WIMD 2011

Welsh Index of Multiple Deprivation

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of Multiple Deprivation 2011

Guidance on use

Contents

The Welsh Index of Multiple Deprivation

The Welsh Index of Multiple Deprivation (WIMD) 2011 is the official measure of **relative deprivation** for **small areas** in Wales. It was produced by the Welsh Government. The Index was developed as a tool to identify and understand deprivation in Wales, so that funding, policy, and programmes can be effectively focussed on the most disadvantaged communities. WIMD 2011 updates the Index published in 2008, without imposing methodological changes, except where data provision makes this unavoidable.

Deprivation is a wider concept than poverty. Poverty is usually considered to be a lack of money, whereas deprivation includes a lack of the opportunities and resources to which we might expect have access in our society, for example, good health, protection from crime, a clean and safe environment. 'Multiple' deprivation therefore refers to the different types of deprivation that might occur. Eight types of deprivation, or domains, are included in the Index. These are: employment, income, education, health, community safety, geographical access to services, housing and physical environment. It should be noted that, due to the nature of the area-based data from which the Index is constructed, we do not know whether individuals are multiply deprived, or if different individuals are suffering different types of deprivation. At present, we are not able to link the data included in the Index in order to understand this.

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.

The Index is produced as a set of ranks, with a rank of 1 assigned to the most deprived area. Ranks are a **relative** system of measurement; we can know which areas are more (or less) deprived than others, but not by how much. This is because of the way that the Index must be constructed. The construction of the Index is described in more detail below.

The ranks of the Index are calculated for each of the 1896 lower layer super output areas (**LSOA**s) of Wales. Although the *geographical* size of these **small areas** varies quite widely, and depends on the local population density, the *populations* are intended to be roughly the same in each LSOA, with an average population of 1500 people. LSOAs were designed by the Office for National Statistics to have consistent population sizes and stable geographies, so that statistical comparisons of small areas over time can be carried out.
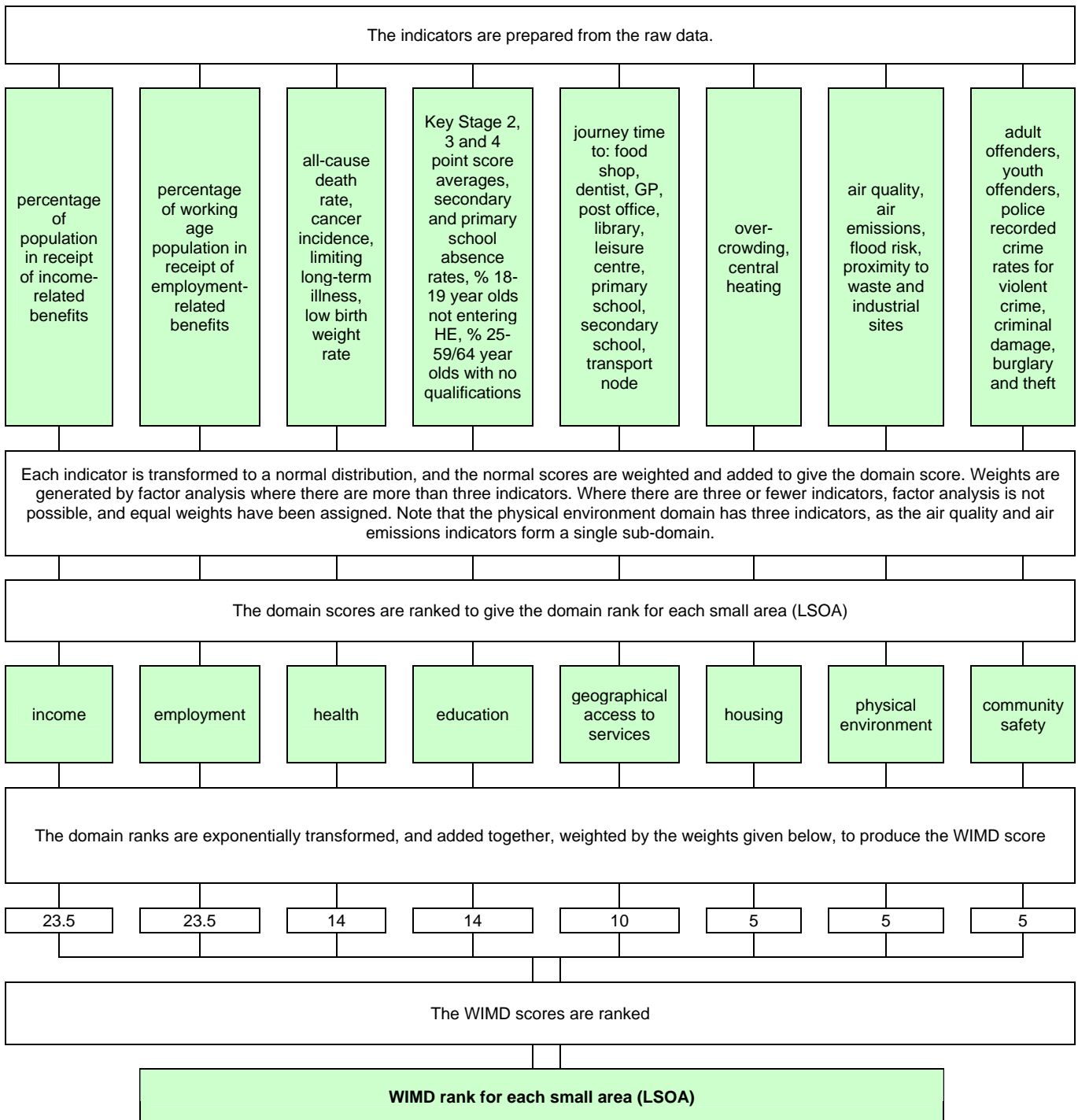
How the Index is constructed

