Glasgow Centre for Population Health

Case Study

Health and its determinants in West Central Scotland compared to the Ruhr area in Germany

Case study: Health and its determinants in West Central Scotland compared to the Ruhr area in Germany.

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Executive Summary

This case study – along with three others – is an accompaniment to the report entitled: *Health and its determinants in Scotland and other parts of post-industrial Europe: the 'Aftershock of Deindustrialisation' study – phase two*.

The case study presents the results of analyses of routine administrative and survey data for two post-industrial regions: West Central Scotland (WCS) and the Ruhr area in West Germany. This is part of a larger set of analyses exploring the reasons behind the poor health profile of WCS in comparison to other parts of Europe that have also experienced the economic, social and health impact of post-industrial decline.

The scope of this report is limited to comparisons of routine administrative and survey data in these two regions: for a broader discussion of the historical, cultural and social context in which these differences should be viewed, readers should refer to the main report.

As with the main section of the report and the other case studies, our aim here is to respond to two key questions:

1. Can WCS's relatively poorer health status be explained purely in terms of socio-economic factors (poverty, deprivation etc.)?
2. Do comparisons of other health determinant information identify important differences between WCS and this post-industrial region of Germany?

Analyses of a large set of existing data were undertaken in an attempt to answer these questions. The principal findings of these analyses are that:

- **Life expectancy** for both sexes has been consistently higher in the Ruhr than in WCS over the past 25-30 years. At a sub-regional level, life expectancy in the majority of WCS local authority areas is lower than that of Gelsenkirchen, the Ruhr district with the lowest recorded life expectancy.

- Measures of **health and function** fail to provide clear insights into the reasons behind WCS's poor health outcomes. Self-reported levels of health and life satisfaction are better in WCS compared to the Ruhr. Reported levels of doctor-diagnosed health problems are either very similar or show little regional variation.

- **Socio-economic** factors alone do not appear to explain WCS's poor health status relative to the Ruhr. For a number of these measures (e.g. current levels of, and historic trends in, unemployment and employment) WCS compares favourably to the Ruhr, while survey data on perceived adequacy of income show little difference between the regions.

- Regional estimates of **income inequalities** also suggest little difference between WCS and this part of Germany, although at a national level, income inequality in Scotland (and indeed the UK) is greater than in Germany. Levels of **relative poverty** appear to be higher in the Scottish region, while **family affluence** is slightly lower.

- In relation to **population measures**, WCS has lower levels of population density, higher fertility rates, and a lower dependency ratio compared to the Ruhr. While both regions saw their population decline from 1995 to 2008, the German region experienced higher levels of population loss overall.

- Some, but not all, aspects of **child and maternal health** in WCS compare unfavourably to the Ruhr. For example, the rate of births

to women under the age of 18 was three times higher in WCS than in the Ruhr area in 2008. However, the Ruhr had a slightly higher rate of low birth weight babies than WCS in 2008 and rates in the region have increased over the last 20 years, while those for WCS have remained largely static.

- Comparisons of **social indicators** show a mixed pattern. In terms of educational attainment, WCS has a higher proportion of working-age adults with tertiary level qualifications (but a much lower proportion with intermediate level qualifications) compared to the Ruhr. The percentage of 'vulnerable' (lone parent or single person) households is similar in both regions. Marriage rates are slightly lower in WCS. Aspects of **social capital** (e.g. voting, participation in religion) may be more developed in the Ruhr compared to WCS.

- In terms of the **physical environment**, WCS has less exposure to sunshine (and therefore vitamin D) than the Ruhr area. In addition, while recorded crime levels and perceptions of community safety are similar at a regional level, this may disguise the higher levels of concern over safety among citizens of Glasgow compared to their counterparts in key cities of the German region.

- Prevalence of certain **health behaviours**, such as female smoking rates and (self-reported) alcohol consumption, appear to be much higher in WCS than in the Ruhr area. However, other measures, such as obesity among the middle-aged and male smoking rates, show little difference between the regions.

  This case study has identified a number of potentially important differences between WCS and an important post-industrial part of Germany, but it is difficult to quantify their impact on health outcomes, or on the rate of improvement in health outcomes.

However, these results add to the evidence that economic issues alone do not appear to be the principal issue. Further research is required, focussing not on routine administrative data, but based on the collation of new data to test specific hypotheses. This is now being undertaken as part of a programme of work focussing on the key WCS city, Glasgow, and its most comparable post-industrial cities in the UK, Liverpool and Manchester. The results of that research will be complete in 2012.

1.0 Introduction

1.1 Background

This case study is an accompaniment to the main report entitled: *Health and its determinants in Scotland and other parts of post-industrial Europe: the 'Aftershock of Deindustrialisation' study – phase two.* The overall aims of the project, its history, rationale, and development are discussed within that report.

The case study presents the results of analyses of routine administrative and survey data for two post-industrial regions: West Central Scotland (WCS) and the Ruhr area in Germany. As described fully in the main report, this is part of a larger set of analyses exploring the reasons behind the poor health profile of WCS in comparison to other parts of Europe that have also experienced the economic, social and health impact of post-industrial decline.

1.2 Why compare these two regions?

The Ruhr Area is an urban region of West Germany defined historically by its industrial activity: coal mining, iron and steel works. However, like WCS, it has experienced long-term industrial decline in recent decades: between 1970 and 2005 the region lost almost 700,000 industrial jobs – a reduction of around 55%[1].

The region consists of almost 4,500 square kilometres and has a population of over five million. The Ruhr is located in the German Federal State of North Rhine-Westphalia (NRW) which borders Belgium and the Netherlands, covers over 34,000 square kilometres, and has a population of around 18 million (about 22% of the total German population). Like WCS, the Ruhr area remains very disadvantaged compared to its parent country, with some of the

highest levels of poverty and unemployment in West Germany concentred in the region (see main report).

1.3 Aim and approach

As with the main section of the report and the other case studies, our aim here is to respond to two key questions:

1. Can WCS's relatively poorer health status be explained purely in terms of socio-economic factors (poverty, deprivation etc.)?
2. Do comparisons of other health determinant information identify important differences between WCS and this post-industrial region of Germany?

The approach taken here was to assemble a range of comparable social, economic and health-based data for the Ruhr area and WCS (and where possible, sub-regions). Indicators were grouped beneath the headings used in the main report. These included:

- Health and function, covering aspects such as life expectancy and self-assessed health and well-being;
- Prosperity and poverty;
- Population-related factors;
- The social environment (including educational attainment, and vulnerable households);
- The physical environment;
- Health behaviours; and
- Child and maternal health.

Many of the limitations of this approach – such as gaps in the data, cultural differences (e.g. in car or home ownership), and variation in the history and context of deindustrialisation – have been noted in the main report. They apply equally to this case study.

1.4 Geographies

Wherever possible, direct comparisons are made between the Ruhr area and WCS and their sub-regions. The definition of the Ruhr area matches that used in the first Aftershock report[1], based on 15 districts ('kreise') and urban districts ('kreisfreie stadt')[i], as shown in the map in Figures 1a and 1b below, and the chart in Figure 3 below. Where data for the Ruhr were not available, data for the larger North Rhine-Westphalia state are shown instead as a proxy. Sub-regional data for the 15 'kreise' are presented where possible. In addition, survey data for three of these areas (cities) – Bochum, Essen and Mulheim – are presented for the Heinz Nixdorf Recall Study discussed below.

Figure 1(a) Map of the Ruhr area within North Rhine-Westphalia and Germany[ii]

[i] All but three of the Ruhr districts (Wesel, Unna and Recklinghausen) are kreisfreie stadt. Wesel, Unna and Recklinghausen cover both the urban districts of the same name and their surrounding rural municipalities.

[ii] Note: map is not to scale.

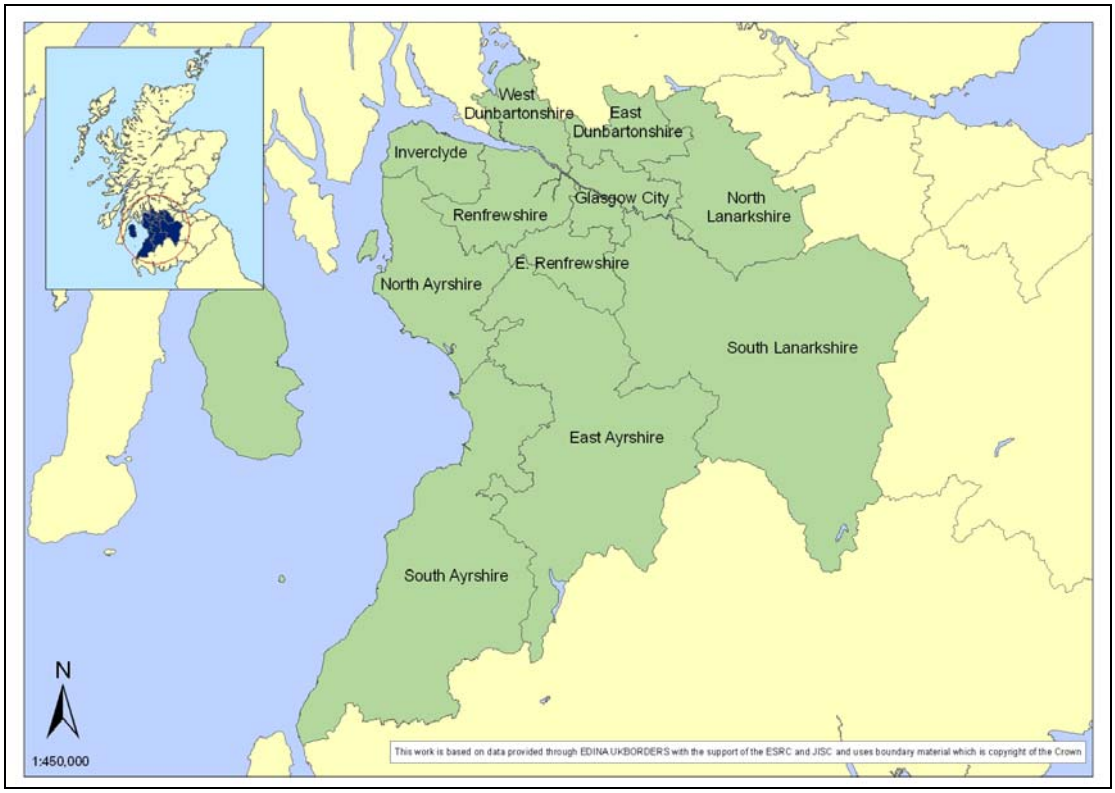
Figure 1(b) More detailed map of the Ruhr area[iii]

The WCS region is defined by the boundaries of 11 local authority areas[iv] (see Figure two below) and covers over 6,500 square kilometres with a population of over two million. This again matches the definition used in the first *Aftershock* report. Where data matching this precise geography were unavailable, proxy geographies were again used as a substitute. These were: Greater Glasgow (and Clyde) Health Board area[v], and South Western Scotland[vi]. Sub-regional data are presented, where possible, for the 11 local authority areas. In addition, for data on voter turnout, parliamentary constituencies were used.

[iii] Note: map is not to scale.
[iv] East Ayrshire, East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, and West Dunbartonshire.
[v] The Greater Glasgow and Clyde Health Board area comprises six local authorities (East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, Renfrewshire and West Dunbartonshire) plus parts of North and South Lanarkshire. The former Greater Glasgow Health Board, which existed before 2006, covered Glasgow City, East Dunbartonshire and parts of West Dunbartonshire, East Renfrewshire, North and South Lanarkshire.
[vi] South Western Scotland covers the 11 local authorities of West Central Scotland, plus Dumfries & Galloway and Argyll & Bute.

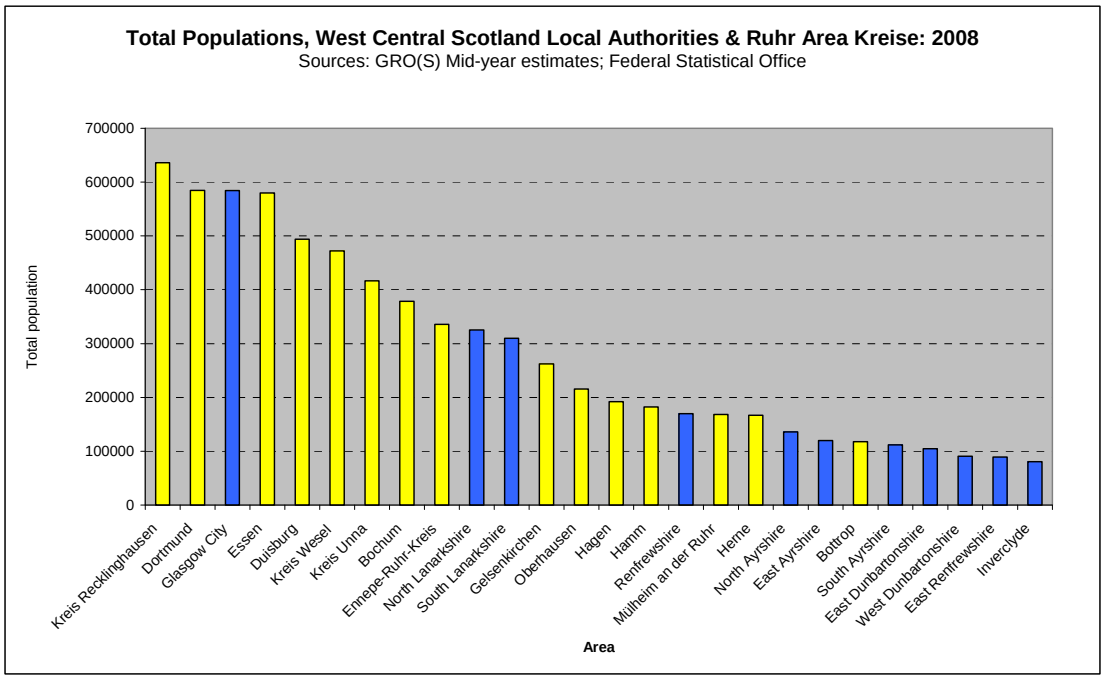
Note that for the main sub-regional comparisons, the populations in the 15 Ruhr *kreise* range from 118,000 to 636,000 while those in the 11 WCS local authorities range from 81,000 to 585,000. Figure 3 shows the distribution of population across these 26 areas in 2008, with Ruhr kreise shown in yellow and WCS local authorities highlighted in blue (a colour scheme employed throughout the report).

Figure 2 Map of West Central Scotland local authorities[vii]



[vii] Note: map is not to scale.

Figure 3



The limitations in using the proxy regions listed above are discussed in the full accompanying report.

1.5 Data sources and limitations

Mortality data for each of the post-industrial regions, including the Ruhr, are presented in the first *Aftershock* report[1]. To represent a broad model of health, as much additional health outcome data as were available for the two regions were analysed.

Population, migration and births data were provided for the German areas by The Federal Statistical Office of Germany, and for Scottish areas by The General Register Office for Scotland (GRO(S)). These data are based on compulsory local registration of events reported to the respective central organisation. Data on child and maternal health variables reported here, such as teenage motherhood, termination of pregnancy and low birth weight were supplied for the German areas by The NRW Institute of Health and Work (LIGA.NRW) and Information and Technology NRW (IT.NRW), and for Scottish areas

by ISD Scotland and GRO(S). These data were collected systematically by the respective central organisations. Self-assessed health data were provided for the German areas by the Robert Koch Institute (RKI), and for Scottish areas by the Scottish Government, based on comparable survey measures (from the RKI telephone health survey in Germany, and The Scottish Health Survey in Scotland).

This report also aims to present analyses of data on the wider determinants of health. Data for socio-economic variables were provided for the German areas by Eurostat, The Federal Statistical Office of Germany, The Federal Employment Agency, The Federal Criminal Police Office of Germany, and IT.NRW, and for Scottish areas by NOMIS[viii], GRO(S), and The Scottish Government. These data are measured objectively on a regular basis by these administrative organisations. Health behaviours data were supplied for the German areas by LIGA.NRW and RKI, and for Scottish areas by the Scottish Government. Smoking and alcohol consumption data were collected via survey (census, RKI, Scottish Health Survey and Scottish Household Survey). Data on body mass index (BMI) were collected by survey but verified by measurement of height and weight by a health practitioner.

