

UK Renal Registry Interactive Maps



Introduction

Each year, the Registry collects a considerable amount of data from the various renal centres around the country. There are currently a number of Registry projects ongoing aimed at improving the ease of accessibility to this data. One such project undertaken with the help of the [East Midlands Public Health Observatory](#) (EMPHO) is the production of interactive geographical maps which allow for the display of data in a number of different formats (tables, charts etc.) with the added benefit of interactivity using a web based Flash interface.

On this website are a number of maps in several different formats as outlined below. All of these maps use data supplied either by the Registry from its [annual report\(s\)](#) or by EMPHO with access to various nationally collected datasets.

We would be grateful for any constructive feedback as to how we might develop the use of these maps further – please email any comments to renalreg@renalreg.com.

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Map Formats

The maps shown are based either on Renal Centre (geography determined by postcode of the main unit) or on Primary Care Trust (PCT) or equivalent topography (Local Government District in Northern Ireland, Local Authority in Wales; Scottish maps to be available soon).

Single map: This provides an interactive view containing a thematic map, table and chart indicating spatial / geographical patterns and temporal trends for a specific indicator of interest.

Double maps: This provides an interactive view containing two thematic maps allowing for the comparison of patterns and relationships between two indicators for the same area type.

Area profile maps: An interactive view allowing users to select a geographical area and to chart a cross-section of selected key indicators. This provides an "at-a-glance" assessment of the selected area in comparison with other areas, including regional and / or national geography regions.

Funnel plot maps: This provides an interactive view of cross-sectional data containing a thematic map, table and chart indicating spatial / geographical patterns as well as a funnel plot with upper and lower 95% and 99.9% confidence intervals.

Instructions On Using The Maps

To view interactive atlases you may need to add support for Flash content to your Internet browser. If when you click on an atlas link icon you do not get an atlas appearing then the most likely cause of the problem is that you do not have the Adobe Flash Player (version 8 or higher) installed. The map will indicate if this is the case and will provide you with a link to Adobe to download the appropriate software.

The source for the maps is the 2001 Census Output Area Boundaries, Crown Copyright and is reproduced with the permission of the Controller of HMSO.

Please be patient. Loading and re-loading after changes can take a few moments and it is not always obvious that the tool is still active.

Single Map

- Select the indicator you want to view by clicking on the **Data** button and then selecting from the menu.
- Hover the mouse over part of the map to find out more information about an area.
- Click on a centre / PCT / LA area to highlight on the map and show a trend line on the graph.
- The dataset chart contains bars representing the percentage meeting the standard plus the 95% confidence interval for each centre / PCT / LA ranked in ascending order. Hover over the bars to find out more information about the relevant bar.
- Click the **Clear** button to remove your selection.
- Use the **Filter** button to filter by Government Office Region or ONS Cluster group.

- Remove the filter via the same button.
- Use the **Legend** tab to change how the data are classified, and how they are coloured.
- Click on a comparator in the **Comparison Areas** box (if shown) to add comparison lines for an area to the graph. Click on the comparator again to remove. Hover over a line to see to which comparator it refers.
- Click the **Magnifying Glass** at the side of any centre / PCT / LA name in the table to zoom in – or alternatively, click and drag on the map to create a box, the map will then zoom to that box. Also, use the zoom tools at the top of the map to change the view (zoom in, zoom out, zoom full and resize map to enlarge / shrink entire map).
- Click on the **Print** button to print the page as it currently looks – Click the **Print Preview** button to edit the layout of the printed page.

Double Map

These have many of the same features as the single maps, with the main difference being that there are two maps available to view at the same time. This allows the user to compare different indicators.

- Select different indicators for the maps by using the two different **Data** buttons and selecting indicators from the list for each map. View the data on the scatter plot, hovering over a point will identify it. The plot will show the best fitting line to the data, and give details of the correlation coefficient. High correlation coefficients mean that there is a strong relationship between the two data items although bear in mind that this assumes the relationship to be linear which may not be the case.
- Hover the mouse over a centre / area on the map to see its position in the scatter chart.
- Click on a centre / area to highlight it. Use the **Clear** button to remove your selection.
- **Zoom** the maps as before – when you zoom one map, the second map automatically zooms to match.
- Use the **Legend, Filter, Print,** and **Print Preview** buttons as before.