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 1896 small areas (LSOAs) of Wales, and are published on the Welsh Government's StatsWales web pages. An overview of the construction of the Index is given in the diagram below.

An overview of the construction of the Index and its domains. For a full description of the indicators see Annex A, and for the methodology, please see the WIMD 2011 Technical Report.

The indicators are prepared from the raw data.

percentage of population in receipt of income-related benefits	percentage of working age population in receipt of employment-related benefits	all-cause death rate, cancer incidence, limiting long-term illness, low birth weight rate	Key Stage 2, 3 and 4 point score averages, secondary and primary school absence rates, % 18-19 year olds not entering HE, % 25-59/64 year olds with no qualifications	journey time to: food shop, dentist, GP, post office, library, leisure centre, primary school, secondary school, transport node	over-crowding, central heating	air quality, air emissions, flood risk, proximity to waste and industrial sites	adult offenders, youth offenders, police recorded crime rates for violent crime, criminal damage, burglary and theft

Each indicator is transformed to a normal distribution, and the normal scores are weighted and added to give the domain score. Weights are generated by factor analysis where there are more than three indicators. Where there are three or fewer indicators, factor analysis is not possible, and equal weights have been assigned. Note that the physical environment domain has three indicators, as the air quality and air emissions indicators form a single sub-domain.

The domain scores are ranked to give the domain rank for each small area (LSOA)

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

The domain ranks are exponentially transformed, and added together, weighted by the weights given below, to produce the WIMD score

23.5	23.5	14	14	10	5	5	5

The WIMD scores are ranked

WIMD rank for each small area (LSOA)

The Index is constructed from a weighted sum of the deprivation score 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. The domains and their weights for WIMD 2011 are:

income	23.5%	geographical access to services	10%
employment	23.5%	community safety	5%
health	14%	physical environment	5%
education	14%	housing	5%

A detailed analysis of the weighting system can be found in Paper 6 presented to the Steering Group on 22 October 2010, and further information on how the domain weights were derived can be found in the paper Determining the domain weights for the Welsh Index of Multiple Deprivation.