The case study also uses data from the Heinz Nixdorf Recall Study from 2000-2003, which collected data on more than 4800 adults (aged 45-74) resident in the three cities of Mulheim, Bochum and Essen in the Ruhr area. Comparisons are made with Greater Glasgow health board residents of the same age group, interviewed in the 2003 Scottish Health Survey. Indicators compared from these two samples include diagnosed diabetes and high blood pressure; obesity; smoking; alcohol consumption; perceived community safety and marital status.

[viii] Nomis is a service provided by the Office for National Statistics, ONS, providing access to the most detailed and up-to-date UK labour market statistics from official sources.

Note that where data for the Ruhr area was unavailable, North-Rhine Westphalia has been used as a proxy. Since socio-economic disadvantage is less pronounced in NRW than the Ruhr, the results shown are likely to overstate levels of prosperity, and understate poverty, in the German region relative to WCS.

A full list of data sources and definitions is included within Appendix 1.

As with the main report and the other three case study reports, a number of limitations and caveats should be borne in mind in interpreting the data presented, not least in relation to the use of routine administrative data. These issues are discussed in more detail in the main report. However, in relation to this case study specifically, the following should be noted:

- Comparing health outcome and determinant data between different countries may be difficult due to known or unknown differences in culture, economy, historical influences, and political systems. As discussed in the main report, some of these issues are currently being researched in a separate but related part of the project.
- Although data were available for districts in WCS, equivalent data were not always available for the Ruhr at an equivalent sub-regional level.
- Data definitions are not identical between countries for every indicator; where this is the case it has been indicated in the report. As stated above, definitions are listed in Appendix 1.
- It has not been possible to show trends for every indicator due to the lack of available time-series data (mostly in relation to the Ruhr districts).

- Data for indicators throughout this report have been collected from a variety of sources. Although some indicators have been objectively and accurately measured, many population rates are estimated from samples taken by survey and some may be subject to recall bias (e.g. alcohol consumption in the last 12 months).

2.0 Health and function: a further analysis of health outcomes in the regions

In this section we revisit life expectancy trends in the two regions, examine the most recent life expectancy data at a sub-regional level and compare self-reported measures of health and well-being, including subjective general health, doctor-diagnosed diabetes and high blood pressure and life satisfaction.

2.1 Life expectancy and mortality

2.1.1 Trends in life expectancy in the two regions

In the first Aftershock report, we showed that life expectancy for both sexes was consistently higher in the Ruhr than in WCS over time. The gap in life expectancy between these regions and their parent countries also widened for both sexes, with the change being more notable in the Ruhr (Figure 4 and Figure 5).

Figure 4

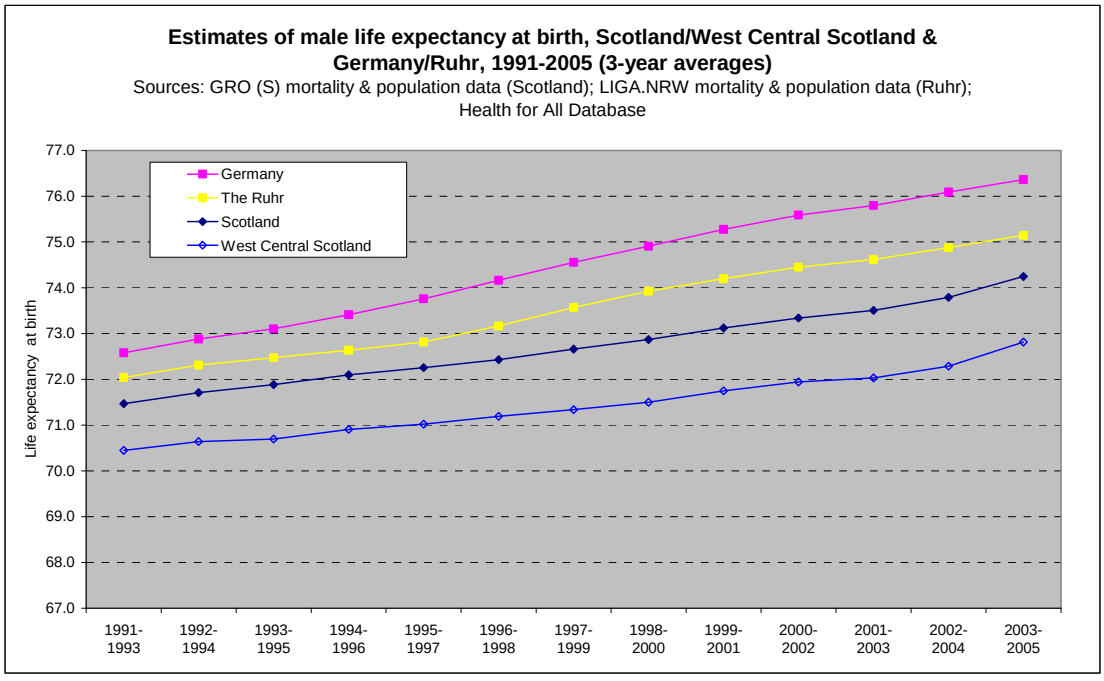
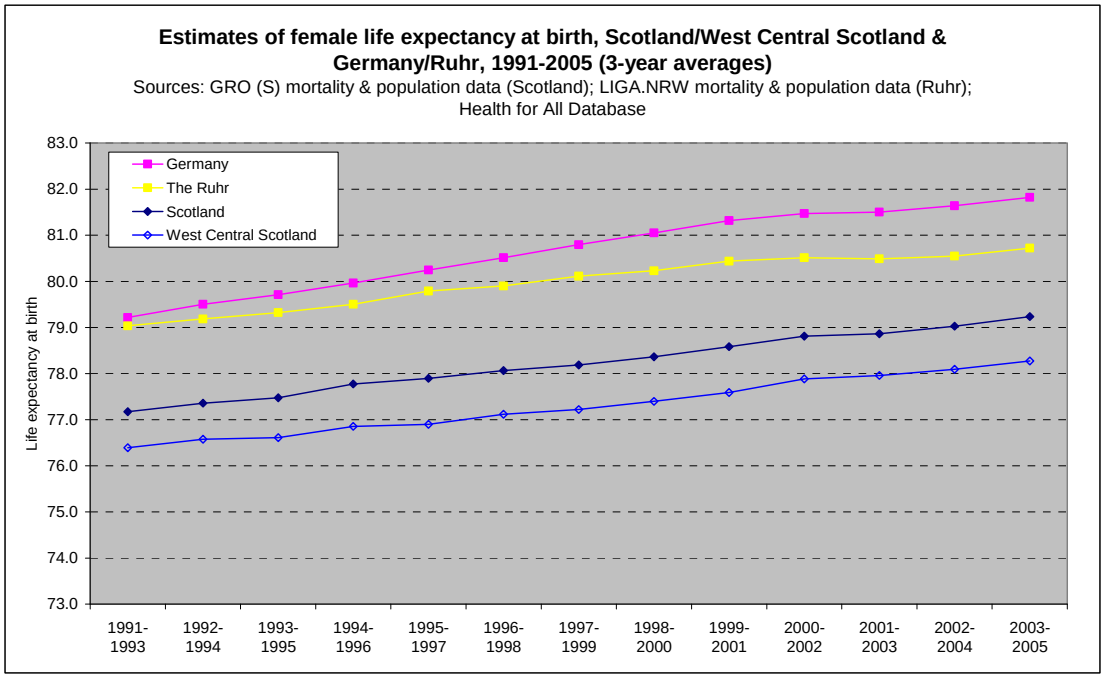


Figure 5



2.1.2 Age and cause-specific mortality

Previous analysis undertaken for the first 'Aftershock' report provides more detail on the different patterns of mortality in the two regions between 1980-82 and 2003-05. In summary:

- Mortality rates for children aged 0-14 were very similar in the two regions throughout the period.

- Mortality rates for younger working-age adults (aged 15-44) were very similar in the Ruhr and WCS throughout much of the 1980s. However, in the 1990s, mortality for this age group rose steadily in WCS and fell steadily in the German region.

- For the middle-aged (aged 45-64) and elderly (65+), mortality rates were consistently lower in the Ruhr than in WCS.

- Mortality from most forms of cancer was lower among Ruhr residents than those in WCS throughout the period, especially for women.

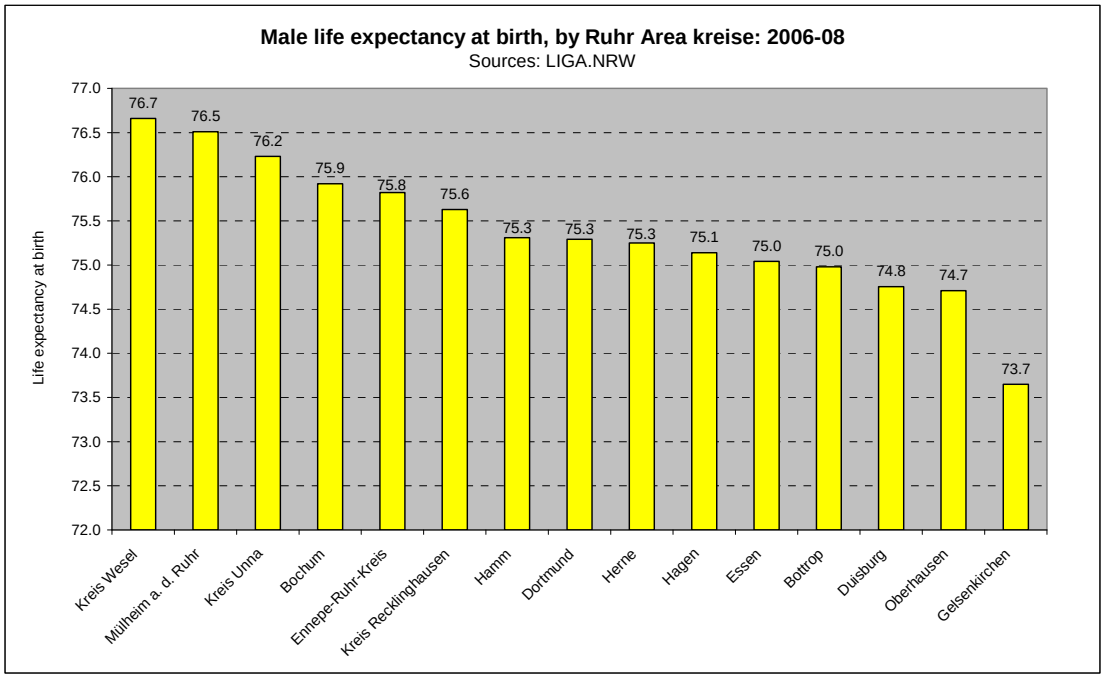
- Rates of both suicide and chronic liver disease-related mortality fell in the Ruhr over time but increased steadily in WCS.

For more details of the above analyses, please consult the first 'Aftershock' report.

2.1.3 Sub-regional life expectancy

Life expectancy at birth varies widely across the Ruhr area. In 2006-08, men in the Wesel and Mulheim an der Ruhr *kreise* could expect to live two years longer than those in Duisberg or Oberhausen, and three years longer than those in Gelsenkirchen (Figure 6). A similar spatial pattern was observed for women.

Figure 6



Figures 7 and 8 compare life expectancy at birth in the Ruhr kreise and WCS districts for men and women. Life expectancy in East Renfrewshire and East Dunbartonshire compares favourably with the Ruhr kreise for both sexes. For men, five of the 11 WCS districts have male life expectancies that compare unfavourably with

Gelsenkirchen – the district with the lowest male life expectancy within the Ruhr area. For women, seven of the WCS districts have lower life expectancies at birth than Gelsenkirchen.

Figure 7

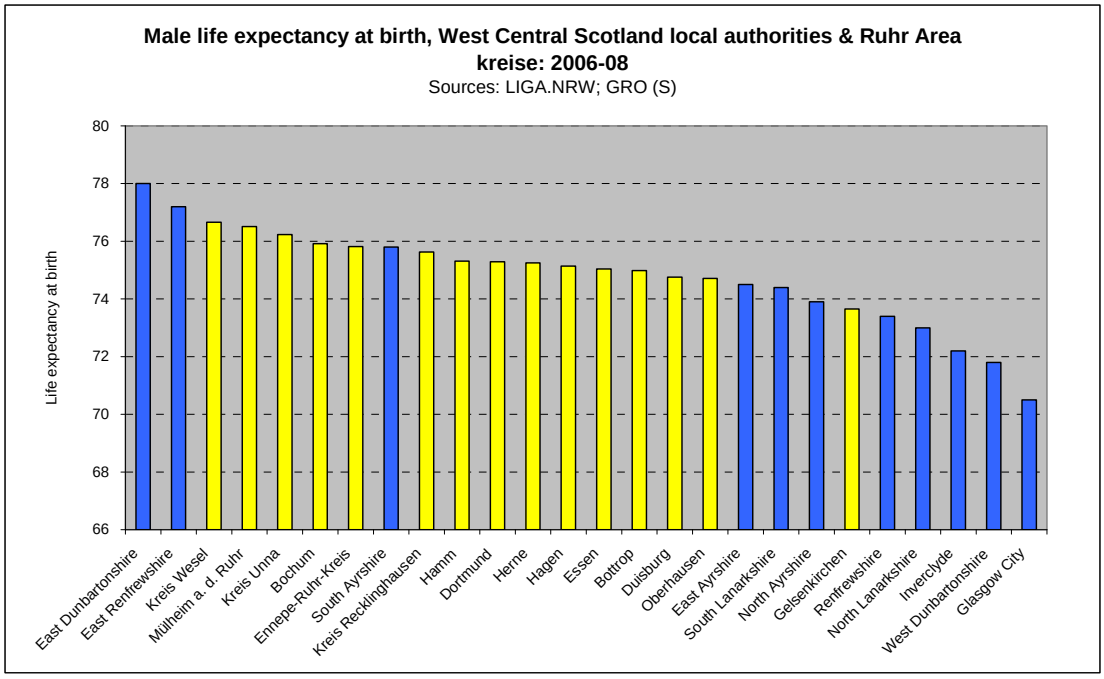
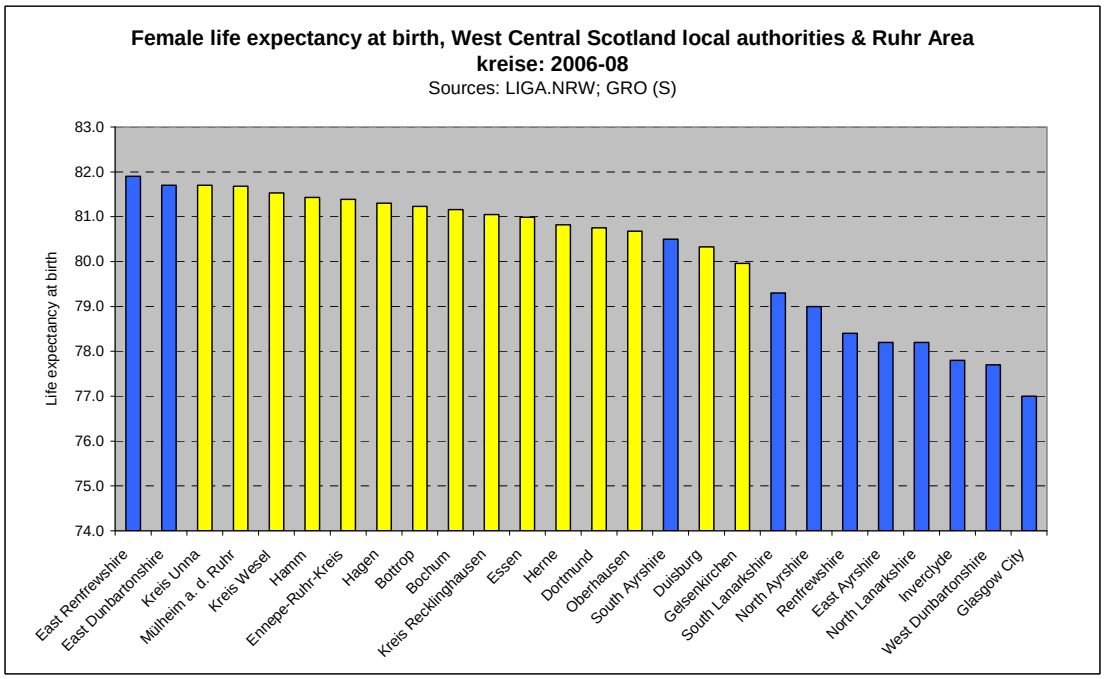


