measure – people often seek housing within an area larger than one LSOA. Also, such an indicator would require the use of household income estimates at a small area level – currently only available at MSOA.

Fuel Poverty – This is defined as households whose fuel costs account for 10% of their income, after housing costs. Data is not currently available at LSOA level, and there are also close links with the income domain. An energy efficiency type indicator may be a more suitable indicator.

Evictions/Repossessions – Data is not available at the required small area level and the same issues as for housing affordability apply to this indicator. It is therefore deemed unsuitable for inclusion.

Housing quality – A measure of housing quality such as proportion of homes meeting the Welsh Housing Quality Standard (WHQS) may be appropriate as a measure of housing deprivation (though this only covers social housing). However, there is currently a lack of data on this topic for the whole housing stock due to the lack of a recent national property survey in Wales. Future developments with regards a property survey should be monitored – should another housing property survey take place, consideration should be given to modelling results to small area level.

5.8.3 Outstanding issues

There is a lack of suitable data at small area level for the Housing domain. Information on housing quality is not available, however a proxy could be included.

Our preferred option would be to use Standard Assessment Procedure (SAP) ratings as a broad proxy for Housing quality. Homes with poor energy efficiency performance are more difficult/ expensive to heat. The Welsh Government is currently considering the potential of Energy Performance Certificate (EPC) information. An EPC is required for properties when constructed, sold or let. The EPC provides details on the energy performance of the property and what can be done to improve it. Should the work on considering the potential of EPC information go ahead, the Welsh Government will be assessing the suitability of SAP ratings from the EPC data – in terms of coverage, consistency and whether the data is up-to-date. If investigations conclude that the data is suitable, the inclusion of an indicator on energy efficiency is proposed.

5.8.4 Issues for response

There are specific questions that will help shape the development of WIMD 2014 listed below. They are not exhaustive, nor should limit any response that is relevant to this domain.

- Is it appropriate for this domain to contain only one (overcrowding) indicator if that is all that is available?
- Do you have any other comments on proposed / rejected indicators, or any additional suggestions (bearing in mind our indicator criteria)?

6 Child Index and other potential indexes

6.1 Child Index

In 2008 a separate WIMD Child Index was published for the first time and this was updated in 2011. At present, the Child Index is a cut-down version of the full Index - it includes selected indicators from the overall WIMD index (those that are relevant to children). The Child Index is an official measure of relative deprivation for small areas in Wales for children and it was developed as a tool to identify and understand deprivation in children in Wales. Further information about the Child Index can be found here: <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/?lang=en>

We are considering the long-term future of the Child Index. As it is only derived from indicators already present in the main WIMD it does not necessarily include the best available indicators of child deprivation for some areas (e.g. health). To develop the child index as more of a stand alone measure with appropriate indicators and domains would require considerable extra resources.

To our knowledge, recent use of the Child Index has been limited – particularly since the introduction of the annual publication of WIMD indicator data on StatsWales. We would therefore be interested in hearing more about how the Child Index (in its current format) is used.

We propose to continue to publish the Child Index in its current format – in early 2015 as a follow on from WIMD 2014. We will also then consider the feasibility of providing an age breakdown in the annual publication of WIMD indicator data on StatsWales as a potential alternative approach. Advances in data linkage also offer the potential for further analyses of data on children in future.

6.2 Other potential indexes

Our 2007 consultation asked for views on potential sub-indexes, and responses suggested interest in an older people's index. The 2009 consultation picked up on this again, asking: whether such an index would be useful; what definition of "older person" would be most useful; and whether indicator data shown by age would meet users' needs. There was some interest in the option of an index, but in general respondents thought that further analysis of underlying indicator data should be prioritised, which could encompass different definitions of older people. As noted above, we will consider the feasibility of providing an age breakdown in the annual indicator data.

In the same (2009) consultation process, some respondents noted the relative weakness of WIMD in locating rural deprivation, suggesting either the construction of a rural index or more rural-specific indicators. Our response to the consultation stated that:

Although we recognise that rural deprivation is an important issue, construction of a Rural Index will not form part of the WIMD work plan. In rural areas, deprived people tend to be more geographically dispersed than in urban areas. Hence, although deprivation exists in rural areas, WIMD is not a suitable tool for locating it. Essentially, any pockets of deprivation in rural areas tend to be on a considerably smaller scale than even the small-scale geography at which WIMD is produced,

and so their contribution to averages in these areas tends to be submerged by larger-scale, less-deprived populations. Therefore, even if more rural-specific indicators were to be used, WIMD area-based ranking will not uncover the deprivation which is scattered amongst rural Lower-Layer Super Output Areas.

However, we proposed to address the issue of rural deprivation through the analysis of the underlying WIMD indicators, which have since been grouped according to their National Statistics rural-urban classification as part of the StatsWales dissemination. This allows a fuller understanding of differences in the type and extent of deprivation in areas of different population densities.

6.3 Questions for consideration

- Please describe your uses of the Child index in its current format
- In the longer term, should analyses of underlying WIMD data (including by age when possible) be prioritised over producing a Child Index in its current form?

7 Next Steps

This consultation exercise begins on 28 November 2013 and **27 February 2014 is the deadline for responses.**

A consultation webinar (online consultation seminar) will be held on 16 December in English, and 17 December in Welsh. This will include a presentation on the proposals together with an opportunity to ask questions. For further details on the webinars and to register, please go to:

<http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/consultation-webinar/?lang=en>

Responses to this consultation will be fed back to topic domain groups, the WIMD advisory group and the WIMD steering group. Membership of these groups can be found in Annex C.

A summary of responses to this consultation will be published in spring 2014. Analysis and production of the updated WIMD will be undertaken throughout summer of 2014, with final publication of the fully updated WIMD planned for late 2014.

We would welcome any other comments on the proposals for WIMD 2014 not already covered.