The domains are in turn built up from sets of indicators, which are the measurable quantities which capture the concept of deprivation for each domain, e.g. the percentage of working age people in receipt of employment-based benefits for the employment domain; Key Stage scores in the education domain; crime rates in the community safety domain, etc.. Indicators must be robust at the small area level and consistent across Wales. In practice, this means that the Index is based largely on administrative data, with a limited number of Census variables where appropriate administrative data are not available.

A full list of the indicators included in the Index in 2011, together with their domains, is given in Annex A.

A complete description of the construction of the indicators, their combination into the domains, and the combination of the domains into the Index is presented in the Technical Report for WIMD 2011.

A summary of the methodological changes in the 2011 Index is available on the WIMD 2011 web pages.

How to use the Index

This section describes how to use the Index, its domains and indicators to carry out some typical analyses.

1. Read the first two sections in this Summary Report

The first two sections of this report (*The Welsh Index of Multiple Deprivation*, and *How the Index is constructed*) give an overview of the Index, and how it is constructed. It is also recommended that users look at the list of indicators and domains given in Annex A, to understand what data are used to create the Index, and are available for downloading.

2. Using the deprivation scores

The Index and domain scores are provided in an annex to the WIMD 2011 Technical Report, and are published for only two purposes, i) for transparency, so that users have access to all the stages of the construction of the Index, and ii) so that users can experiment with different weighting systems for the Index if they so wish. The scores should generally be seen as a stage in the construction of the Index rather than a product in themselves. For all purposes other than the two outlined above, the ranks should be used.

Because of the way in which the Index must be constructed, the scores do not represent a *level* of multiple deprivation. If, for example, area A has twice the score of area B, it does not necessarily mean that area A is twice as deprived as area B. This means that the scores do not in fact contain any more information on levels of multiple deprivation than the ranks do. The constraints on constructing an index mean that we can only produce a *relative* measure of deprivation. For *levels* of deprivation, the underlying indicator data must be used.

3. Identifying areas of need

Understanding how disadvantaged people are distributed through Wales by carrying out the following kind of analysis is important when developing area-based policies, programmes and funding.

The simplest use of WIMD is to identify the areas of greatest deprivation using the Index ranks. For example, the most deprived 10% of areas in Wales are those ranked 1 – 190 (inclusive). However, it should be understood that not all deprived people live in the most-deprived areas. Around 1 in 5 of the people in income-benefits 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 5 people in income-benefits households live outside these areas, and this should be borne in mind when developing policy.

The figure below shows how the percentage of the population in income-benefit households is distributed by income domain rank in WIMD 2011. It is important to understand that:

- deprivation rates increase steeply for the most deprived areas;
- deprived people live outside the most-deprived areas;
- the 's-curve' shape of the distribution is seen to a greater or lesser extent in all the indicators of deprivation;
- at the most deprived end of the distribution, the steep curve means that large changes in the indicator value may only result in small changes to ranks. At the less deprived end, where the curve is flatter, the opposite is