Figure 8



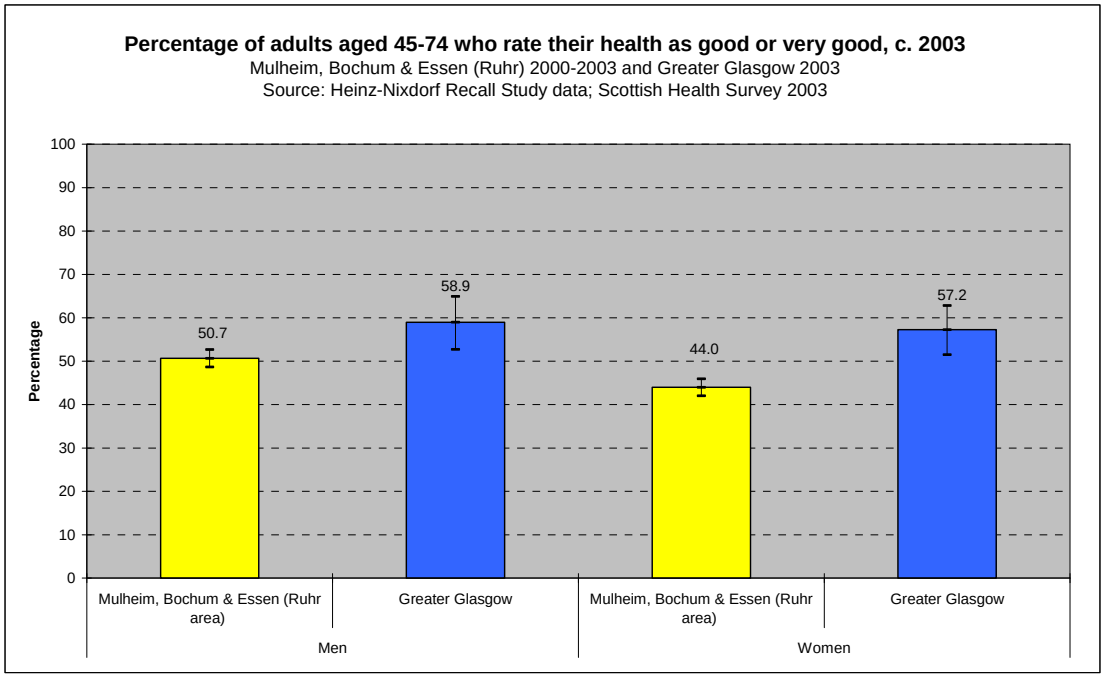
2.2 Self-reported measures of health and wellbeing

2.2.1 General health

In the main report, we show self-rated health data which indicate adults in North Rhine-Westphalia (as a proxy for the Ruhr area) were less likely to rate their general health as good or very good compared to those in Greater Glasgow and Clyde (used here as a proxy for WCS). This issue can be explored more directly (for adults aged 45-74) by comparing results from the Heinz-Nixdorf Recall Study (discussed earlier) with the Scottish Health Survey.

Figure 9 shows the percentage of men and women aged 45-74 rating their health as good or very good in the three cities of the Heinz Nixdorf Recall Study and in Greater Glasgow. In 2002-03, middle-aged residents of Greater Glasgow were significantly more likely to rate their health as good or very good than those in the three Ruhr cities.

Figure 9

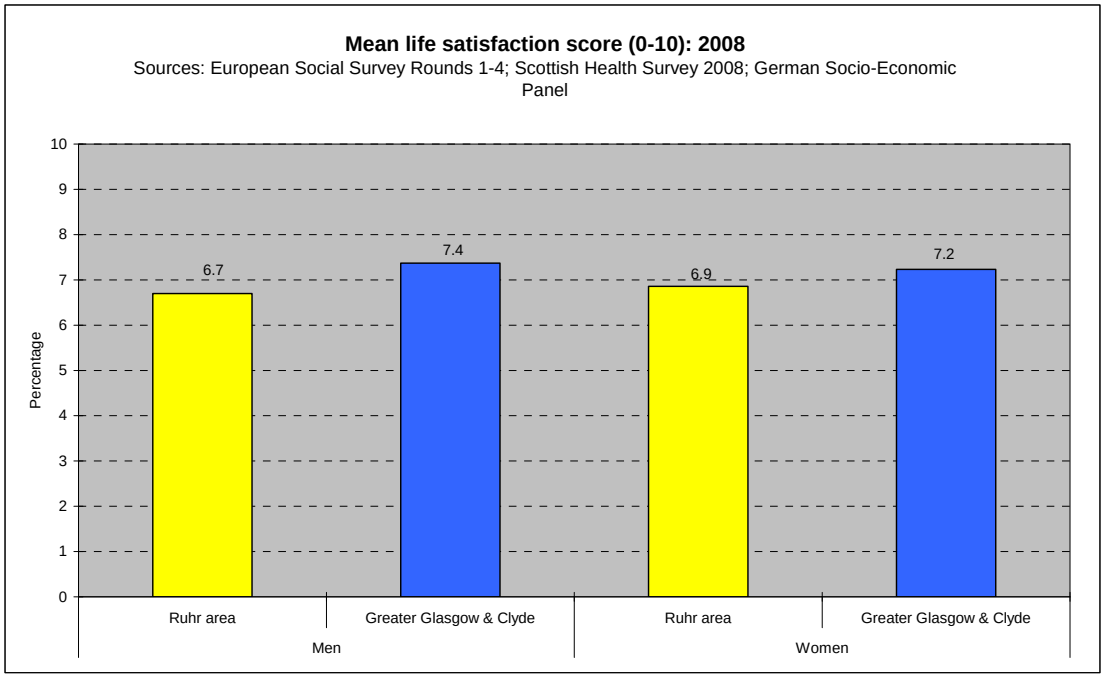


Sample sizes: HNRS 2000-2003 (3 cities) – 2385 men and 2416 women; Scottish Health Survey 2003 (Greater Glasgow) – 242 men and 318 women.

2.2.2 Life satisfaction

There is continuing interest in measures of life satisfaction as an indicator of subjective well-being[ix]. The indicator presented here is based on the mean score from 0-10 based on adult responses to how satisfied they are with their life as a whole nowadays. Life satisfaction scores were slightly higher in Greater Glasgow and Clyde (used here as a proxy for WCS) than in the Ruhr area[x] (Figure 10).

Figure 10



Sample sizes: German Socio-Economic Panel (Ruhr area) - 569 men and 626 women; Scottish Health Survey 2008 (Greater Glasgow & Clyde) - 703 men and 843 women.

[ix] For example, the adoption of a question on life satisfaction by the European Survey, the Scottish Health Survey and the Scottish Household Survey.

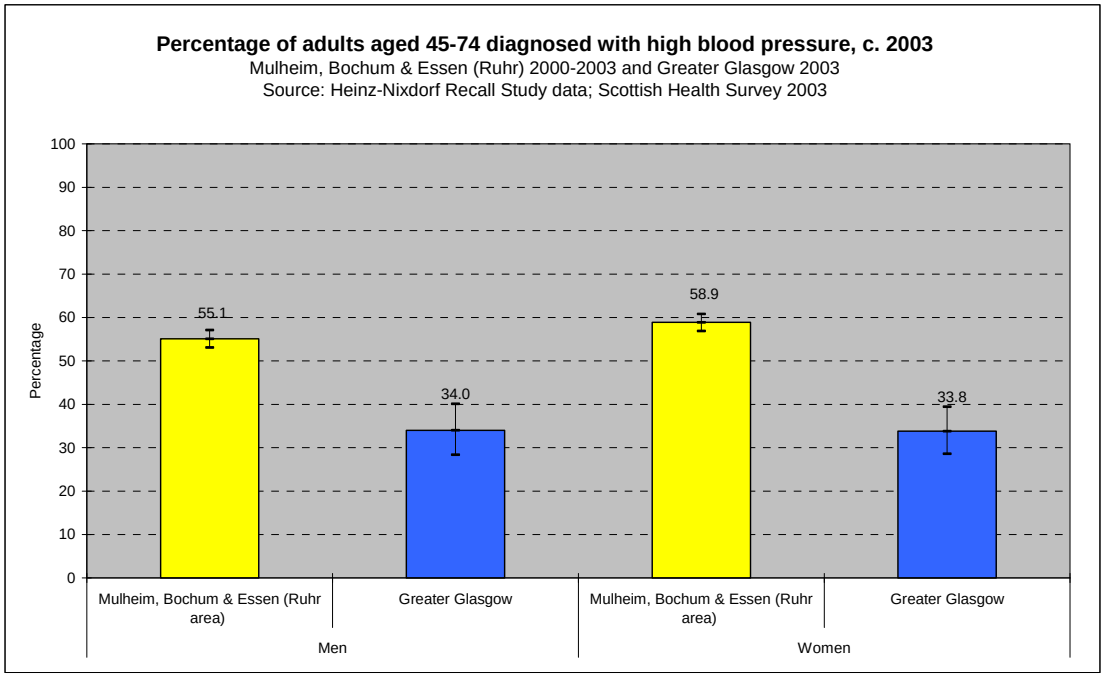
[x] Ruhr figures were provided by Dr. Jan Goebel, Research Associate German Socio-economic Panel Study (SOEP) at DIW Berlin.

2.2.3 Diagnosed diabetes and high blood pressure

Using the Heinz Nixdorf Recall Study, we can compare selected biological markers of health for older working-age adults (aged 45-74) in three cities of the Ruhr and Greater Glasgow. The measures included are diagnosed diabetes and high blood pressure.

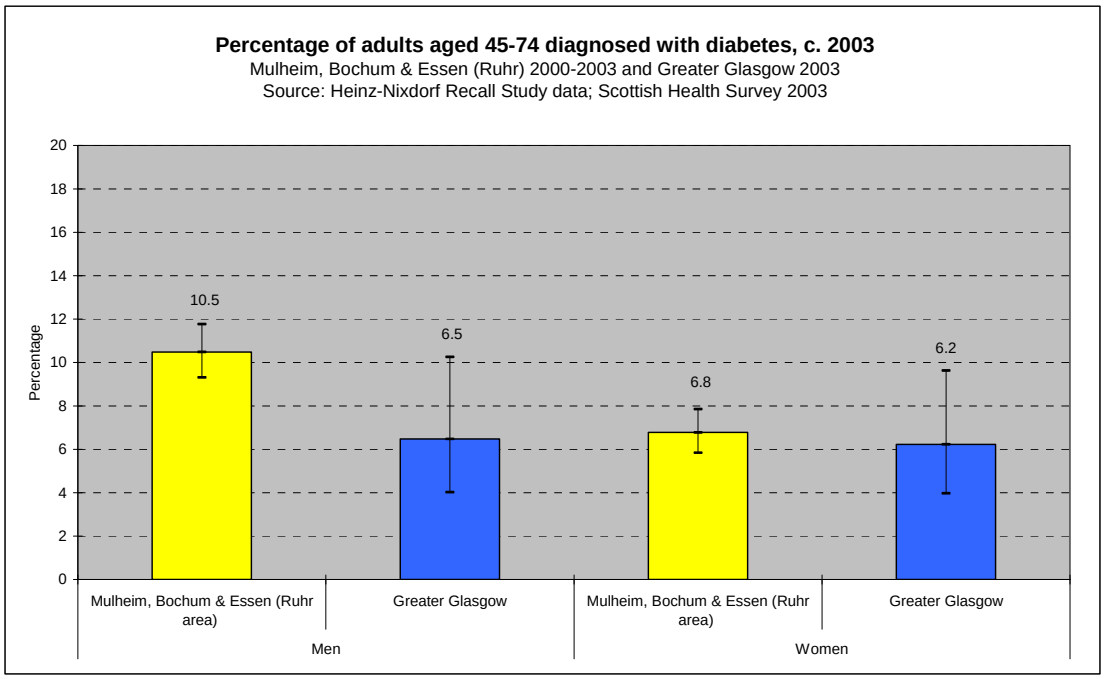
Figure 11 shows that the percentage of middle-age adults with diagnosed high blood pressure was much higher in the three Ruhr cities than in Greater Glasgow. However, Figure 12 shows that among the same age group, the percentage of adults with diagnosed diabetes did not vary significantly by region.

Figure 11



Samples sizes= HNRS 2000-2003 (3 cities) –2,372 men and 2,407 women, Scottish Health Survey 2003 (Greater Glasgow) – 242 men and 316 women.

Figure 12



Samples sizes= HNRS 2000-2003 (3 cities) –2395 men and 2419 women, Scottish Health Survey 2003 (Greater Glasgow) –242 men and 318 women.

Summary: Health and function

- **Life expectancy** was consistently higher in the Ruhr area compared to WCS for both sexes between 1991 and 2005.
- Patterns of **mortality** differ by age, sex and cause in the two regions. The relatively high mortality rates for women, and rising mortality rates for young adults, seen in WCS appear to be driving the slower improvement in life expectancy in WCS compared to the Ruhr.
- Despite higher mortality rates, middle-aged adults in Greater Glasgow were more likely to rate their **general health** as good or very good than their counterparts in three large cities of the Ruhr area.
- Mean **life satisfaction** scores were also higher in Greater Glasgow than in the Ruhr area.
- The percentage of middle-age adults with diagnosed high **blood pressure** was much higher in the three Ruhr cities than in Greater Glasgow. Prevalence of diagnosed **diabetes** was, however, very similar in the two regions.
- Overall, self-reported measures of health and function appear to be 'worse' in the Ruhr than WCS: this is at odds with higher objective rates of mortality in the Scottish region, and probably reflects cultural differences in the self-reporting of health between the two countries (note that this is discussed further in the main report).

3.0 Prosperity and poverty

As highlighted in the introduction to the main report, a key research question of this project is whether WCS's relatively poorer health status can be explained purely in terms of socio-economic factors, such as poverty and deprivation. This section presents some data comparing a range of measures of prosperity and poverty in the Ruhr area and WCS to test the plausibility of this idea. The available socio-economic data that have been analysed here include: unemployment and employment rates; access to a private car; home ownership; perceived adequacy of household income; relative poverty; and income inequality.

3.1 Unemployment

The measure of unemployment uses the International Labour Organisation (ILO) definition[2] . This includes all those who are out of work, want a job, have actively sought work in the previous four weeks and are available to start work within the next fortnight; or who are out of work and have accepted a job that they are waiting to start in the next fortnight. The unemployment rate is the number of unemployed people divided by the economically active population (employed plus unemployed).

In Scotland, the unemployment rate in 2007 was around 5%. Rates across the WCS local authority areas ranged from 3.1% in East Dunbartonshire to 7.1% in Inverclyde (Figure 13). Unemployment in Germany in 2007 was more than 8%[3]. As with WCS in relation to Scotland as a whole, the majority of districts in the Ruhr (12 out of 15) had unemployment rates that were higher than that of Germany or NRW state (8%). There was, however, substantial variation across the Ruhr, with rates varying from around 7% to more than 14% (Figure 14).