7.1 Question for consideration

- Do you have any other comments on proposals for WIMD 2014 (not already covered) or future work on WIMD?

Annex A: Methodology

For each LSOA, ranks are calculated for 8 domains (or kinds) of deprivation, with the most deprived LSOA ranked 1 and the least deprived ranked 1909. The 8 domains of deprivation included in WIMD are:

- income
- health
- community safety
- housing
- employment
- education
- geographical access to services
- physical environment

Further information on the techniques used in WIMD can be found in the WIMD 2011 technical report²⁵.

Construction of WIMD

Step 1: Data Collection

Administrative and Census data is collected from various official sources and allocated to each of the LSOAs. Administrative data is specifically used due to the robustness that it offers at a small area level. Indicators have been reviewed by domain groups who have specific knowledge about the data sources and potential indicators.

Step 2: Matching data to LSOA level or postcodes

Data are generally not allocated to an LSOA as part of the collection process. Different data sets vary in their level of geographic coding and so different approaches are required. Data sets fall into one of the following categories, shown in order of preference in terms of data quality:

- i. data are geocoded and can be allocated to LSOAs exactly using a Geographic Information System (GIS);
- ii. data contain the full postal address and can be allocated exactly to LSOAs using ONS lookup tables;
- iii. data are coded with some other small area geography (e.g. only postcode) and these can be allocated to LSOAs in some way, using a best fit method if necessary (in a minority of cases)

If the individual records of data are not of a sufficient standard to match to an LSOA, after data cleansing, then an apportionment technique is used (see Appendix A in the WIMD 2011 technical report).

Step 3: Construction of indicators

Some indicators require further calculations to become a WIMD indicator. Many of the indicators are expressed as rates (e.g. police recorded criminal damage rate) and are calculated by dividing the number of count of criminal crimes at LSOA level by the appropriate population estimate for that LSOA.

Three of the indicators included in the health domain use age sex standardisation. The aim is to correct the indicators for different age and sex distributions amongst LSOA populations. For example, one might expect to observe a higher rate of deaths in an aging population than in one consisting predominantly of young families. Standardisation attempts to adjust for these differences in population, so areas can be directly compared.

²⁵ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

For further information see the technical paper presented to the Health Domain group (3 May 2011)²⁶.

Step 4: Constructing the domain indices

The preferred method for constructing the domain indices is factor analysis, as this seeks to find a single underlying factor for the domain. Currently, the method of construction varies dependent on the data that is available. The methods are outlined below, in order of preference.

a. Factor analysis

In the Health, Education, Access to Services and Community Safety domains, the statistical technique factor analysis is used to combine the deprivation indicators. Factor analysis is a method for assessing the extent to which a set of indicators may be measuring the same underlying construct or factor. By analysing the correlation between indicators it is possible to make inferences about the common factor and, as a result, estimate a 'factor score' (used as the domain index) for each LSOA. Factor analysis cannot be carried out with 2 indicators or less. For further information see Appendix C of the WIMD 2011 technical report²⁷.

b. Domains with 2 indicators or less

The Income and Employment domains both contain one indicator, of de-duplicated counts, which can be summed and expressed as a percentage of the population. For WIMD 2014, it is proposed that only one indicator be included in the Housing domain. Therefore, there is no requirement for factor analysis as these domains already contain a single measure.

c. Sub domains

The indicators in the Physical Environment domain are treated as sub domains, which are transformed into scores in the same way as domains are (see step 4), then combined together using equal weights.

The Physical Environment domain is made up of four indicators which form three sub domains. The percentiles for air quality and air emissions are averaged to create the third sub domain. Factor analysis cannot be used as there is no single underlying factor for Physical Environment.

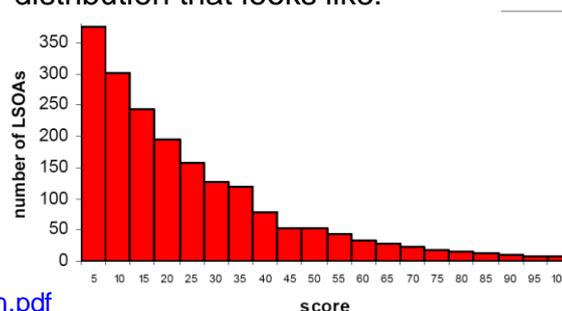
Step 5: Transformation of the indices

In order to reduce the extent to which deprivation in one domain is cancelled out by lack of deprivation in another domain, an exponential transformation is applied to each domain index:

$$T = -23 \ln \left(1 - R \left[1 - e^{-\frac{100}{23}} \right] \right)$$

Where R is the rank of the LSOA divided by 1909. The transformation gives us scores between 0 and 100 for each individual LSOA, for each of the domains.

The transformed data has a distribution that looks like:



²⁶ <http://wales.gov.uk/docs/statistics/meeting/110516healthinden.pdf>

²⁷ <http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/2011-technical-report/?lang=en>

For further information see Appendix D of the WIMD 2011 Technical report²⁷.

Step 6: Combination of the Domains

The index is then constructed from a weighted sum of the scores for each domain. The weights reflect the importance of the domain as an aspect of deprivation, and the quality of the indicators available for that domain. For WIMD 2014, we currently intend to use the same as those used in WIMD 2011. These are listed below.

Domain	Weight
Income	23.5 %
Employment	23.5 %
Health	14.0 %
Education	14.0 %
Access to services	10.0 %
Community Safety	5.0 %
Physical Environment	5.0 %
Housing	5.0 %

The weighted scores are then ranked, for each LSOA.

Annex B: Geographical Unit

Geographic unit

It is proposed that the geographic areas used in the calculation of WIMD 2011 are the 1,909 Lower layer Super Output Areas (LSOAs).

LSOAs were used as the geographic unit in WIMD 2005, 2008 and 2011, and were designed for the reporting of small area statistics. LSOAs are also in line with the approach used by the other three UK nations for their indexes.