true, and small changes to the indicator values could result in large movements in the ranks.
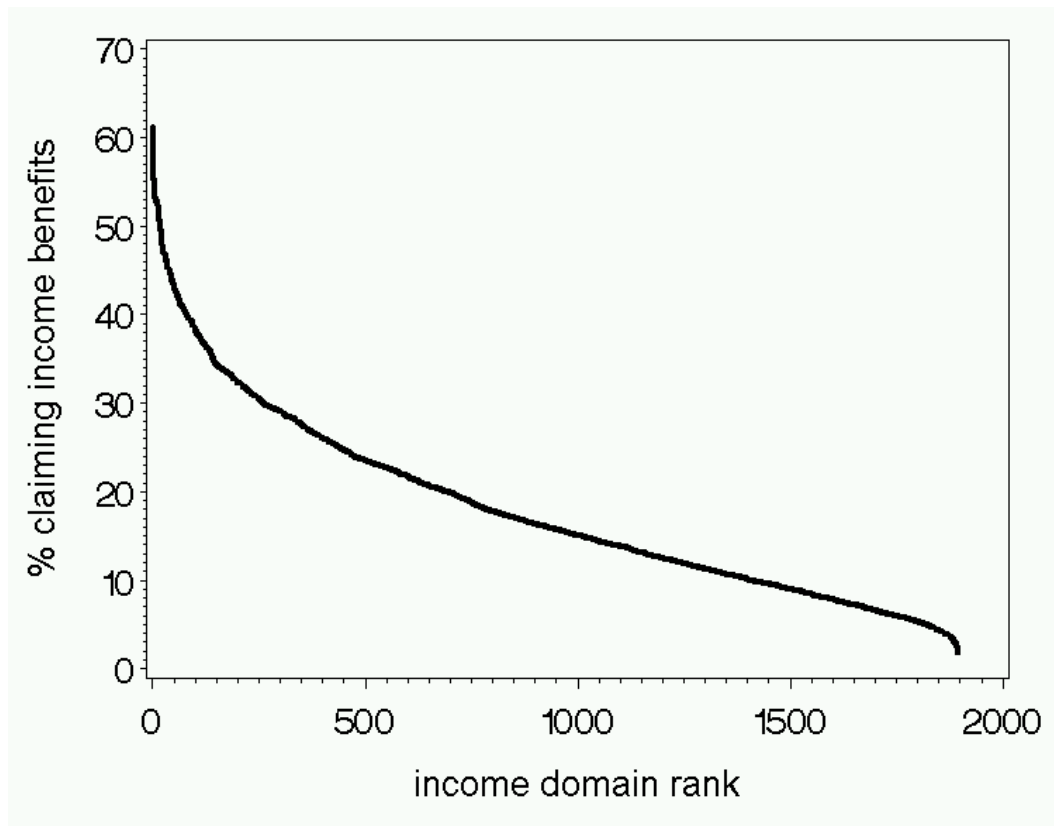
## 4. Understanding local areas using the domain ranks

One of the strengths of the Index is that, in addition to providing a rank for overall relative multiple deprivation for the small areas of Wales, ranks are also calculated for the eight different types of deprivation that make up the overall index. These domain ranks can be used to understand the drivers for deprivation in an area. For example, the three areas presented in the table and radar charts below are consecutive in their WIMD ranks, but the pattern of deprivation across their domains is quite different.

LSOA	W01000187	W01001219	W01001880
LSOA name	Tudno 2	Pen-y-graig 3	Trowbridge 4
local authority	Conwy	Rhondda Cynon Taf	Cardiff
WIMD 2011 rank	121	122	123
income rank	72	198	35
employment rank	182	81	400
education rank	205	200	89
health rank	499	53	229
community safety rank	208	544	157
physical environment rank	184	563	463

|			
housing rank	32	312	647
access to services rank	996	1639	939

Radar plots for three areas with consecutive WIMD 2011 ranks, showing the different contributions from the domain ranks for each area, which nevertheless contribute to consecutive Index ranks. Note that deprivation increases towards the centre of the plots, and scales vary on the radar plots. The WIMD 2011 ranks are: Tudno 2 – 121; Pen-y-graig 3 – 122; Trowbridge 4 – 123.
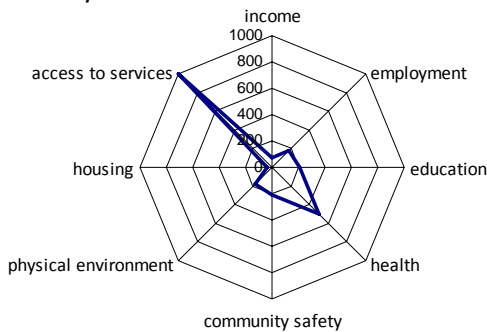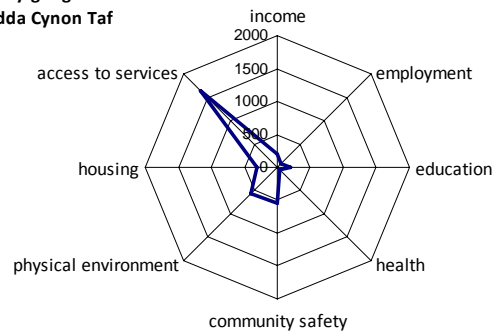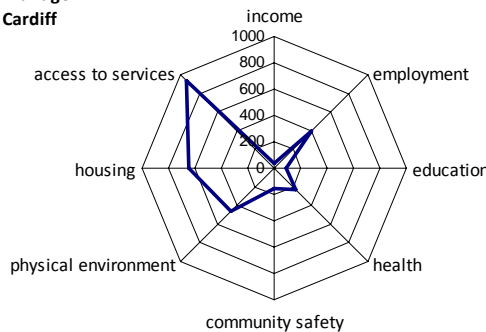