Figure 13

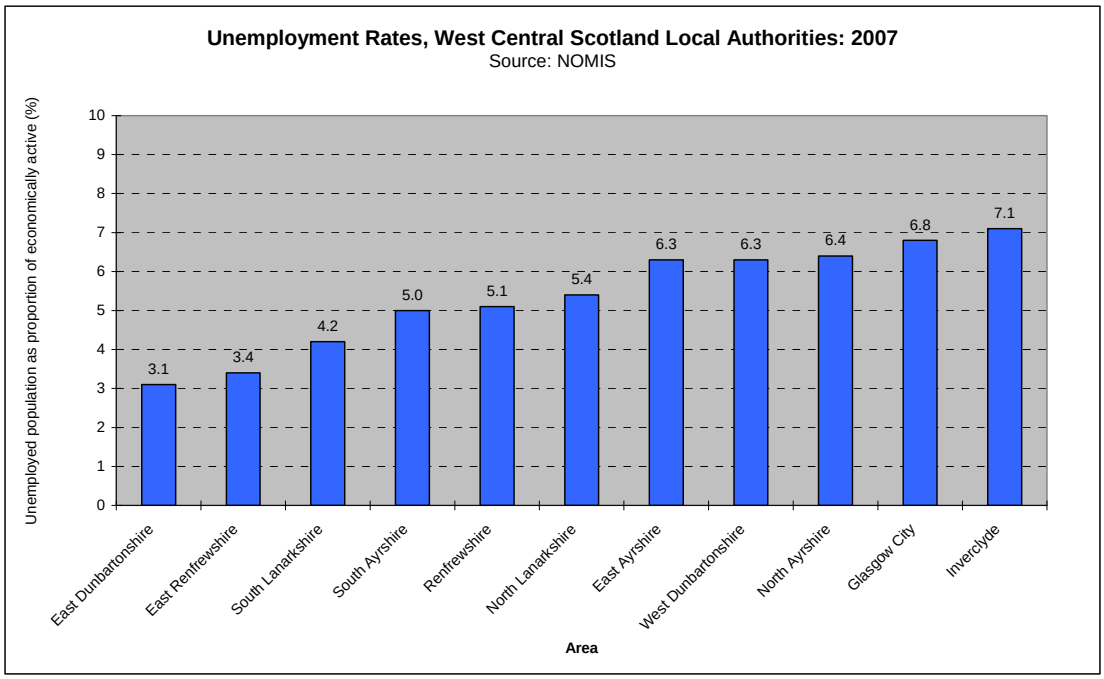


Figure 14

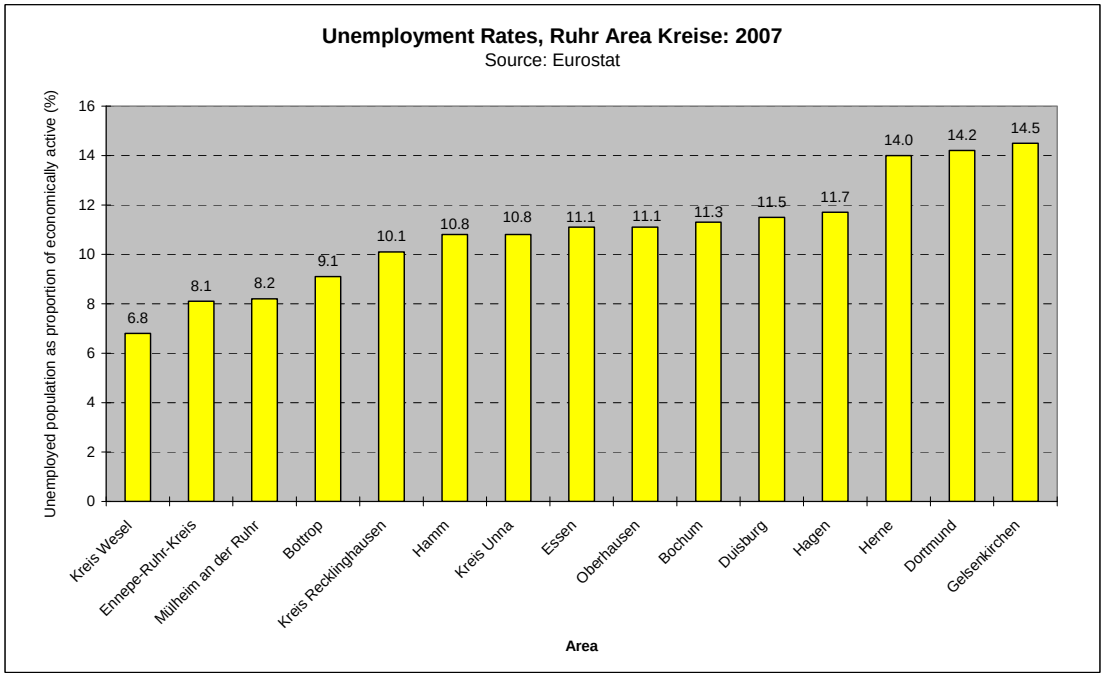
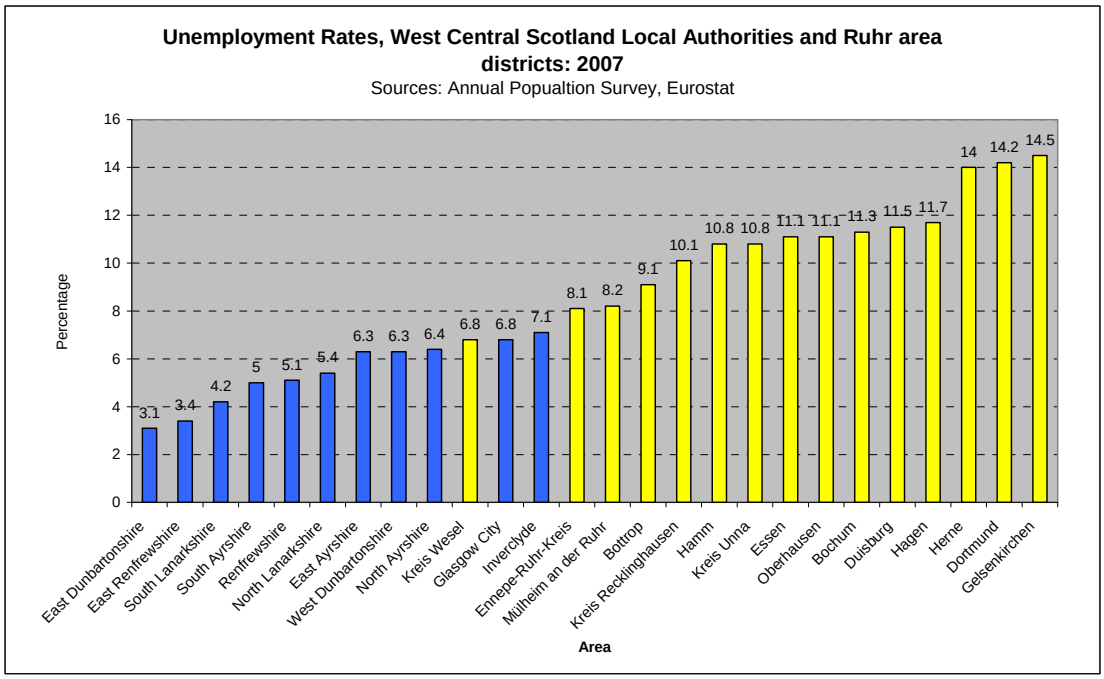


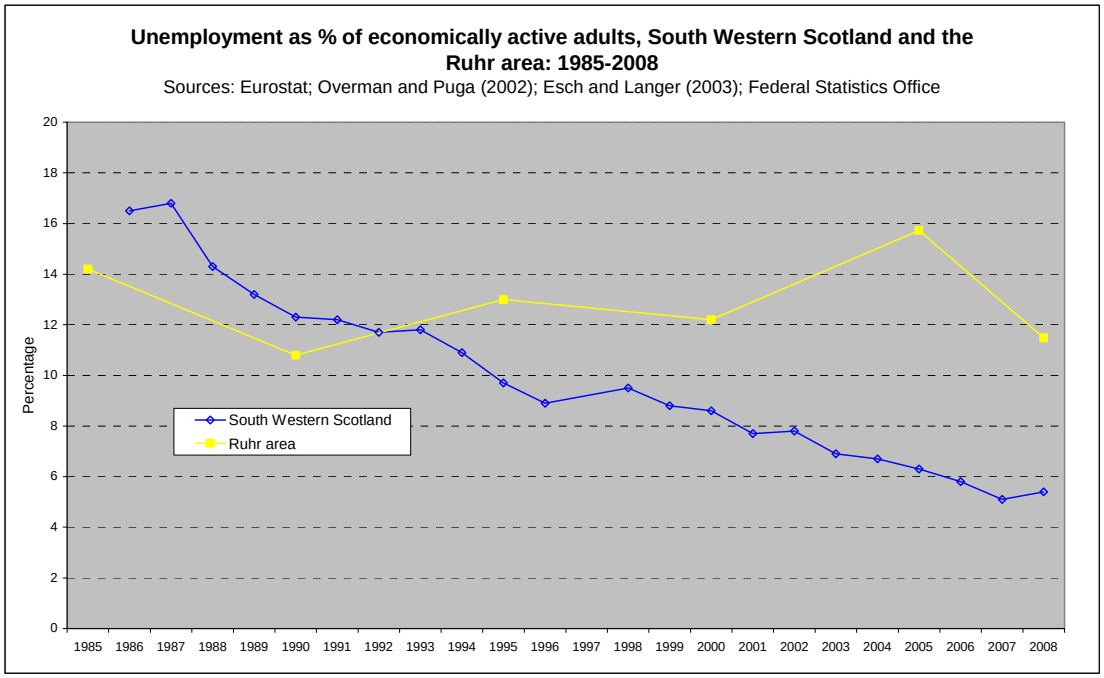
Figure 15 compares all Ruhr *kreise* and WCS local authorities. It is quite obvious that, in general, unemployment in 2007 was a greater problem in the Ruhr than it was WCS.

Figure 15



The figures above all refer to unemployment rates in 2007. Figure 16, however, shows how unemployment had changed over the period from 1985 to 2008. Note that South Western Scotland is used as a proxy for the WCS region. In the mid-1980s, unemployment was much higher in the Scottish region. However, rising unemployment in the Ruhr and falling unemployment in WCS meant that rates converged in the early 1990s. These trends continued until the middle of the last decade: by 2005, unemployment in the Ruhr was nine percentage points higher than in South Western Scotland.

Figure 16

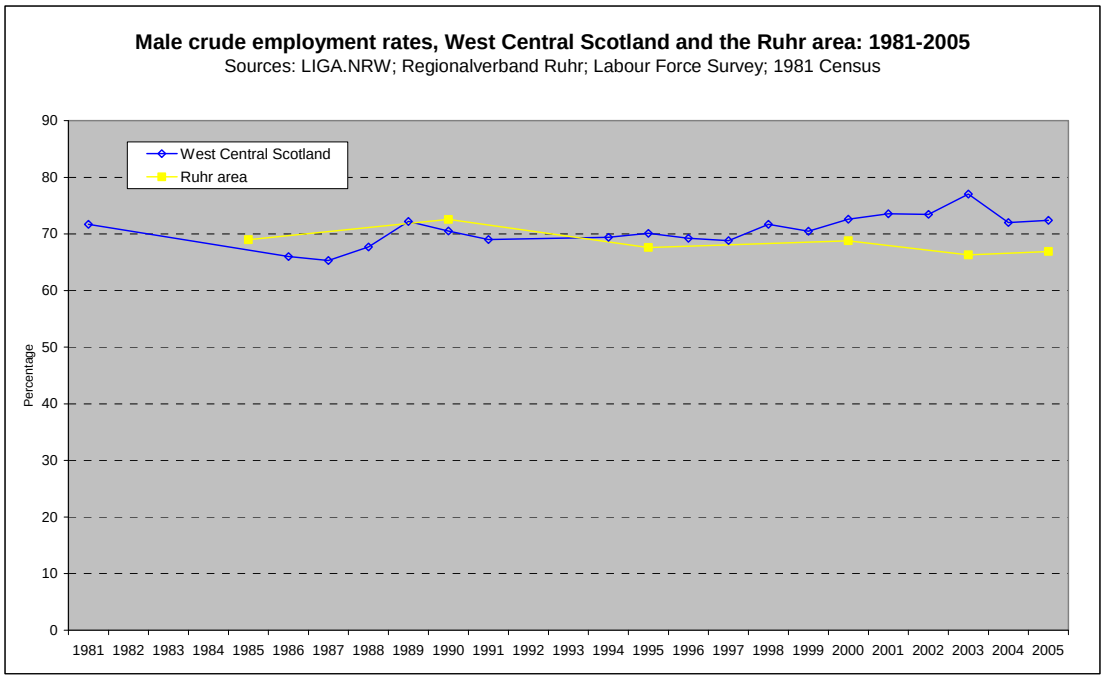


3.2 Employment rates

As discussed in the main report, unemployment rates alone may provide an incomplete picture of labour market change in the regions over time, given the diversion of working-age adults from unemployment to early-retirement and onto sickness benefits. To partly compensate for this, crude employment rates were calculated for men and women aged 15-64 for both regions for the period 1981-2005. The gender division is important given that since the 1970s, female labour market participation has been higher in the UK than in Germany[4].

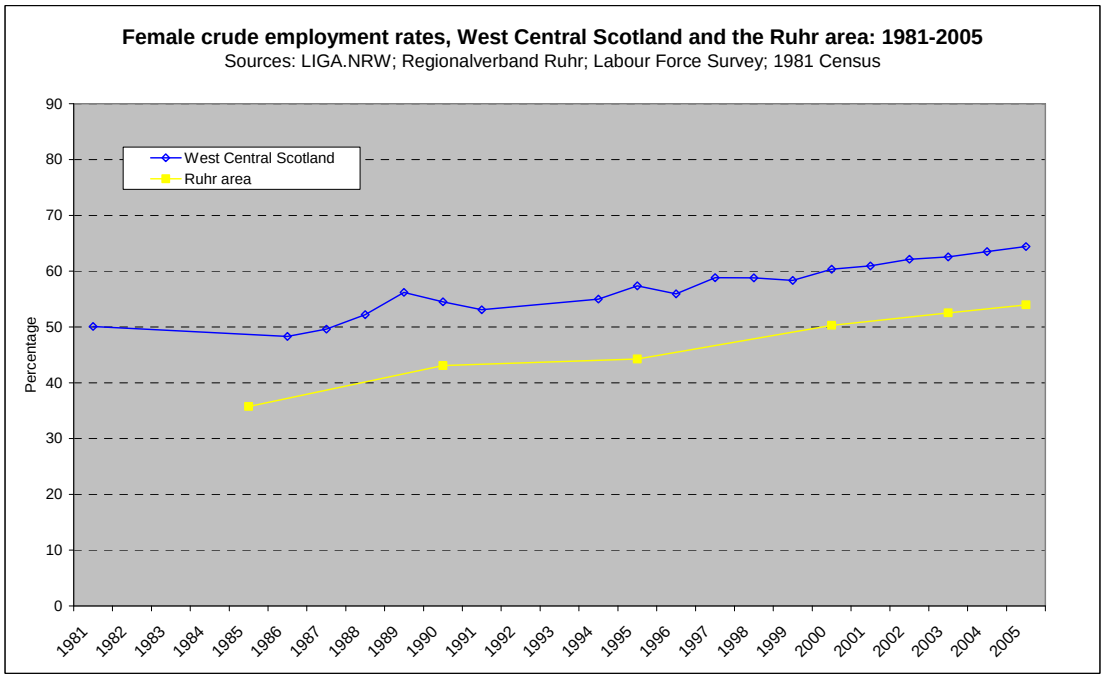
Employment rates for men aged 15-64 were a little higher in the Ruhr in the 1980s and similar in both regions until the late 1990s, when they diverged as rates rose in WCS but fell in the Ruhr (Figure 17).

Figure 17



For women, employment rates rose steadily in both regions between 1985 and 2005, but were consistently higher in WCS than in the Ruhr (Figure 18).

Figure 18

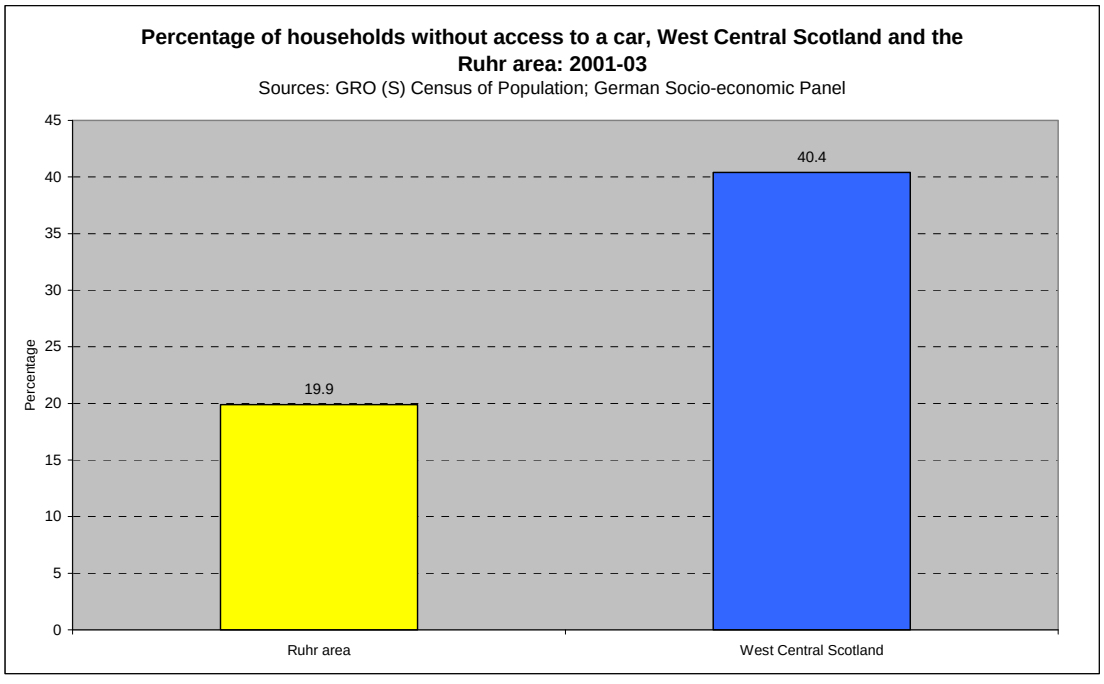


3.3 Car ownership

This section examines access to private cars as a proxy for household and individual wealth. As discussed in the main report, although levels of car ownership have been shown to be a very useful proxy measure for household income with the UK, cross country comparisons of this indicator are more problematic, given differences in relative cost and affordability within different countries, as well as potential cultural influences.