Area Profile Map

This allows users to compare two areas with each other across a number of different indicators.

- Click on a centre / area to select – its data will appear on the chart in red. By then hovering over another centre / area, its data will appear on the chart in blue. The chart shows the percentage difference between the centre / area and the national average for each indicator. Use the **Clear** button to remove your selection.
- Collapse / expand the indicators in the table by clicking on the '+' symbol to the left of the indicator label.
- Use the **Legend, Filter, Print, Print Preview** and buttons as before.
- **Zoom** the map as before.
- As with the single map hover over bars in the dataset chart to find out more information about the relevant bar.

Funnel Plot Map

This allows users to view cross-sectional data in the context of the national average and 95% and 99.9% confidence intervals for the parameter of interest.

- Click on a centre to select – its data will appear on the bottom chart in orange. The corresponding point on the funnel plot will be highlighted in red. Use the **Clear** button to remove your selection.
- As with the single map hover over bars in the dataset chart to find out more information about the relevant bar. Both the relevant centre on the map and the relevant point on the funnel plot will be highlighted.
- Similarly hovering over a point on the funnel plot will highlight the centre on the map.
- Use the Toggle Table button to show the underlying data table. Hovering over individual centres here will highlight them with cross-hairs in the funnel plot; selecting a centre here will turn the corresponding point red. Use the **Clear** button to remove your selection.
- Use the **Legend, Filter, Print, Print Preview** and buttons as before.
- **Zoom** the map as before.

Interpretation Of The Data Shown On These Maps

It is important to emphasise that for the reasons outlined below, caution must be used in interpretation of any apparent differences between areas. Such apparent differences may reflect genuine differences which may warrant further examination but may also reflect random variation or issues regarding multiple comparisons, sample size, data collection and processing. To the best of our knowledge the data presented on these maps is correct.

Caution should be used when comparing data between many areas using maps such as these. Unless you have a priori comparisons in mind and make only those specific comparisons then there will be problems. There are two main issues here:

- Multiple testing: with 232 PCT areas there are a large number of possible comparisons. Some of these will be 'significant' purely by chance (i.e. with no true difference).
- Choosing to make a comparison between an area with a high value and one with a low value *after you have seen the data* is invalid statistically. It greatly increases the chance of obtaining an apparently 'statistically significant result'.

The funnel plots allow for the identification of renal centres which fall outside of the upper or lower 95% and 99.9% confidence intervals. These compare all centres with the average rather than being centre to centre comparisons like you are tempted to make from the 'caterpillar' style plots. You are still making multiple comparisons (comparing each of about 70 centres with the average) but using the 99.9% intervals instead of the 95% ones makes some adjustment for this. Funnel plots by PCT may be added to this website in the near future.

The Registry is currently investigating alternative methods of displaying data such as statistical process control charts. These are being developed for use in centre-specific reports and will be released soon.

Definitions Of The Terms 'NA' and 'ND'

'NA' is used when an area has less than 50% completeness for a data item or if there are five or fewer patients with a measurement for that item.

'ND' is used for areas which were not covered by the Renal Registry for the relevant year. Up until now, not all renal centres have been sending data to the Registry. This means estimates could not be obtained for all centres / PCTs but only for those which were covered by the Registry in the relevant year. For the PCT based maps the UKRR identified all areas which were estimated to have complete coverage and analyses were restricted to those areas. Whether an area was covered or not was dependent on whether the renal centre in the area was sending data to the UKRR and whether there were any overlapping areas with renal centres not yet connected to the UKRR.

Due to various renal centres beginning to send data to the UKRR at different times, the covered PCTs are different for the analyses for each year. For example, for the 2007 data, 148 of the 152 English PCTs and all parts of Wales, Scotland and Northern Ireland were covered by the Registry. This is a total coverage of 228 areas out of 232.

Calculation Of Standardised Incidence And Prevalence Ratios

These are calculated in exactly the same way as for the [Registry's Annual Report](#) and the following is taken from Appendix D of that report.

Patient definitions

For the acceptance rate analyses, all new cases recorded by the Registry as accepted on to RRT in each year were included. For the prevalence rates analyses, prevalent patients at the end of the year were included. The analyses used the patient postcode rather than the GP postcode. Each postcode was matched to a 2001 Census output area and hence to the relevant area code.