5. Aggregating to larger geographies

It is not possible to aggregate the ranks of either the Index or the domains to larger geographies or non-geographic groups by taking an average of the ranks (or scores) of the small areas which make up the larger area. This is because of the way in which the Index is constructed. We can know if one area is more or less deprived, but not by how much, so taking an average does not make sense. However, if larger geographies (or non-geographic groups) are to be compared, there are two methods for doing this.

The first method is to calculate the percentage of the small areas in the larger geography which are in the most-deprived 10 (ranks 1-190) or 20 (ranks 1-380) per cent of areas in Wales. This has been done for the local authorities, and the results

are presented in the Index and domain chapters of The WIMD 2011 summary report, with a summary in Annex D. The data are also available from the StatsWales web pages (Local Authority Analysis).

In general, the method for calculating the percentage for larger geographies is:

- count the number of LSOAs in the area of interest – n_LSOA;
- count the number of LSOAs ranked 1-190 (for the most-deprived 10%) in the area of interest – n_10%
- calculate the percentage of LSOAs in the most-deprived 10% - p_10%:
  $$p\_10\% = 100 \times (n\_10\% / n\_LSOA)$$

If an area has more than 10% (20%) of its small areas in the most-deprived 10% (20%) it can be considered relatively deprived. If it has fewer than 10% (20%), then it can be considered relatively undeprived.

The second method is to use the individual indicators, which **can** be aggregated. Since March 2011, the indicators have been published not just at the small area level, but also for a range of other useful groups, including local authorities and Community First areas. These can simply be downloaded from the WIMD: indicator analysis folder on StatsWales . A full list of the available aggregations can be found in Annex A.

6. Monitoring change over time

A ranking system cannot be used to monitor change over time. This is because it is not known whether a change in rank for an area is due to changes in that area itself, or to other areas moving up or down the ranks, changing its position without actual change in the area.

However, the indicator data offer a solution. The WIMD: indicator analysis will be updated annually, or as frequently as data are available. As the indicators represent absolute levels of the various measures of deprivation, they can be used to monitor change over time. The natural variability of small area statistics has been mitigated by the use of mean values over several years where appropriate, but care should still be taken with the interpretation of small number statistics. Annual updates to the indicator analysis will be carried out for all the available aggregations which were first published in March 2011, starting with the WIMD 2011 indicators in autumn 2011.

7. Adding contextual information

The Index is most useful if it is used in conjunction with other information, either from the Index indicators, other published data, or local information. Contextual information could include: the location of existing programmes or services; the number of people affected by a particular aspect of deprivation, for example, the number in receipt of benefits, or the number affected by a particular health issue;

the Defra rural-urban class; broadband access, and so on. Exploring the indicators and using additional information ensures that the challenges in individual areas can be understood.

8. Making UK comparisons

England, Scotland and Northern Ireland all produce their own indexes of multiple deprivation. However, these are not directly comparable because:

- they are produced for different geographies; there is no suitable small area geography which is consistent across the four nations;
- there are differences between the indicators. Not all data is collected consistently across the UK. For example, the justice and education systems for Scotland are different from England and Wales, so many crime and education indicators are not comparable;
- the Indexes have developed according to the policy drivers in each of the countries. As devolution has evolved, these differences have grown;
- the Indexes are produced on different timescales, so they do not tend to refer to the same year of data across the UK. Again, this is often driven by different policy requirements in the different countries.