Bearing those caveats in mind, Figure 19 shows the percentage of households with no access to a private car or van in the Ruhr area compared to WCS. In 2001-03, households in the Scottish region were twice as likely as those in the Ruhr to be without a car (40.4% vs. 19.9%).

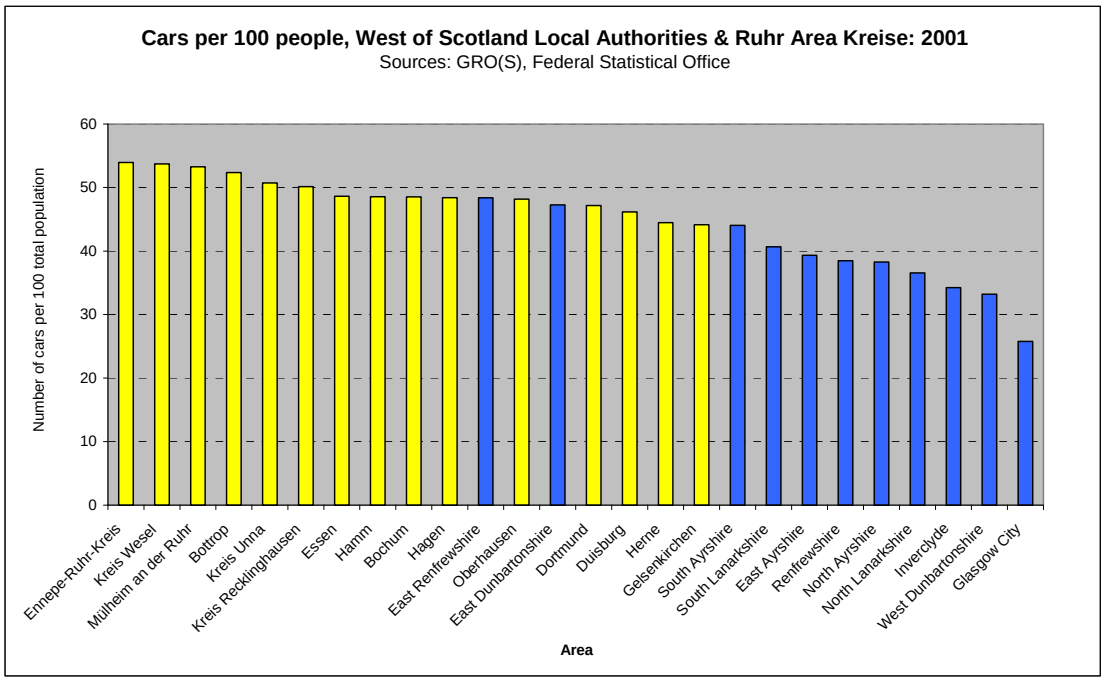
Figure 19



Although it was not possible to obtain comparable district-level data on car access, a proxy measure is analysed here: cars per 100 people. Figure 20 presents this measure for the WCS local

authorities and Ruhr kreise. In all but three of the WCS local authorities, the number of cars per capita was lower than that recorded for any Ruhr kreise. Variation between kreise was also not as wide as between WCS local authorities.

Figure 20



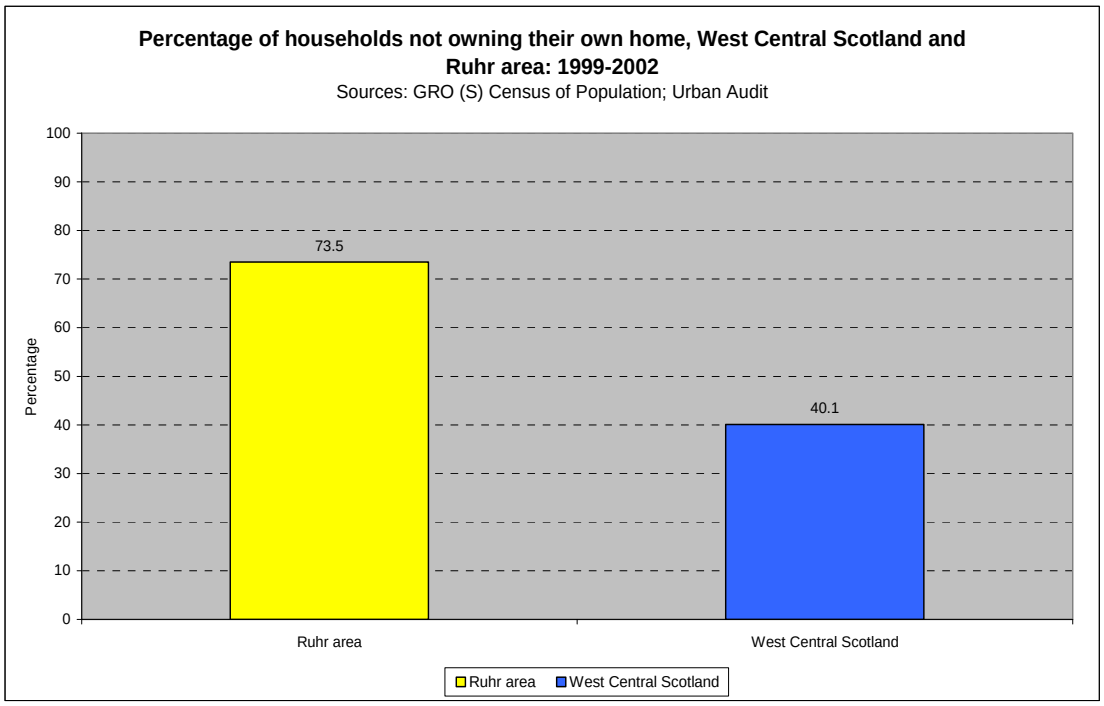
3.4 Home ownership

Lack of home ownership has been used as a measure of relative disadvantage in many studies of health and deprivation in the UK. However, as with car ownership, there are clear difficulties in making cross-country comparisons of such an indicator. Any differences may reflect cultural attitudes towards home ownership and the policy environment (e.g. 'Right to Buy'[xi] in the UK) as much as levels of prosperity.

[xi] *Introduced in 1980, the Right-to-Buy scheme gave tenants of council housing in the UK the right to buy the home they lived in. From March 2011, those renting social housing for the first time in Scotland or those returning to rent social housing no longer have the right to buy.*

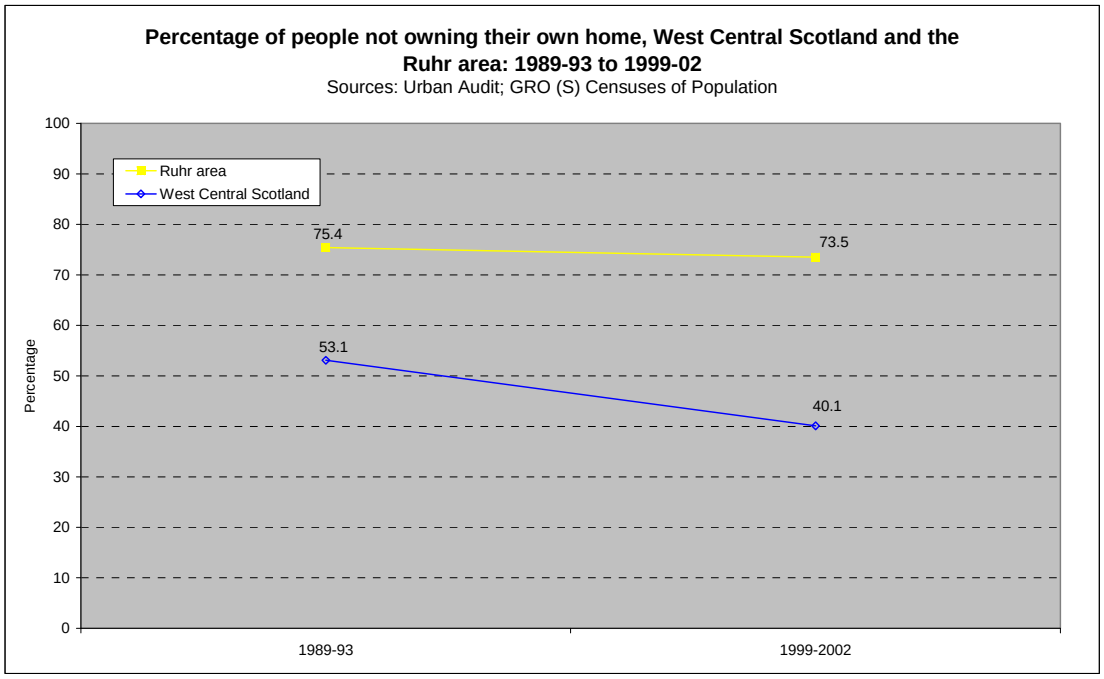
Figure 21 shows that owner-occupation is much more common in WCS than in the Ruhr: in 2001, nearly three-quarters of households in the German region did not own their own home, while in WCS this figure was much lower, at four in 10.

Figure 21



This divide in owner-occupation rate widened between 1991 and 2001. In the Ruhr, the percentage not owning their own home remained relatively stable but in WCS it decreased from 53.1% to 40.1% (Figure 22).

Figure 22

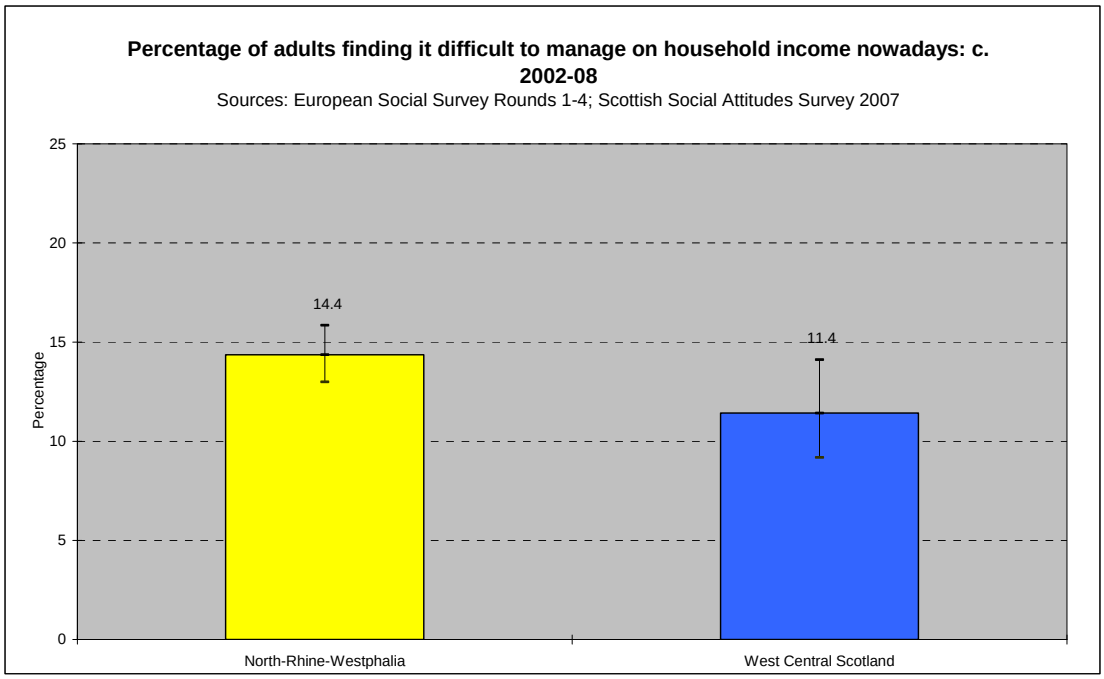


3.5 Perceived adequacy of income

As discussed in the main report, survey data can be compared to assess regional differences in perceived adequacy of income at the household level. The question asked in both the European Social Survey (ESS) and the Scottish Social Attitudes Survey (SSAS) is whether people "*find it difficult to manage on household income nowadays*"[xii]. Some care must be taken in comparing these results, given small sample sizes and the use of North-Rhine-Westphalia as a proxy for the Ruhr area. Nonetheless, the percentage reporting they found it difficult to manage was not significantly different in the two regions: 11% of the WCS sample in the SSAS compared to 14% of the ESS sample for North-Rhine-Westphalia (Figure 23).

[xii] ESS data are taken from Rounds 1-4 of the survey which cover the years 2002, 2004, 2006, and 2008. However, reported values for this question for the selected region do not vary significantly between rounds. Note also that ESS data are available for all Scotland (but not WCS), and the figure for this question is close to that for WCS taken from the SSAS: 12.8%.

Figure 23



Sample sizes: North-Rhine-Westphalia=1854; WCS=534.

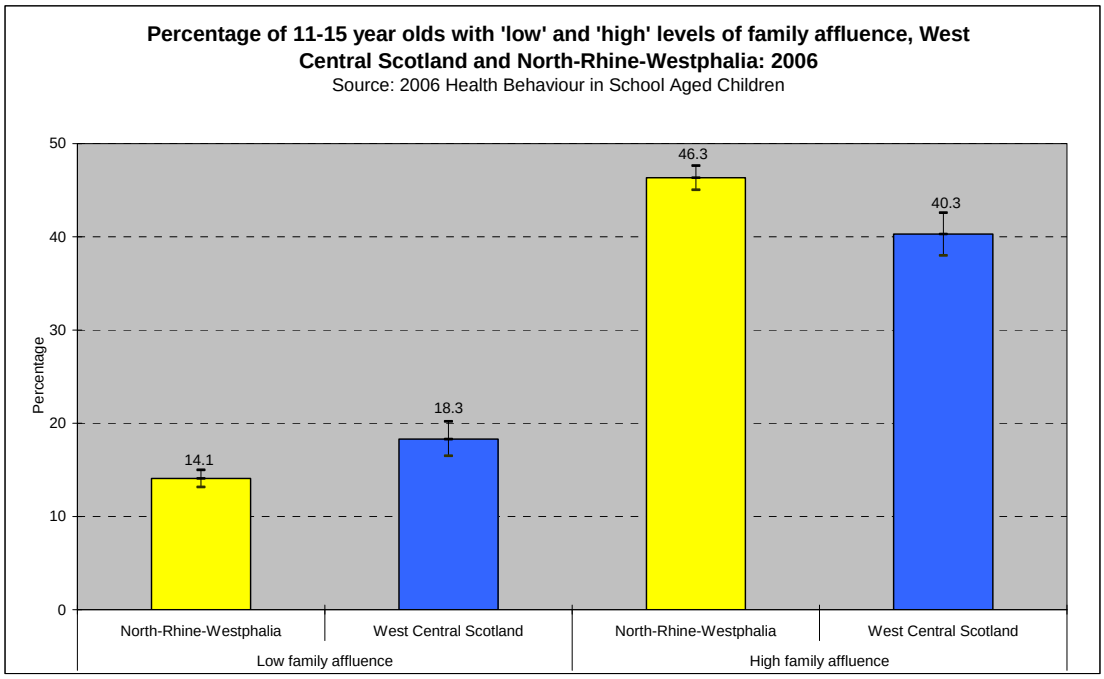
3.6 Family affluence

The Family Affluence Scale is calculated from young people's responses to four questions in the WHO-collaborative Health Behaviour in School-aged Children survey (HBSC)[5]. The questions relate to: family ownership of a car; ownership of computers; whether the young person has their own bedroom; and number of family holidays in the year prior to the survey. A composite score is derived from the answers to these questions and, from this, families can be assessed as being of low, middle or high levels of affluence[6]. The main report presents data for five regions of interest for this study. Here we compare the percentage of 11-15 year olds living in 'high' and 'low' affluence families in North-Rhine-Westphalia (used here as proxy for the Ruhr area) and WCS.