Super Output Areas

Following the 2001 Census of Population, the Office for National Statistics developed a geographic hierarchy called Super Output Areas (SOAs). They were designed to improve the reporting of small area statistics in England and Wales. Where available, official statistics are now routinely published for the SOA geography.

There are three layers of SOAs: Lower layer, Middle layer, and Upper layer. This was because disclosure requirements meant that some sets of data could be released for much smaller areas than others. So to support a range of potential data requirements it was decided to create these three SOA layers. These are the constraints.

- A Lower Layer SOA must have a minimum population of 1,000. The mean size of all the Lower Layer SOAs must be close to 1,600. They are built from groups of Census OAs (usually between four and six).
- A Middle Layer SOA must have a minimum population of 5,000. The mean size of all the Middle Layer SOAs must be close to 7,200

Changes between 2001 Census and 2011 Census

SOA boundaries are revised following each Census, to take into account changes in the population. WIMD 2014 will be the first Welsh Index of Multiple Deprivation to use the revised boundaries following the 2011 Census. In the 2001 Census there were 1,896 LSOAs, 49 of these have been discontinued and 61 new LSOAs have been created.

There have been changes to LSOA boundaries where populations have:

- become too big, the LSOA has been split into two or more areas;
- become too small the LSOA/MSOA has been merged with an adjacent one; or
- changed significantly, so there has been a combination of the two cases above.

In some cases there have also been changes following the Output Geography Consultation ran by the Office for National Statistics in 2010. Where LSOAs have changed, the old code has been deleted and a new code has been assigned. To ensure ease of use, English and Welsh names have been allocated to each of the LSOA codes. Each LSOA name has been determined by the Local Authority to which the LSOA belongs.

The following table gives the number of Lower layer SOAs in each Local Authority in Wales.

Local Authority	Number of Lower Layer SOAs
Isle of Anglesey	44
Gwynedd	73
Conwy	71
Denbighshire	58
Flintshire	92
Wrexham	85
Powys	79
Ceredigion	46
Pembrokeshire	71
Carmarthenshire	112
Swansea	148
Neath Port Talbot	91
Bridgend	88
Vale of Glamorgan	79
Rhondda Cynon Taf	154
Merthyr Tydfil	36
Caerphilly	110
Blaenau Gwent	47
Torfaen	60
Monmouthshire	56
Newport	95
Cardiff	214

Electoral divisions

Electoral divisions (previously known as wards) were the basic geographical units used for the Welsh Index of Multiple Deprivation 2000, but there were disadvantages with this approach.

Electoral divisions vary greatly in size, from around 1,000 people to 20,000 (in Wales). This is not ideal for making comparisons throughout Wales, and it also means that data which can safely be released for larger electoral divisions may not be released for smaller electoral divisions due to disclosure rules (that is, the need to protect the confidentiality of individuals).

The boundaries of electoral divisions change. This creates problems when trying to compare data from different time periods. ONS decided to develop a range of areas that would be of consistent size and whose boundaries would not change regularly.

Annex C: Governance Group Membership

This Annex provides a list of all members involved in the development of the proposals for WIMD 2014. Please note that not all members attended every meeting.

WIMD team

Luned Jones – WG Social Justice Statistics
Nia Jones – WG Social Justice Statistics
Craiger Solomons – WG Social Justice Statistics
David Hunt – WG Social Justice Statistics
Annabel Williams – WG Social Justice Statistics

Steering Group Membership

Steve Marshall (Chair) – WG Chief Social Research Officer
Glyn Jones – WG Chief Statistician
Jonathan Price – WG Chief Economist
Mike Harmer – WG Social Justice Research
Gary Haggaty – WG Deputy Director, Rural Affairs
Terri Thomas – WG Agricultural Policy
Eleanor Marks – WG Deputy Director, Communities Division
Paul Dear – WG Community and Third Sector Policy
Michael Curties – WG Communities First Unit
Charles Coombs – WG Policy Support, FCS
Bethan Bateman/Beverley Morgan – WG Tackling Poverty Unit
& WIMD Team representatives

Advisory Group Membership

Rachel Dolman – WG Data Collection Team
David Fone – Cardiff University
Nathan Lester – Public Health Wales
Susan Williams – Natural Resources Wales
Andrew Stephens – Data Unit Wales
Vicki Doyle – Caerphilly County Council
Scott Orford – WISERD
& WIMD Team representatives

Domain Group Membership

Income & Employment

John Morris – WG Economic & labour Market Statistics
Sara Ahmad – WG Assistant Economist
David Blackaby – Swansea University
Stephen King – Swansea County Council
Stuart Grant – DWP
& WIMD Team representatives

Health

Cath Roberts – WG Public Health Stats
Gwyneth Thomas – WG Primary & Community Health Stats
Chris Roberts – WG Health Research
Chris Tudor-Smith – WG Health Improvement Division
Neil Riley – WG and Public Health Wales
Nathan Lester – Public Health Wales
Gareth John – NHS Wales Informatics Service
Gareth Williams – Cardiff University
Ceri White - Cancer Intelligence Surveillance Unit
& WIMD Team representatives

Education

Steve Hughes – WG School Statistics
Abigail Woodham – WG School Statistics
Chris Williams – WG Post 16 Education Statistics
Martin Parry – WG Education Policy
Andy Milne – WG Policy - School Information & Improvement Branch
Mike Jones – Swansea County Council
Sioned Cardew Richardson – Estyn
Chris Taylor – Cardiff University
& WIMD Team representatives

Community Safety

Gareth Hewitt – WG Head of Substance Misuse Treatment Service
Helen Griffiths – WG Fire and Armed Forces Branch
Phillip Davies – Youth Justice Board Cymru
Helen Innes – Universities Police Science Institute
Brett Davis – Statistician for South Wales Police
& WIMD Team representatives