Years used

Analyses have been done for each of the last 6 years. Combined analyses have also been done using the data from as many of the years as are available for each area. This combined analysis is especially useful for the acceptance ratios analyses as there can be small numbers of incident patients particularly in the smaller areas.

Geography

The areas used were the 152 (English) Primary Care Trusts (PCTs), the 22 Welsh local health boards, the 32 Scottish council areas and the 26 Northern Ireland district council areas – these different types of area are collectively called PCTs here.

Population data

Mid-2006 population estimates were obtained from the ONS website (www.statistics.gov.uk) by PCT, gender and age group. These 2006 estimates have been extrapolated by the ONS from the 2001 census data. The areas range in population size from 17,000 (Moyle in NI) to 1.27 million (Hampshire).

This 2006 population data is used for the analysis for each year. As the analyses only cover 6 years this was a reasonable approximation.

Standardised acceptance/prevalence ratios (SRR/SPR or just SR)

There are large differences in acceptance and prevalence rates for RRT between age and gender groups. As there are also differences in the age/gender breakdowns of the different areas it is useful to produce estimates standardised for age and gender. The method used is *indirect* standardisation.

Observed cases (O_i) were calculated by summing all cases in all age and gender bands for each PCT. Expected cases (E_i) for each PCT were calculated as follows:

Overall crude rates (for each year) were calculated for the whole covered population (the *standard population*) by summing the observed numbers, over the PCTs, for each age/gender band and dividing this by the total covered population in that age/gender band. These crude rates (by age/gender band) were then multiplied by the population each PCT has in each band to give the number of cases expected in that band if that PCT had the same rates as the standard population.

These expected numbers were then summed over the age/gender bands to give an expected total number of cases in each PCT. The age/gender standardised ratio (SR) for PCT i is then O_i / E_i .

The expected number of cases is the number you would see if the rates seen in the standard population applied to that individual PCT's age/gender breakdown. 95% confidence intervals were calculated for each area using an error factor (EF) as follows:

$$\begin{aligned} \text{LCL} &= \text{SR}/\text{EF} \\ \text{UCL} &= \text{SR}*\text{EF} \end{aligned}$$

Where $\text{EF} = \exp(1.96/\sqrt{O_i})$

A SR of 1 indicates that the area's rate was as expected if the age/gender rates found in the total covered population applied to the PCT area's population structure; a value above 1 indicates that the observed rate was greater than expected given the area's population structure, if the lower confidence limit was above 1 this was statistically significant at the 5% level. The converse applies to standardised ratios under one.

The combined years analyses are similar to the above except that the observed and expected numbers are summed over the years.

Remaining variability between rates

Even after standardisation there remains a large amount of variability between PCTs - as can be seen by the large numbers of significantly low or high rate ratios. This is partly because these ratios have only been adjusted for age and gender and have not been adjusted for ethnicity. Much higher rates are expected in populations with a high percentage of patients from South Asian and Black backgrounds.

Caution needed when comparing a PCT's standardised incidence or prevalence ratios over time

As the covered areas have changed over time, the 'total' population used for standardisation is different each year. For example, the rate ratios for 2005 and 2006 are not strictly comparable as they are standardised to different populations. However, for most years the change in numbers of covered areas is relatively small.

Public Health Demographic & Mortality Data

The definitions of the demographic and mortality data vary amongst each of the individual four UK constituent countries which mean that between-country comparisons are not valid. Within-country comparisons may be undertaken using the individual country PCT or equivalent based maps.

Mortality from Circulatory Disease

This indicator is a directly age and sex standardised mortality rate per 100,000 people of all ages, (standardised to the European population). The data shown for each of the different countries are not directly comparable because of the years that the data represent. England, Scotland & Northern Ireland include data from 2005 to 2007; Wales from 2002 to 2004.