Figure 24 shows that: children living in North-Rhine-Westphalia were less likely to live in 'low affluence' families than those in WCS (14.1% vs. 18.3%); conversely, children living in WCS were less likely to live

in ‘high affluence’ families than those in North-Rhine-Westphalia (46.3% vs. 40.3%).

Figure 24



Sample sizes: North-Rhine-Westphalia=5642; WCS=2547.

3.7 Relative poverty and inequality

In the European Union, poverty is usually measured in relative terms: that is, showing income levels relative to national income standards. The most common indicator used is the percentage of people living in households with an income less than 60% of median national income. Lemmi et al (2003)[7] have published methods and data that can be used to estimate relative poverty rates for a large number of NUTS II[xiii] regions, averaged for the period 1994-2001. These were used to estimate poverty rates for North-Rhine-Westphalia (used here as a proxy for the Ruhr area) and South Western Scotland (used as a proxy for WCS). Again, some caution should be used in

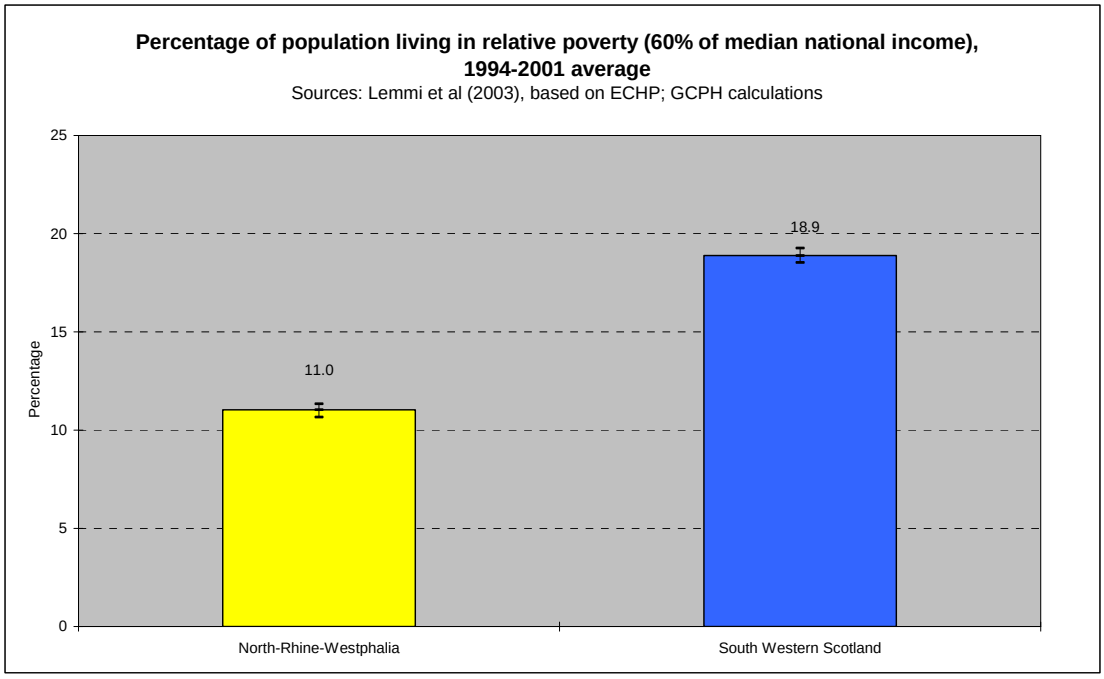
[xiii] Nomenclatures of Units for Territorial Statistics (NUTS) are the standard geographies used by the European Union to divide countries into regions and sub-regions. NUTS II regions have populations between 800,000 and 3m.

interpreting these results, given that levels of poverty in the core Ruhr area are higher than those in NRW State[8].

Figure 25 shows that relative poverty was substantially lower in North-Rhine-Westphalia than in South Western Scotland (11.0% vs. 18.9%). This is likely to be driven by much lower rates of poverty among children and pensioners in Germany than in Scotland.[9]

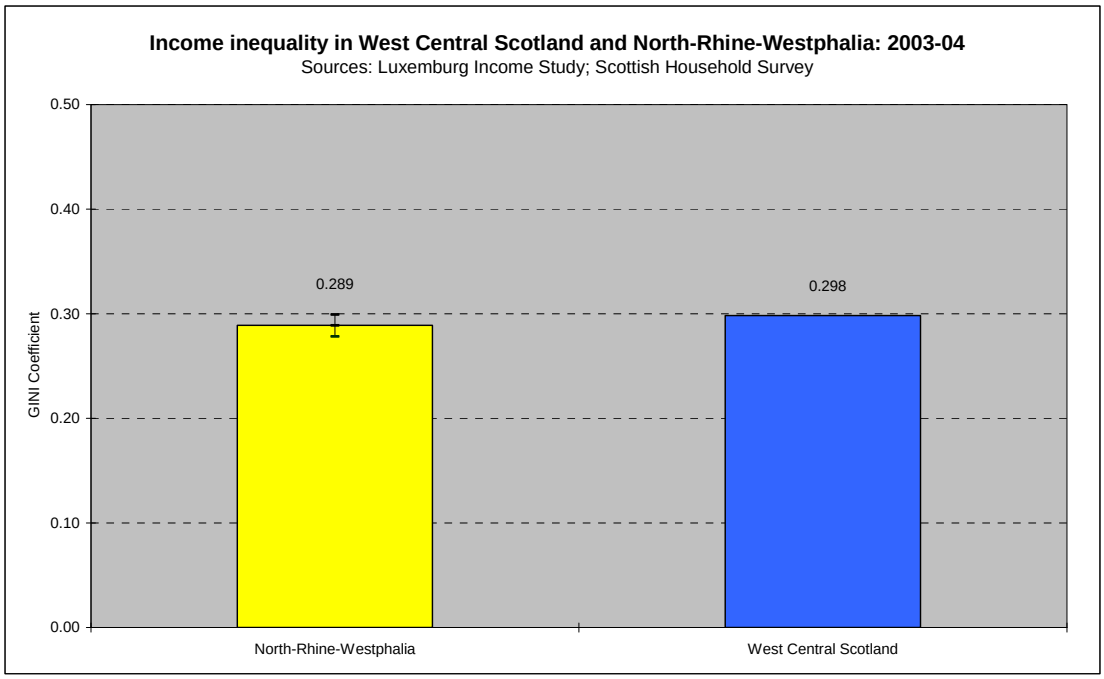
In the main report, we show that income inequality in Scotland (as measured by the Gini coefficient) was higher than levels seen in Germany. However, at a *regional* level, income inequality in WCS was only marginally higher in North-Rhine-Westphalia (0.296 vs. 0.289, Figure 26).

Figure 25



Sample sizes: 2164 (North-Rhine Westphalia); 1279 (South Western Scotland).

Figure 26



Sample sizes: 2379 (North-Rhine Westphalia); 11030 (West Central Scotland).

Summary: Prosperity and poverty

- Current levels of **unemployment** are higher and current **employment** rates lower, in the Ruhr area compared to WCS.
- Relative to WCS, male employment rates in the Ruhr were slightly higher in the 1980s, similar in the 1990s and slightly lower in the 2000s, while female employment rates have remained consistently lower in the German region.
- **Car ownership** was lower, but **home ownership** higher, in WCS compared to the Ruhr. However, clearly these differences may reflect cultural as much as socio-economic differences in the two regions.
- According to comparable survey data, the percentage of adults finding it difficult to manage on their **household income** nowadays was similar in WCS and North-Rhine-Westphalia.
- **Family affluence** may be lower in WCS. Survey data show that compared to North-Rhine-Westphalia, WCS had a lower percentage of children aged 11-15 living in 'high affluence' families and a higher proportion living in 'low affluence' families.
- WCS has much higher rates levels of **relative poverty** compared to North-Rhine-Westphalia, though **income inequality** is very similar in both regions.
- It is difficult to conclude that differences in socio-economic factors alone can account for WCS's poorer health outcomes compared to the Ruhr.

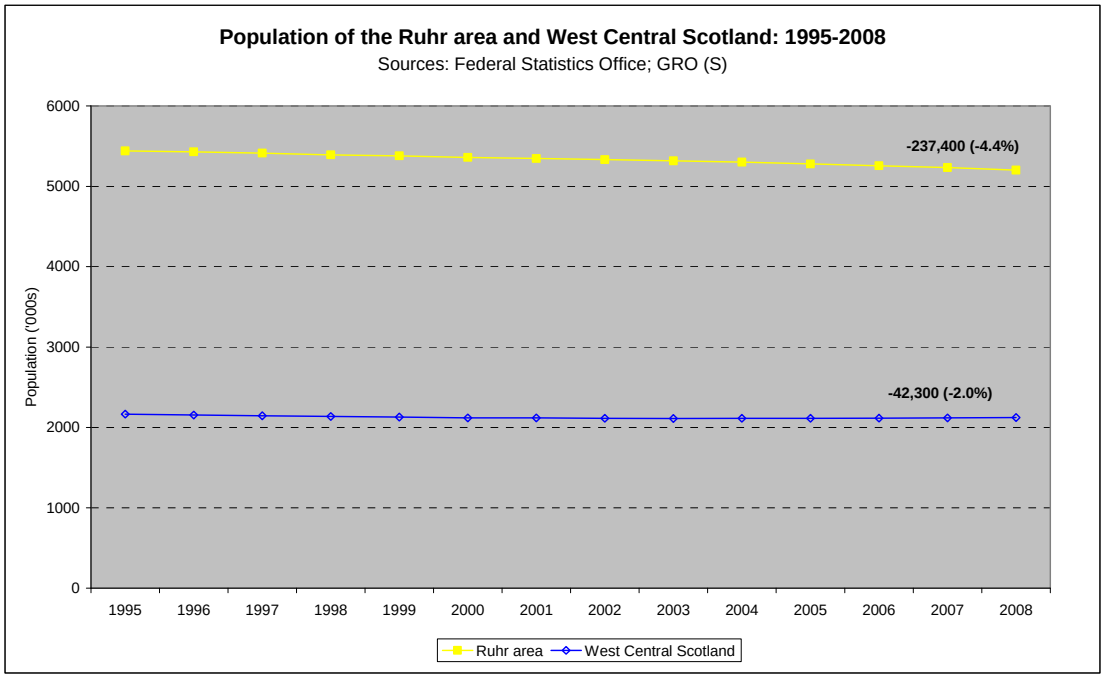
4.0 Population

Understanding the composition of the population, and how it has changed over time, may provide insights into factors driving population health. This section explores aspects of population in the two regions: overall trends; population size; population structure and density are presented here. Time trends and data for each district (Ruhr kreise and WCS local authorities) are presented where available. The most recent available data are shown.

4.1 Population change

Population change over time can be accounted for by the birth rate, death rate, immigration and emigration. Figure 27 shows how the total population changed over the 12 year period from 1996-2008 for WCS and the Ruhr area. Both regions experienced a decrease in population over this period, but it was relatively more pronounced in the Ruhr area than in WCS (Figure 27).

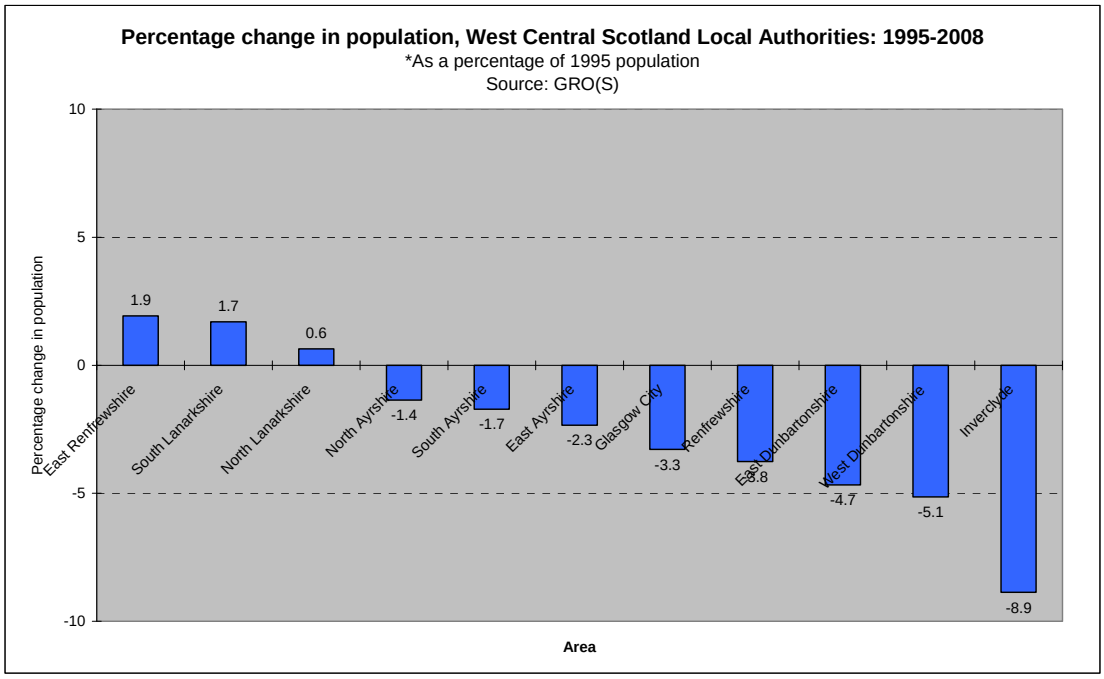
Figure 27



Population change between 1995 and 2008 (as a percentage of the 1995 population), was also calculated for each kreise in the Ruhr and local authority in WCS, to examine variation within the regions.

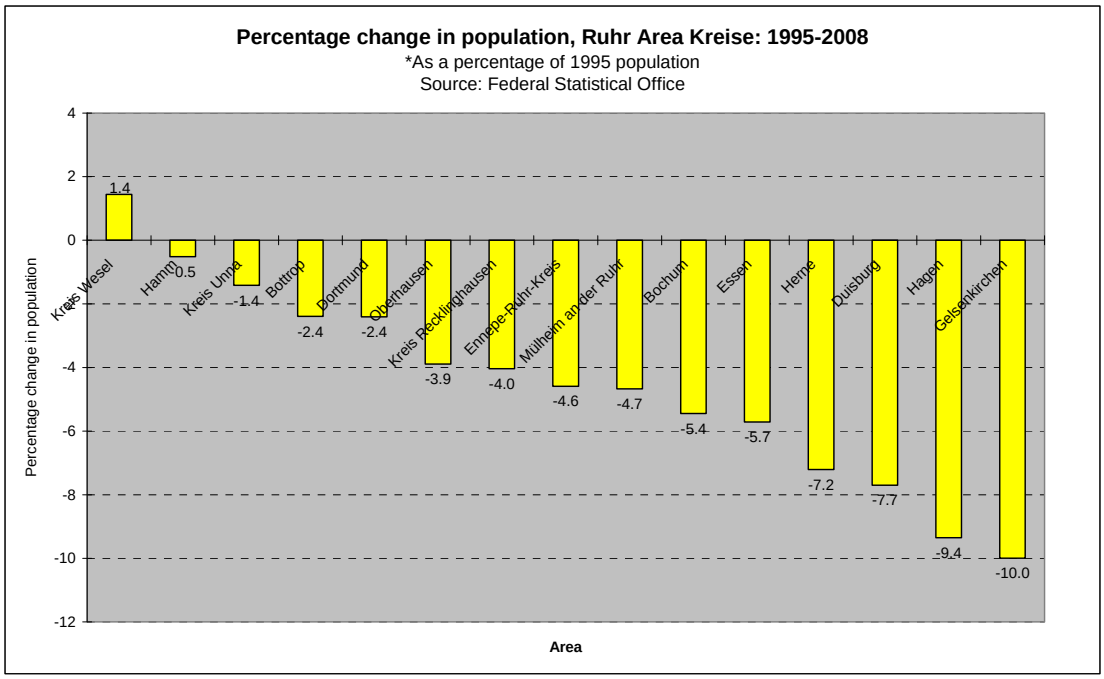
Figure 28 presents results for the WCS local authorities. Most of WCS local authorities experienced net population loss over the period from 1995 to 2008. East Renfrewshire, South Lanarkshire and North Lanarkshire saw modest increases in their populations. The Inverclyde population, at the worst end of the scale, decreased by almost 9% between 1995 and 2008.