Physical Environment

Rhiannon Caunt – WG Housing Statistics
James Morris – WG Flood and Coastal Risk Management
Charlotte Gibson – WG Energy Efficiency & Community Energy Policy Lead
Barbara McLean – WG Sustainable Futures Senior Research Officer
Julie Boswell – Natural Resources Wales
Helena Sykes – Natural Resources Wales
Pete Frost – Natural Resources Wales
& WIMD Team representatives

Housing

Rhiannon Caunt – WG Housing Statistics
Sara James – WG Senior Research Officer Housing
Steve Palmer – WG Housing Strategy
Amanda Oliver – Cymru Community Housing
Steve Wilcox – York University
Sue Finch – Welsh Local Government Association
Bob Smith – Cardiff University
& WIMD Team representatives

Access to Services

Steve Marshall (Chair) - WG Chief Social Research Officer
Stuart Neil – WG Agricultural Statistics
Bill Oates – WG Geography and Technology
Henry Small – WG Transport Statistics
Terri Thomas – WG Agricultural Policy
Natalie Grohmann – WG Transport Policy
Dianne Greaves – Powys County Council
Gareth Phillips - WG Geography and Technology
& WIMD Team representatives

Annex D: WIMD 2011 Indicators

Income

- percentage of those in any of the following categories: in receipt of income-related benefits; in a household receiving Tax Credits with a dependent child and an income less than 60% of the Wales median; a NASS-supported asylum seeker.

Employment

- percentage in receipt of employment-related benefits

Health

- cancer incidence
- all-cause death rate
- percentage of live single births < 2.5kg
- limiting long-term illness

Education

- Key Stage 2 average point scores
- Key Stage 3 average point scores
- Key Stage 4 average point scores
- percentage of people not entering higher education age 18-19
- percentage of adults aged 25-59/64 with no qualifications
- percentage primary school half day absence
- percentage secondary school half day absence

Community Safety

- percentage of adult offenders
- police recorded burglary
- police recorded criminal damage
- fire incidence
- police recorded theft
- police recorded violent crime
- percentage of youth offenders

Access to Services

- mean bus and walking journey time to NHS dentist
- mean bus and walking journey time to food shop
- mean bus and walking journey time to GP
- mean bus and walking journey time to leisure centre
- mean bus and walking journey time to library
- mean bus and walking journey time to Post Office
- mean bus and walking journey time to primary school
- mean bus and walking journey time to secondary school
- mean bus and walking journey time to transport node

Housing

- percentage of population in households with no central heating
- percentage of population living in overcrowded households

Physical Environment

- air emissions
- air quality
- flood risk
- proximity to waste disposal and industrial sites

Annex E: Access to Services - Combining public and private transport travel times

As outlined under “Outstanding issues” in the Access to Services chapter, we are currently investigating the use of 2011 Census data on car ownership to weight the average road travel times together with average public transport travel times. It should be noted that other UK countries’ deprivation indexes either do not measure access by public transport, or apply a single weighting (of one third) to public transport travel.

Our preference is for weights to be applied at an LSOA level, reflecting the considerable variation that may exist within wider areas, for example, Local Authority or national level (also see table towards end of this annex). This suggests the use of Census data to allow for robust LSOA figures. Numbers of licensed vehicles have been changing at a slower rate since 2007 (after showing steady increase for more than a decade), suggesting that using Census data from 2011 for a 2014 index would be acceptable since we are not in the midst of a large increase in vehicle stock. The 2011 Census included a question on car/van ownership and on travel to work, with wording as shown below. We have ruled out the latter question for our purposes since we are concerned with travel wider than commuting to work, and the data provides no indication of usual mode of transport for unemployed people or those working from home (around a third of people).

We acknowledge that car/van ownership at a household level does not tell us whether individuals within the household are able to access the vehicle when needed. We will investigate whether we can adjust the vehicle ownership data to better reflect access to the vehicle, for example by comparing number of vehicles with number of adults aged 17 and above in a household.

It should be noted that the National Survey for Wales asks whether respondents have the use of a car for activities such as visiting local shops or going to the doctor. The annual sample size does not allow for robust data for LSOAs, but may be useful to indicate disparity between individuals’ access to, and household ownership of a car. In 2011/12, 79% of adults said that they had the use of a car, which compares to 77% of households owning at least one car/van according to the 2011 Census. Although patterns may vary by area, at a Wales level, this does not suggest that there are a large number of adults unable to access a vehicle, despite living in a household owning one or more vehicles.

We would seek to use National Survey and other contextual data on use of public transport to validate findings from our Census analysis and to finalise the weightings to be used in combining public and private transport modes.

Analysis of the likely impact of this change in approach on the index is underway. The sensitivity analysis we can conduct at this point is limited to examining data on travel times compiled for the National Transport Plan (rather than WIMD 2011), which provide figures for public and private transport to selected services (fewer than those proposed for inclusion in WIMD). Although useful as an indication of the likely scale of change, findings will be interpreted with caution since the proposed method of combining modes of transport, the services covered and the method of measurement of travel times are all likely to change.

2011 Census car ownership by LSOA

In total, how many cars or vans are owned, or available for use, by members of this household? Include any company car(s) or van(s) available for private use

2011 Census travel to work

How do you usually travel to work? Tick one box only. Tick the box for the longest part, by distance, of your usual journey to work.

- Work mainly at or from home
- Taxi
- Passenger in a car or van
- Motorcycle, scooter or moped
- Driving a car or van
- Train
- Bus, minibus or coach
- Underground, metro, light rail, tram
- Bicycle
- On foot
- Other

The following table shows Census 2011 data on ownership of one or more cars or vans at Local Authority level (in ascending order), with an indication of variation by constituent LSOA. The range of LSOA values within local authorities (e.g. ranging from under 60% to over 96% in Powys LSOAs) supports the use of weighting at LSOA level, rather than a wider geography.