Measure of Social Deprivation

Four different deprivation measures are available for the individual countries, each of these measures reflect differing methodologies and composite indicators. The England and Northern Ireland measures represent the summary score for the represented geographical level (PCTs for England, LGD (Local Government Districts) for Northern Ireland), **higher scores represent higher levels of deprivation.**

Summary scores are not available for the relevant geographical areas for both Wales and Scotland. A proxy measure of deprivation is therefore used as an alternative. The number of data zones in the respective geographical area which are in the 20% most deprived nationally are presented as a proportion of the total number of data zones in the same area. **A higher proportion of zones in the most deprived quintile indicates higher levels of deprivation in the area.**

Ethnicity data

The ethnicity data is again not comparable between countries due to the different classification systems used and the differing years that the data represents. For all the countries except England, 2001 census data has been used; England uses ethnicity estimates for 2006. All of the countries allow the data to be grouped into the broad ethnicity groupings of white and non-white although the underlying constituent ethnicity groups contained in these larger groups vary depending on the country.

Details of Indicators and Sources for the non Renal Registry data

Indicator	Source
England	East Midlands Public Health Observatory.
Circulatory disease mortality 2005-2007	The Information Centre for Health and Social care. © Crown Copyright. Source: Compendium of Clinical and Health Indicators, National Statistics.
Deprivation (IMD 2007)	Index of Multiple Deprivation (IMD) 2007 is a summary score at PCO (Primary Care Organisation) level. Source: Department of Communities and Local Government. High numbers represent increased levels of deprivation.
Ethnicity (ONS estimates 2006)	Experimental Population Estimates by Ethnic Group for PCOs and Strategic Health Authority areas in England for 2006. Source: Office for National Statistics. Ethnic groups are classified consistent with the 2001 Census classifications. The proportion of the population who are classified as non-white has been presented. This includes all people who were not classified as: "White British", "White Irish" or "White Other White" in the population estimates.

Indicator	Source
Northern Ireland	Institute of Public Health in Ireland.
Circulatory disease mortality 2005-2007	Source: The Northern Ireland Statistics and Research Agency (NISRA).
Deprivation (NIMDM 2005)	Northern Ireland Multiple Deprivation Measure 2005. Average score for LGD (Local Government District) is presented. Source: The Northern Ireland Statistics and Research Agency (NISRA). High numbers represent increased levels of deprivation.
Ethnicity (2001 census)	Ethnicity data is taken from the 2001 Census standard tables. Source: The Northern Ireland Statistics and Research Agency (NISRA). The proportion of the population who are classified as non-white has been presented. This includes all people who were not classified as: "White" and "Irish Traveller" in the census.

Scotland	Scottish Public Health Observatory Information Services.
Circulatory disease mortality 2006-2008	Source: ScotPHO.
Deprivation (SIMD 2009)	Scottish Index of Multiple Deprivation 2006. Source: ScotPHO. Note: this is the number of data zones in the council area which are in the 20% most deprived nationally, as a proportion of the total number of data zones in the same area. High numbers represent increased levels of deprivation.
Ethnicity (2001 census)	Ethnicity data is taken from the 2001 census. Source: ScotPHO. The proportion of the population who are classified as non-white has been presented. This includes all people who were not classified as: "White Scottish", "Other White British", "White Irish", and "Other White" in the census. Note: the 2001 Census Data was based upon the old Scotland NHS Board configuration listing a value for NHS Argyll & Clyde. Argyll & Bute is now part of NHS Highland, while the remaining part of NHS Argyll & Clyde merged with NHS Greater Glasgow to become NHS Greater Glasgow & Clyde. The ethnicity data has therefore been re-apportioned assuming that the population ethnicity characteristics are the same for the whole of the original Argyll and Clyde population.

Wales	Wales Centre for Health.
Circulatory disease mortality 2002-04	Source: National Public Health Service for Wales.
Deprivation (WIMD 2008)	Welsh Index of Multiple Deprivation (WIMD) 2008. Source: Welsh Assembly Government. Note: this is the number of data zones in the Local Authority area which are in the 20% most deprived nationally, as a proportion of the total number of data zones in the same area. High numbers represent increased levels of deprivation.
Ethnicity (2001 census)	Ethnicity data is taken from the 2001 Census. Source: Office for National Statistics. Ethnic groups are classified consistent with the 2001 Census classifications. The proportion of the population who are classified as non-white has been presented. This includes all people who were not classified as: "White British", "White Irish" or "White Other White" in the population estimates.

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March 2010