Figure 28



The change in population also varied across the Ruhr area (Figure 29). With the exception of Wesel (which saw a small increase in its population), all the kreise lost population between 1995 and 2008. The most striking population loss over the period was seen in Gelsenkirchen: its population fell by 29,101 between 1995 and 2008, representing a net loss of 10% of the total 1995 population.

Figure 29

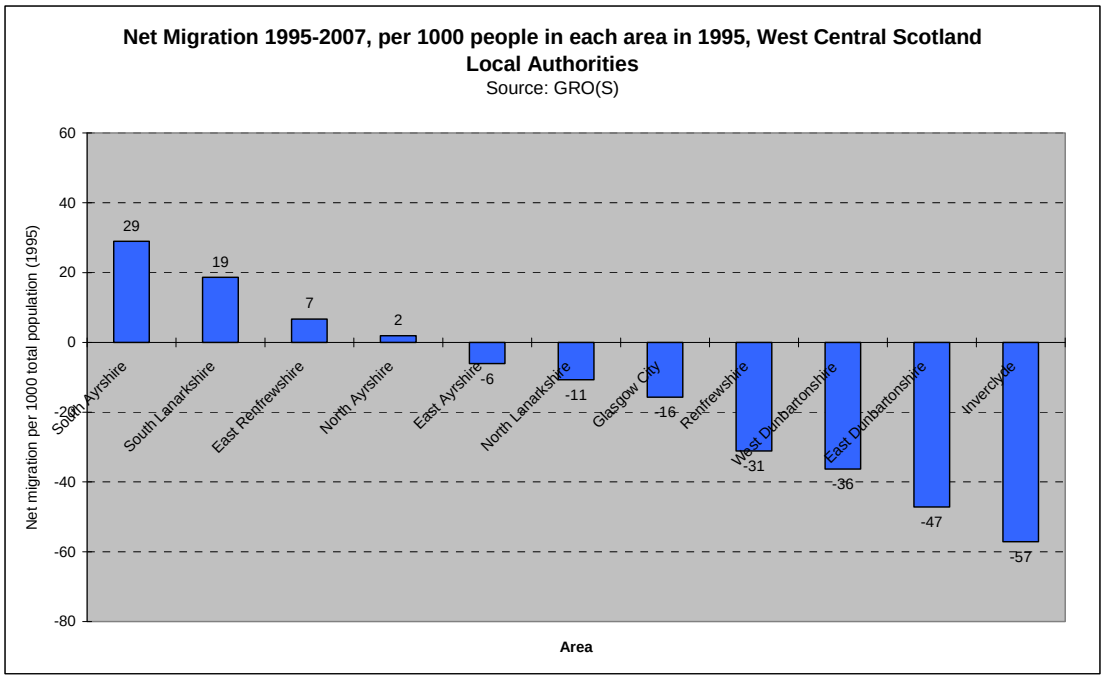


4.2 Migration

Net migration is shown for a 12 year period (1995-2007) to minimise the effect of short-term fluctuations on the overall movement of populations. To ensure comparisons between areas are valid, net migration between these dates is expressed per 1000 people resident in each area in 1995.

Between 1995 and 2007, there was net emigration of 23,000 people from WCS: almost 11 people per 1000 total population. There is a contrasting pattern in Scotland, which saw net immigration of almost 95,000 people to Scotland: an increase of 19 people per 1000 of the total (1995) population of Scotland. Variation between the local authorities was marked, with net immigration of 29 people per 1000 population in South Ayrshire and net emigration of 57 people per 1000 population in Inverclyde (Figure 30).

Figure 30



Between 1995 and 2007, the Ruhr lost over 15,000 people or almost three people per 1000 population. This is in sharp contrast to Germany as a whole, which saw net-immigration of 25 people per 1000 people over the same period[106]. Substantial disparity among the Ruhr area kreise is evident in Figure 31, below. The range of net migration from 1995-2007 was from 44 immigrants per 1000 population in Wesel, to 64 emigrants per 1000 population in Hagen (Figure 31).

Figure 31

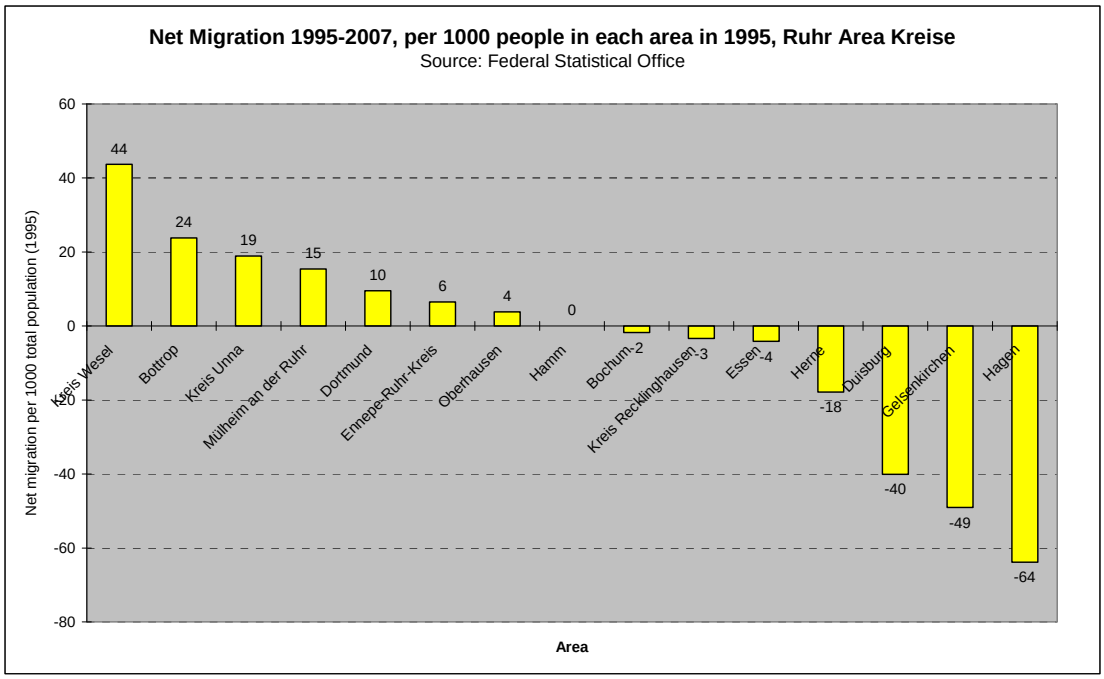
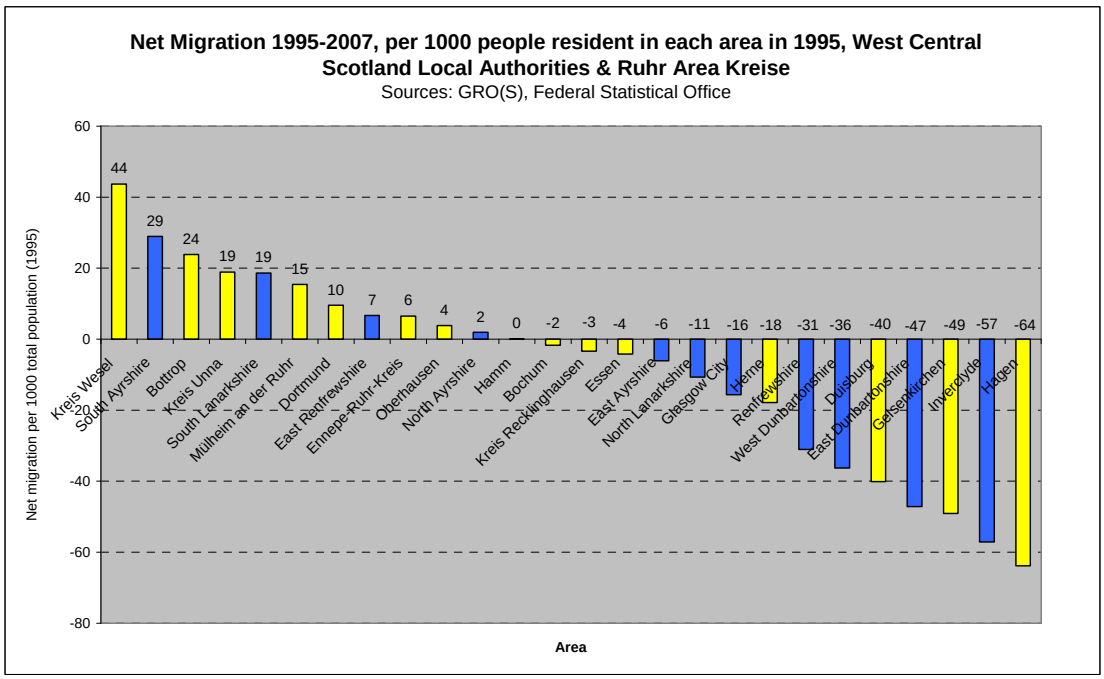


Figure 32

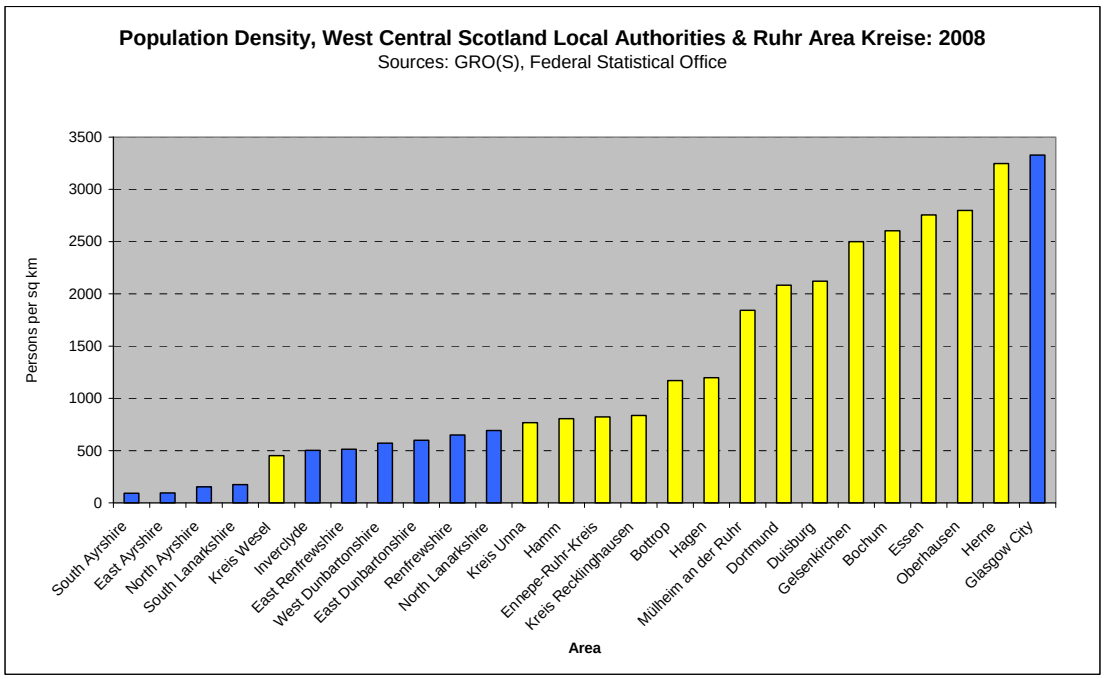


4.3 Population density

WCS is a predominantly urban environment, and as such had a considerably higher population density in 2008 (316 people per square kilometre) than that of Scotland as a whole (66 people per km^2). This varied from 91 people per km^2 in South Ayrshire, to 3329 in Glasgow City, although all local authorities except the city had less than 700 persons per km^2.

The Ruhr was far more densely populated than WCS, with 1173 persons per km^2, in a range from 453 in Wesel to 3247 in Herne. Although North Rhine-Westphalia is an urban state with 526 persons per km^2, Germany on the whole had far more people per area (230 per km^2 in 2007) than Scotland [2]. Figure 33 below shows population densities for the Ruhr area kreise and WCS local authorities in 2008. Population density was highest in the cities of Glasgow and Herne.

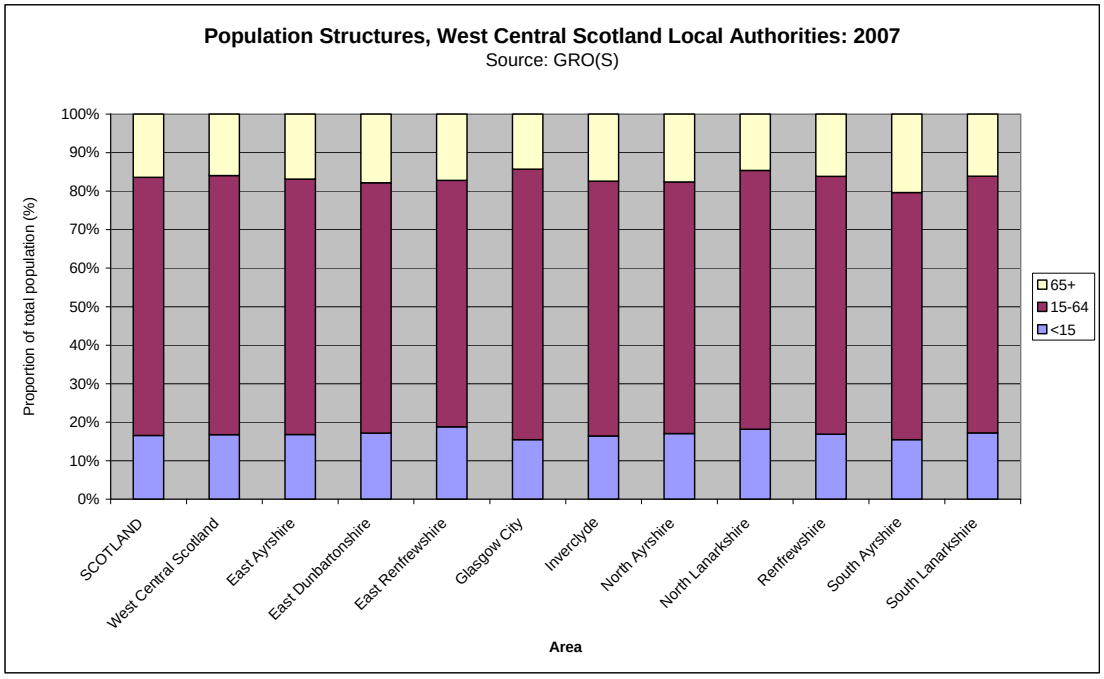
Figure 33



4.4 Population structure and dependency ratio

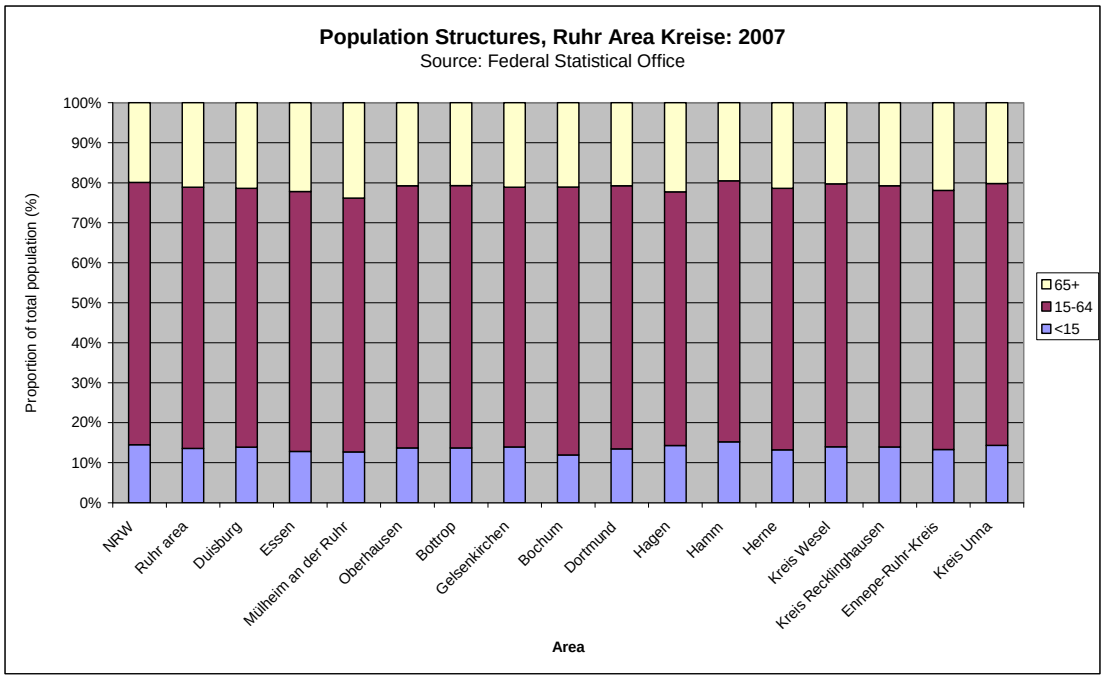
Figure 34 shows the population structure for each WCS local authority, dividing the 2007 population into three age groups: children (under 15), working-age adults (15-64), and pensionable adults (65+). As would be expected of a large city, Glasgow City local authority had the largest proportion of working-age adults (70%) in WCS, but there was not substantial variation across the region. The proportion of pensionable adults ranged from 14% in Glasgow City to 20% in South Ayrshire; the proportion of children ranged from 15% in South Ayrshire and Glasgow City to 19% in East Renfrewshire.