Local Authority	Percentage of households with at least one car	Median LSOA value	Lowest LSOA value	Highest LSOA value
Merthyr Tydfil	70.3	72.2	46.6	90.9
Cardiff	71.0	73.1	37.6	96.7
Blaenau Gwent	71.0	70.6	51.0	87.0
Newport	72.1	74.0	38.8	97.8
Rhondda Cynon Taf	72.9	71.4	48.7	97.4
Swansea	74.2	78.0	25.2	96.6
Neath Port Talbot	74.5	76.0	45.9	93.8
Caerphilly	75.6	75.8	45.4	95.9
Torfaen	76.4	74.9	53.0	95.6
Wrexham	77.8	80.1	37.4	96.4
Bridgend	78.1	77.8	54.5	98.5
Conwy	78.3	80.2	51.2	94.0
Gwynedd	78.6	82.2	48.6	94.3
Denbighshire	79.0	80.9	31.0	95.2
The Vale of Glamorgan	80.6	82.6	57.6	97.1
Carmarthenshire	81.2	83.7	44.6	97.3
Ceredigion	81.6	87.4	45.2	93.7
Isle of Anglesey	82.0	86.3	50.6	93.5
Pembrokeshire	82.1	84.5	55.8	96.3
Flintshire	83.0	86.1	56.2	97.5
Monmouthshire	84.8	87.4	60.7	97.5
Powys	85.0	89.6	57.4	96.1
Wales	77.1	78.8	25.2	98.5

Annex F: Access to Services - Detail of proposed approaches to travel time calculations

Public Transport

The calculation of public transport service accessibility will utilise the Mapumental service provided by MySociety. In its standard operating mode, this service utilises the national collection of public transport timetable data (including rail travel) to calculate a journey time map from a nominated point on a map. This service is publicly available at <http://property.mapumental.com>. Welsh Government have commissioned Mapumental to develop this algorithm to run on a multiple set of nominated points at once and also return output in GIS-ready format. A pilot study based on secondary schools demonstrated a calculation time of minutes (rather than the several days needed for the previous methodology). The detailed results set from this updated algorithm is being evaluated.

MySociety and Mapumental have published details of the calculation approach in blogs and papers published through their website. Some of the key assumptions used for the evaluation work undertaken for Welsh Government include:

- a changeover time of 5 minutes at non bus stops, 1 minute change at a bus stop;
- a walking speed between stops of 1.34m/s or 3mph;
- a maximum walking time between two stops of 10 minutes²⁸;
- a maximum travel time of 4 and ¼ hours.

Note also that walking speeds and times between stops are calculated irrespective of terrain (i.e. a passenger travels at a constant speed over all gradients) and obstacles (i.e. a passenger travels 'as the crow flies' between stops).

Private transport

There are currently two candidate technologies for the private transport calculations. The first is the house desktop network analysis system 'Routefinder' for Mapinfo Professional. (<http://www.routeware.dk/routefinder/routefinder.php>). Car journeys along the road network are calculated to generate a journey time map from each service point. Some key assumptions include:

- Travel speed set at 25% below the road speed limit;
- A maximum travel time of 75 minutes.

The road network used for the calculation will be the Ordnance Survey Integrated Transport Network (<http://www.ordnancesurvey.co.uk/business-and-government/products/itn-layer.html>).

The alternative method – still currently under evaluation – is to utilise the ArcGIS Online services from ESRI, which includes a number of tools for logistics and service delivery

²⁸ Note this can then chain together to a longer walking time if the stops are all within 10 minutes of each other. If the walking time between two stops exceeds ten minutes then, using the standard Dijkstra algorithm we wait at the stop as long as necessary to continue the journey i.e. until another service arrives.

planning. Specifically, the 'Service Area' tool which is accessed through a web API²⁹ provides the capability to generate the journey time contours that we are proposing to use for calculation.