However, users often want to compare deprivation across the UK, for example, to allocate funding. The Four Nations have therefore worked together with eth Office for National Statistics to produce a paper which outlines several approaches to doing this. The guidance paper *Comparing countries' indices of deprivation* can be found on the website of the Office for National Statistics.

How to download the Index, its domains and indicators

This section presents a step-by-step introduction to downloading WIMD data from the Welsh Government's StatsWales web site.

- go to the StatsWales web pages;
- WIMD data can be found under Social Inclusion -> Welsh Index of Multiple Deprivation;
- select required data set, e.g. WIMD 2011 for the 2011 publication of the Index, WIMD: indicator analysis, for indicator data. See Annex A for a list of available data;
- click on the data set of interest, and view the table of data;
- to explore the table:
  - o click on '**Area**' to select areas of interest, and then '**Show table**' to return to the edited table;
  - o use the **arrows** at the top of the table, next to '**other**', to view different data sets;
  - o click on the '**i**' icons for more information;
  - o to download data, click on the **open folder** symbol, at the top left of the page, and download as an Excel or csv spreadsheet;

- o to change the LSOA labels, from names (e.g. Braint) to codes (e.g. W01000008 or 008A) , click on '**Area**', and then the label icon, fourth from the left, top left of the table. '**View alternate labels**' will appear as you hover over the correct icon. Then click on '**Show table**'.
- The figure below shows the location of the icons listed above.

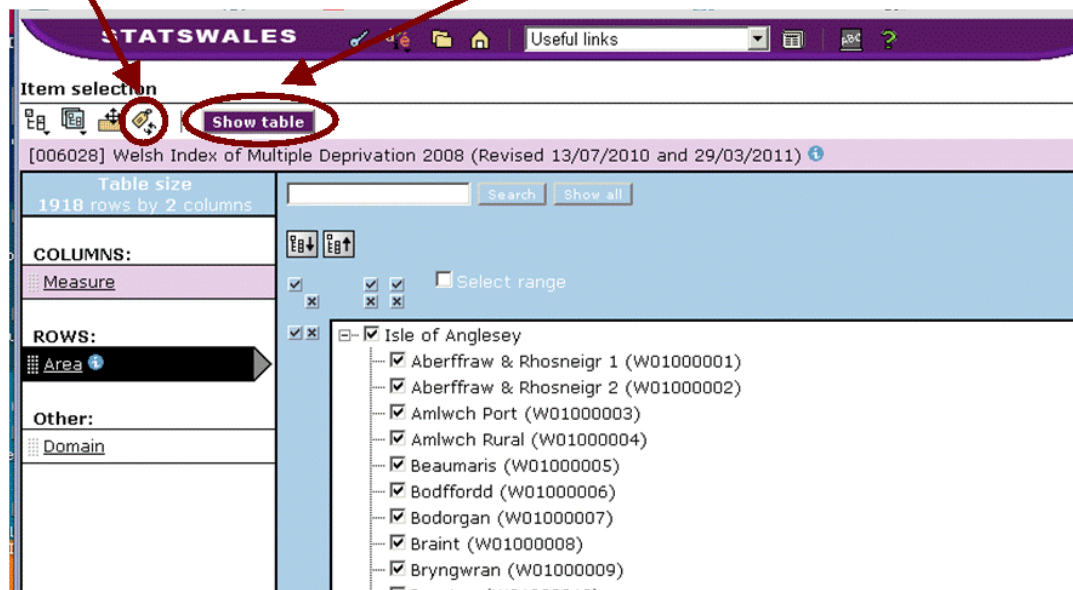*Screenshots of StatsWales tables, with useful icons marked.*

download data

select geographical areas

explore data sets

read information

Further guidance and information

The Welsh Index of Multiple Deprivation [web pages](#) host further information on the Index, including:

> WIMD 2011 Technical Report
> WIMD 2011 Quality Report
> A summary of methodological changes in WIMD 2011
> WIMD 2011 Guidance Leaflet
> [Papers and minutes from the Index governance groups](#)

Annex A: the indicators

Table A1: the indicators for the Welsh index of Multiple Deprivation 2011. Indicators which have been updated in this publication are in **bold**.

domain	indicator	units	denominator	indicator year(s)	data source
geographical access to services	mean bus + walking journey time to NHS dentist	minutes	number of journeys	2008	Public Transport & Road Network Postal Address File, Ordnance Survey
	mean bus + walking journey time to food shop	minutes	number of journeys	2008	
	mean bus + walking journey time to GP	minutes	number of journeys	2008	
	mean bus + walking journey time to leisure centre	minutes	number of journeys	2008	
	mean bus + walking journey time to library	minutes	number of journeys	2008	
	mean bus + walking journey time to Post Office	minutes	number of journeys	2008	
	mean bus + walking journey time to primary school	minutes	number of journeys	2008	
	mean bus + walking journey time to secondary school	minutes	number of journeys	2008	
	mean bus + walking journey time to transport node	minutes	number of journeys	2008	
community safety	**percentage of adult offenders**	%	resident population age 18+, less prison population age 18+	2008/9 – 2009/10	Wales Probation Trust
	police recorded burglary	%	number of dwellings, plus total number of business addresses	2008/9 – 2009/10	Welsh Police Forces
	police recorded criminal damage	%	resident population excluding prisoners, plus total non-resident workplace population	2008/9 – 2009/10	Welsh Police Forces
	fire incidence	%	resident population	2009/10- 2010/11	Welsh Government

	police recorded theft	%	resident population excluding prisoners, plus total non-resident workplace population	2008/9 – 2009/10	Welsh Police Forces
	police recorded violent crime	%	resident population excluding prisoners, plus total non-resident workplace population	2009/10	Welsh Police Forces
	percentage of youth offenders	%	resident population age 10-17, less prison population age 10-16	2008/9 – 2009/10	Ministry of Justice
education	**Key Stage 2 average point scores**	point score	number of KS2 pupils	2008-10	National Pupil Database / Pupil-Level Annual School Census / National Data Collection
	Key Stage 3 average point scores	point score	number of KS3 pupils	2008-10	
	Key Stage 4 average point scores	Point score	number of KS4 pupils	2009-10	
	percentage of people not entering higher education age 18-19	%	number of 18-19 year olds	1998-2005	HEFCE
	percentage of adults aged 25-59/64 with no qualifications	%	number of adults aged 25-59/64	2001	Census
	percentage primary school half day absence	%	number of half day school sessions	2008/9-2009/10	National Pupil Database / Pupil-Level Annual School Census / National Data Collection
	percentage secondary school half day absence	%	number of half day school sessions	2008/9-2009/10	
employment	**percentage in receipt of employment-related benefits**	%	LSOA working age population	2009/10	DWP
physical environment	**air emissions**	score		2008	Environment Agency
	air quality	score		2008	Environment Agency
	flood risk	score		2009	Environment Agency

	proximity to waste disposal and industrial sites	score		2010	Environment Agency
health	**cancer incidence**	number per 100,000	direct age-sex standardised populations	2000-2009	Velindre NHS Trust
	all-cause death rate	number per 100,000	direct age-sex standardised populations	2000-2009	ONS
	percentage of live single births < 2.5kg	%	number of live single births	2000-2009	ONS
	limiting long-term illness	number per 100,000	indirect age-sex standardised populations	2001	Census, ONS
housing	percentage of population in households with no central heating	%	number of people living in households	2001	Census, ONS
	percentage of population living in overcrowded households	%	number of people living in households (excluding student households)	2001	Census, ONS
income	**percentage in receipt of income-related benefits, or dependent child of same**	%	LSOA population	2009/10	DWP
	percentage in households receiving Tax Credits with income less than 60% of the Wales median, or dependent child of same			2009/10	HMRC
	NASS-supported asylum seekers			2010	NASS