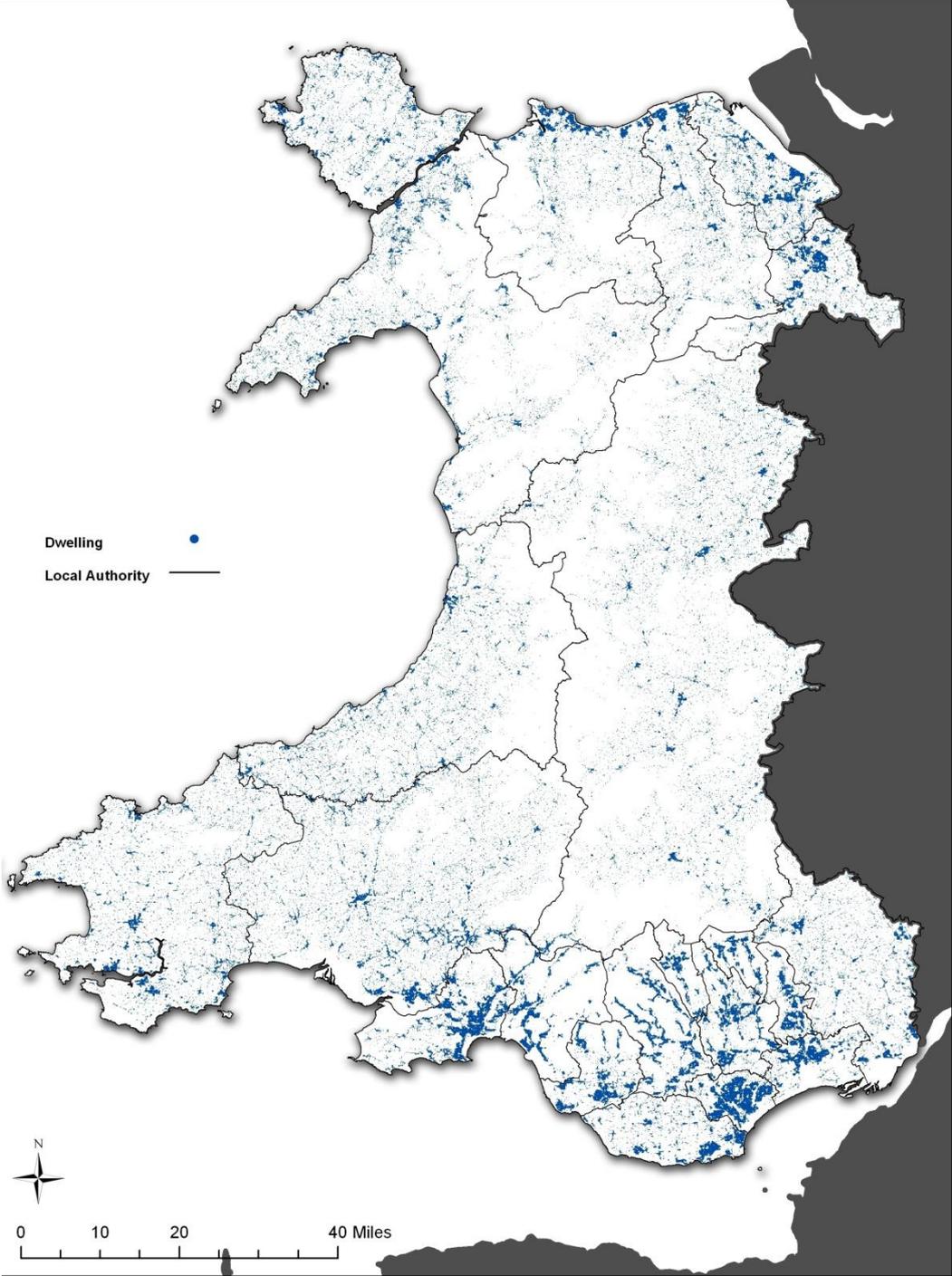
The road network used by the ESRI service includes attributes for the traffic speed at different times of the day, potentially improving the quality of the outputs.

Example maps

The following three maps show locations of dwellings in Wales (as context), followed by two thematic maps of LSOAs grouped into the most deprived 10%, 10-20%, 20-30%, 30-50% and least deprived 50% in terms of travel times to secondary schools, by public and private transport respectively. These use calculation approaches described above: Mapumental for public transport, and Routefinder for private transport.

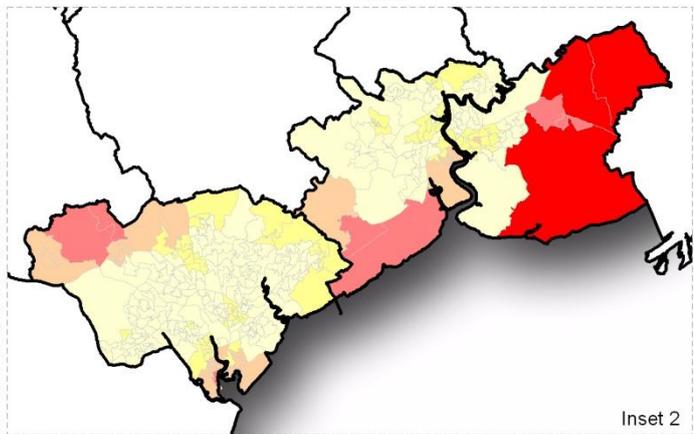
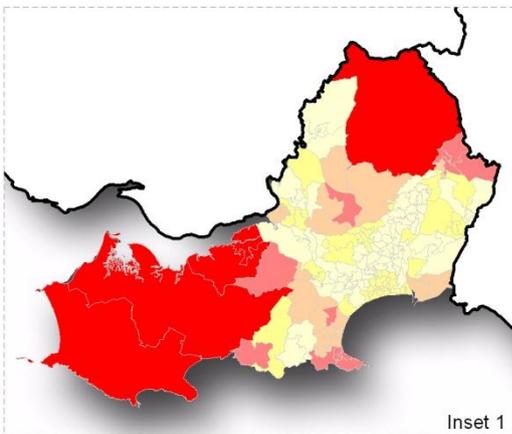
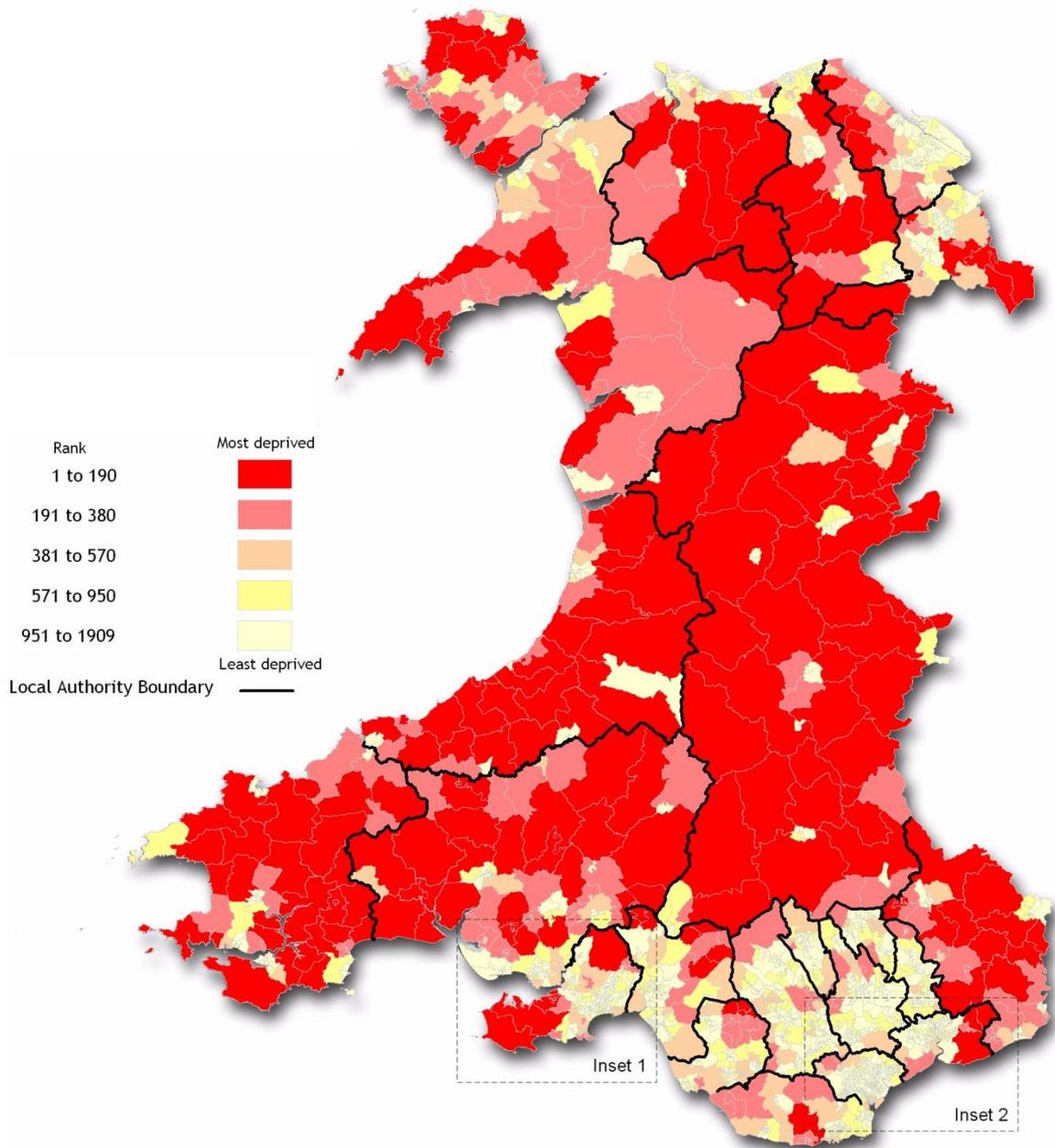
²⁹ See documentation at http://resources.arcgis.com/en/help/arcgis-rest-api/#/Service_Area_service_with_asynchronous_execution/02r3000000n0000000/

Locations of Dwellings in Wales, 2013



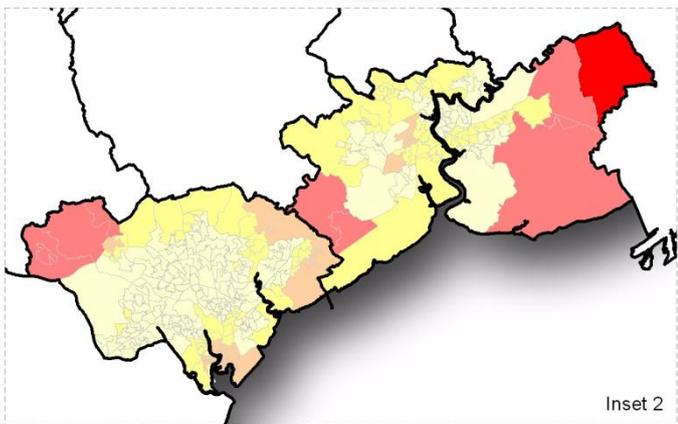
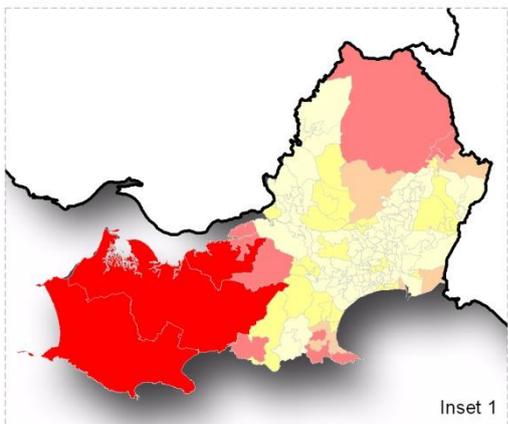
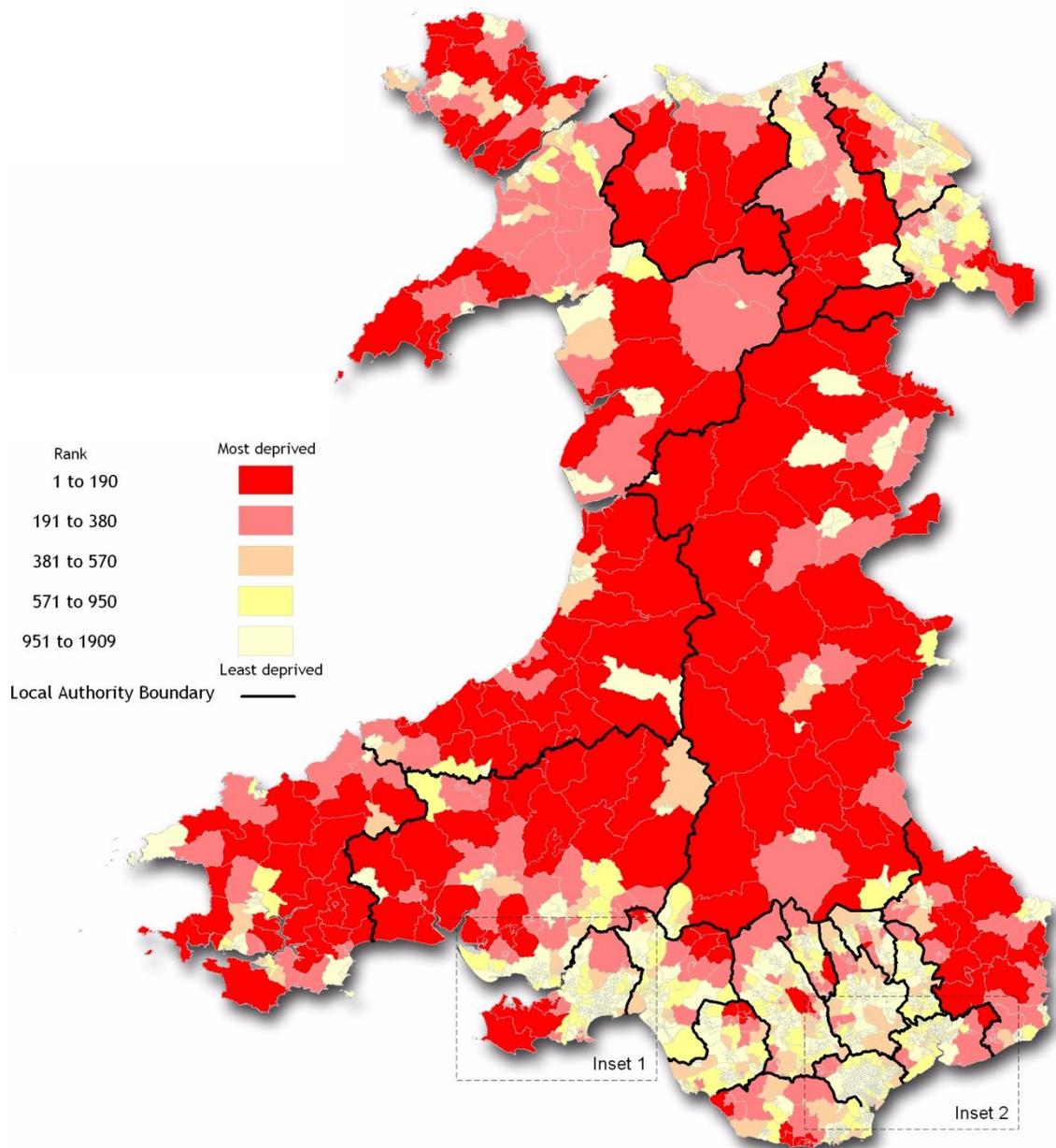
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Travel times to secondary schools by public transport, by Lower layer Super Output Area (LSOA)



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Travel times to secondary schools by private car, by Lower layer Super Output Area (LSOA)



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Annex G: Proposed technical changes to Environment (Air) Indicators

Please see below for information on the current air quality indicators followed by proposed changes.

Concentrations

A 1km x 1km vector (polygon) grid was generated to cover Wales, corresponding to concentration GRIDs supplied by Netcen (2008 data). The model used to create the grids include 2007 emissions data. Concentration values were then extracted for each LSOA for the following pollutants and statistics:

- Benzene annual mean across LSOA
- Carbon monoxide annual mean across LSOA
- Ozone maximum daily 8 hour mean across LSOA
- Nitrogen dioxide annual mean across LSOA
- Particulates annual mean across LSOA
- Sulphur dioxide annual mean across LSOA
- 99.9th percentile of Sulphur Dioxide 15-minute means across LSOA

Additionally, population averages for each LSOA containing an Air quality Management Area (Particulates) and Air quality Management Area (Nitrogen dioxide) were calculated.

The 2012 Indicator update used 2009 concentration data. The model used to create these grids used 2008 emissions.

Emissions

A 1km x 1km vector (polygon) grid was generated to cover Wales, corresponding to emission GRIDs supplied by Netcen (2008 data). Annual emission values were extracted for each grid cell for the following pollutants:

- Arsenic
- Benzo (a) pyrene
- Butadiene
- Cadmium
- Chromium
- Dioxins
- Mercury
- Ammonia
- Nickel
- Nitrogen Oxides
- Lead
- Vanadium
- Volatile Organic Chlorides

The 2012 Indicator update used 2009 emissions data.

Recommended Changes

As a result of changes to air quality regulations and methodological changes within Defra a number of changes to the air indicators have been suggested.

- (a) Nitrogen oxides – Currently in the Air emissions indicator. There is now a concentration grid as well as an emissions grid. Concentration grids are preferable as they can be directly related to the Objective. The proposal is to move Nitrogen oxides to the Air Concentration Indicator and to use the same $30\text{ug}/\text{m}^3$ standard from the Air Quality strategy.
- (b) Carbon monoxide – currently in the Air concentration indicator. There is no longer any CO modelling undertaken for the UK – the compliance assessment that this modelling is used for is now based on an objective estimation technique because the concentrations were so low. The proposal is to remove this from the Indicator.
- (c) Sulphur dioxide – there are currently 2 AQ objectives used in the Air concentration Indicator. An annual mean of $20\text{ug}/\text{m}^3$ and a maximum of $266\text{ug}/\text{m}^3$ averaged over 15mins with no more than 35 exceedences in any year. This second objective is not in the Air Quality Strategy (Wales) regulations 2010. The proposal is to change the second objective to match the new Air Quality Strategy objective of $350\text{ug}/\text{m}^3$ averaged over 1 hour with no more than 24 exceedences in any year.
- (d) Particulate matter – the Air concentration Indicator currently includes a grid for PM10. The method uses an annual mean objective of $20\text{ug}/\text{m}^3$. The current Air Quality Strategy limit value is $40\text{ug}/\text{m}^3$. The proposal is to change the objective to match the target. In addition, there is now a limit value in the AQS (Wales) regulations 2010 for PM2.5 The proposal is to also add PM2.5 to the Concentration Indicator, using the limit value of $20\text{ug}/\text{m}^3$.