Figure 34



Variation between Ruhr area kreise was less than in WCS (Figure 35). Of note, however, is the greater proportion of the population that were over 65 – ranging from 19% in Hamm to 24% in Mulheim an der Ruhr – when compared to local authorities in WCS. Proportions of 15-64 year-olds ranged from 63% in Mulheim an der Ruhr and Hagen to 67% in Bochum. Children generally made up less of the population in the Ruhr (14%) than in WCS (17%).

Figure 35



The dependency ratio is defined by Last (2001) as "*the proportion of children and old people in a population in comparison to all others i.e. the proportion of economically inactive to economically active*"[11]. This is calculated by dividing the working-age (15-64) population by the sum of children and pensionable adults, expressed as a percentage. This of course does not take into account the number of people aged 15-64 who are economically inactive due to ill health, care responsibilities, or lack of employment opportunities. The trend in OECD countries, and in particular Germany, is that of an ageing population (and, therefore, an increasing dependency ratio). The consequential increase in the dependency ratio has been a concern to policy makers in Germany in recent years[12].

Figure 36 shows trends in the dependency ratios for both regions between 1995 and 2007. In 2007, the dependency ratio was marginally higher in the Ruhr area than in West Central Scotland. This is a reversal of the position seen in the mid-1990s and was driven by a fall in the dependency ratio in WCS and a rising dependency ratio in the German region.

Figure 36

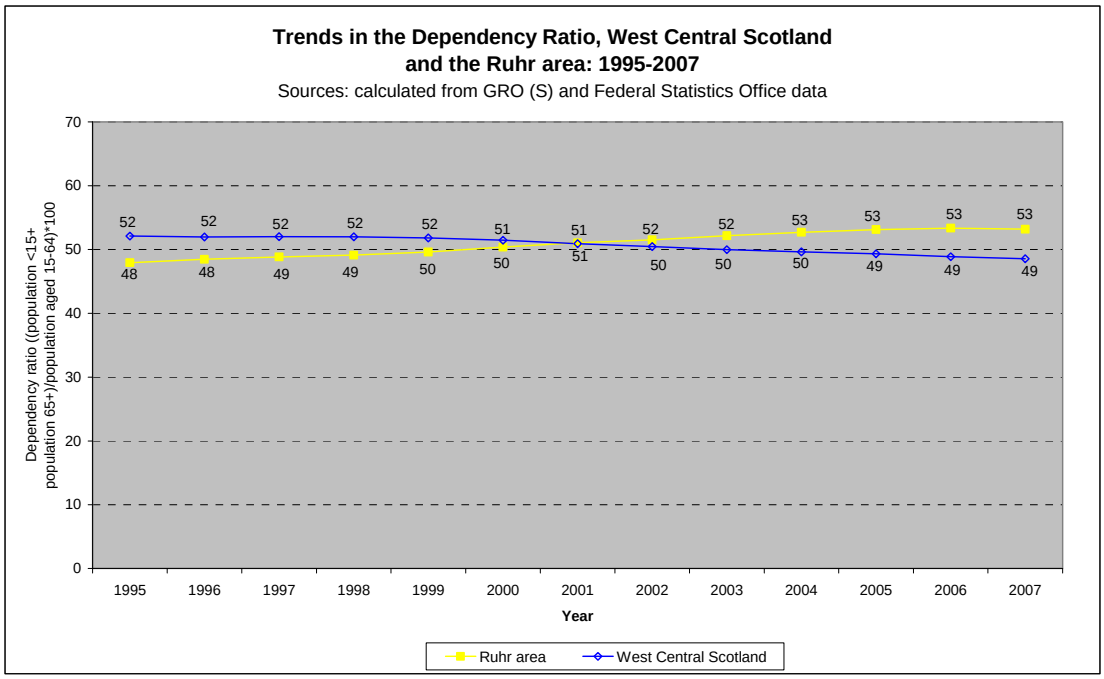
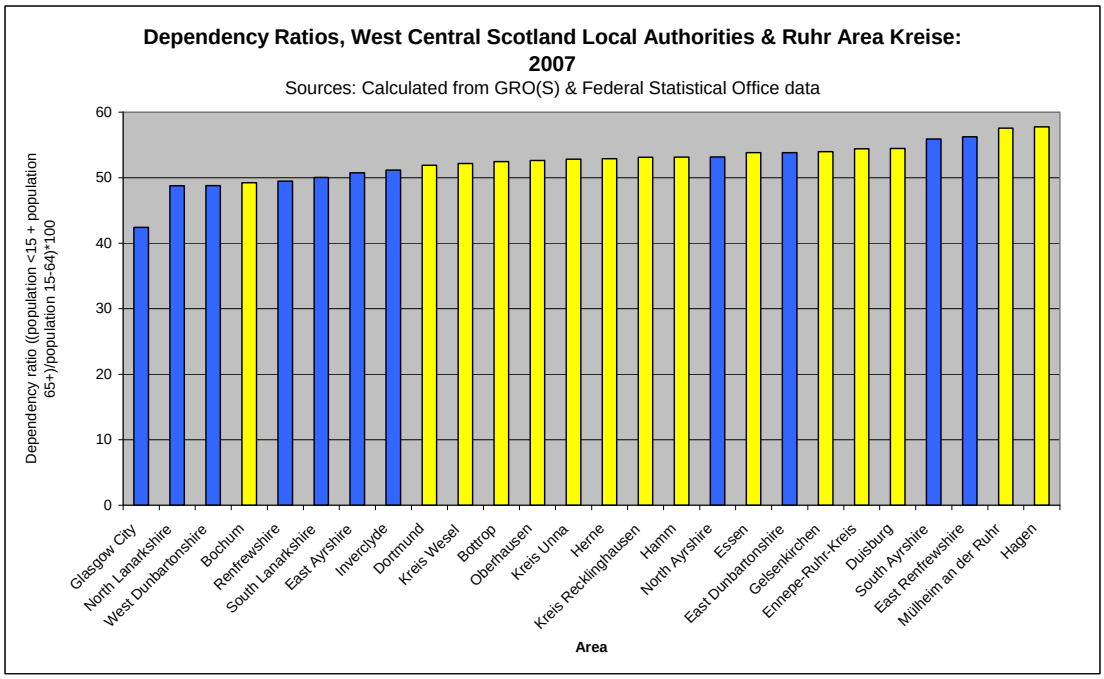


Figure 37 shows the range of dependency ratios across the Ruhr area kreise and WCS local authorities. In the Ruhr area, dependency ratios in the kreise varied from 49 in Bochum (where there was the smallest proportion of children) to 58 in Hagen (where there was a relatively large proportion of pensioners). In WCS local authorities, the 2007 dependency ratios ranged from 42 in Glasgow City (where there was a high proportion of working-age people) to 56 in East Renfrewshire (where there was a high proportion of children).

Figure 37



4.5 Fertility rates

The birth rate (live births per 1000 people) and the fertility rate (live births per 1000 women aged 15-44) complement the mortality rate in understanding population change. Both were calculated but here we show only the fertility rate since it is a more precise and comparable measure (Figure 38). The fertility rate for Scotland (and WCS) in 2008 was 57 per 1000 women aged 15-44. There was only slight difference between local authorities, in a range from 62 per 1000 in North Lanarkshire to 52 per 1000 in East Dunbartonshire.

Figure 38 also shows recent trends in the fertility rate for WCS and the Ruhr area. In 2008, the fertility rate in WCS (57 per 1000) was higher than that recorded for the Ruhr area (44 per 1000). The regional gap in fertility rates also widened between 2003 and 2008. The upward trend in WCS was mirrored by each of the local authorities, and was particularly steep in South Lanarkshire, Renfrewshire and West Dunbartonshire. However, the trends of individual kreise of the Ruhr were not uniform. While most kreise had

very moderate increases or decreases over the five year period, fertility rates increased in Recklinghausen (from 42 per 1000 in 2003 to 53 per 1000 in 2008) and decreased in Hagen (from 48 to 44 per 1000).

Figure 38

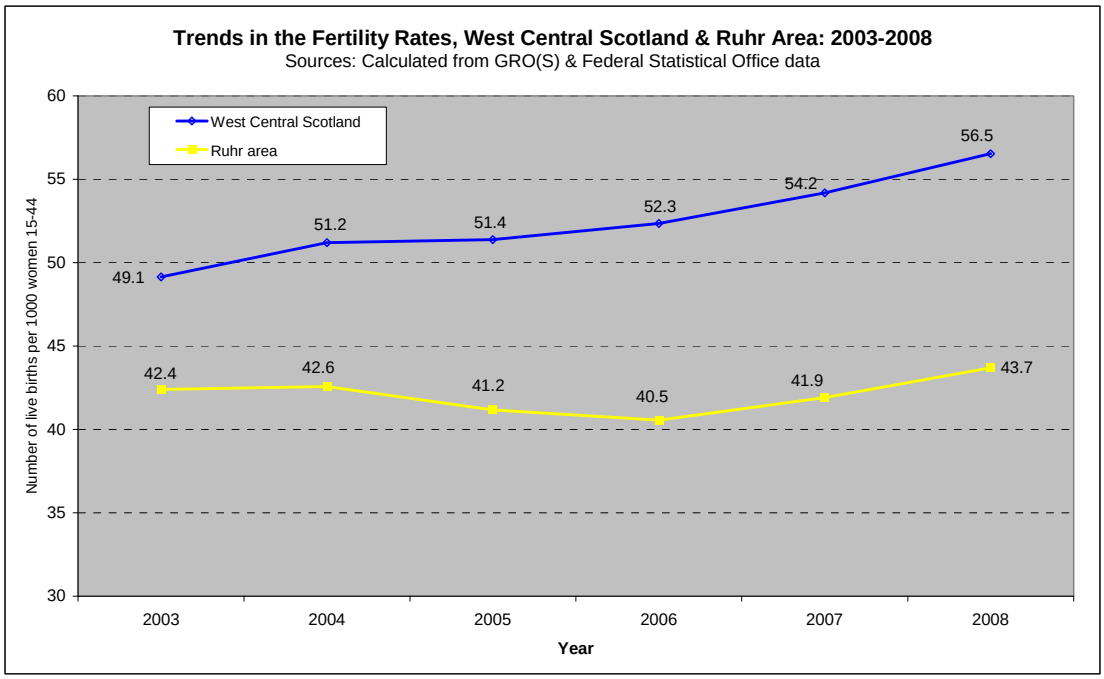
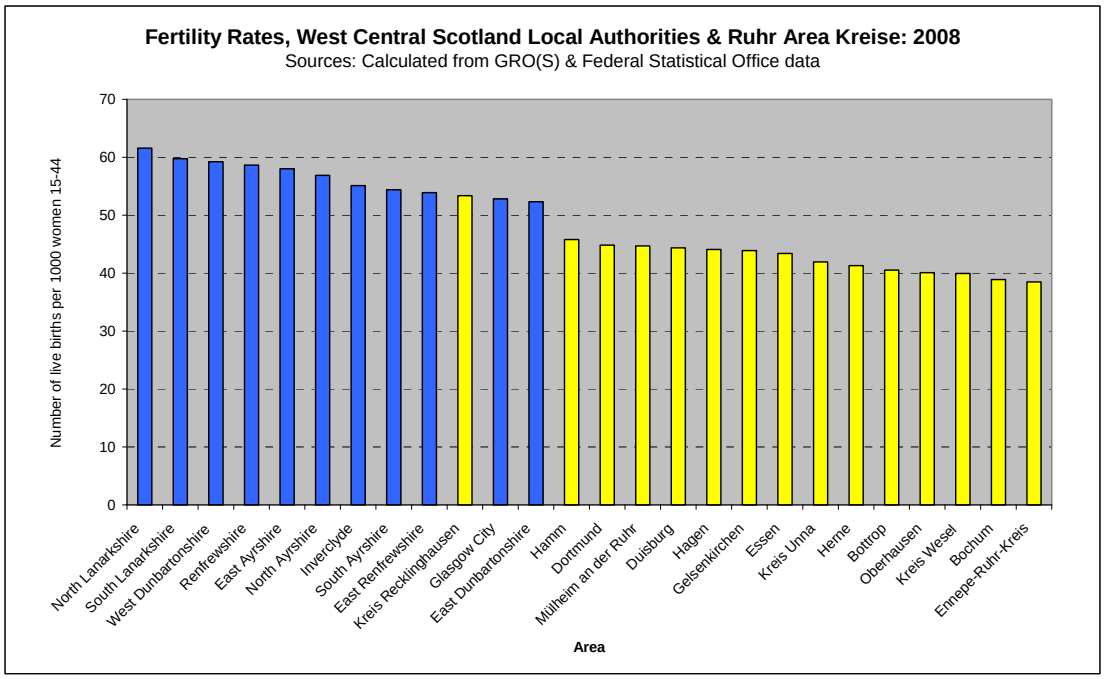


Figure 39 shows the range of fertility rates across the WCS local authorities and Ruhr area kreise. Except for Recklinghausen, none of the Ruhr kreise had a fertility rate as high as any of WCS local authorities.

Figure 39


Fertility Rates, West Central Scotland Local Authorities & Ruhr Area Kreise: 2008
Sources: Calculated from GRO(S) & Federal Statistical Office data
Number of live births per 1000 women 15-44
70
60
50
40
30
20
10
0
North Lanarkshire
South Lanarkshire
West Dunbartonshire
Renfrewshire
East Ayrshire
North Ayrshire
Inverclyde
South Ayrshire
East Renfrewshire
Kreis Recklinghausen
Glasgow City
East Dunbartonshire
Hamm
Dortmund
Mülheim an der Ruhr
Duisburg
Hagen
Gelsenkirchen
Essen
Kreis Unna
Herne
Bottrop
Oberhausen
Kreis Wesel
Bochum
Ennepe-Ruhr-Kreis
Area

Summary: Population

- Both West Central Scotland and the Ruhr area saw their populations decrease between 1995 and 2008, though the scale of change was slightly higher in the German region (-4.4% vs. -2.0%).
- **Population density** is higher in the Ruhr (1173 persons per km^2) than WCS (316 people per km^2).
- Both regions experienced net **emigration** between 1995 and 2007. Rates in WCS were much higher than in the Ruhr (11 per 1000 compared to three people per 1000 population).
- The **dependency ratio** was slightly higher in the Ruhr (53) than in WCS (49).
- **Fertility rates** were higher in WCS than in the Ruhr in 2008, and remained consistently higher than the German region between 2003 and 2008.

5.0 Social environment

Social factors – such as education and the support available to people from family, community or state – can play a role in creating, preserving or destroying health. This section reviews selected aspects of the social environment in the Ruhr and WCS to see if key differences exist that can begin to explain the poorer health outcomes in the Scottish region. Comparisons include: educational attainment, vulnerable households and selected aspects of social capital (religious participation and voter turnout).

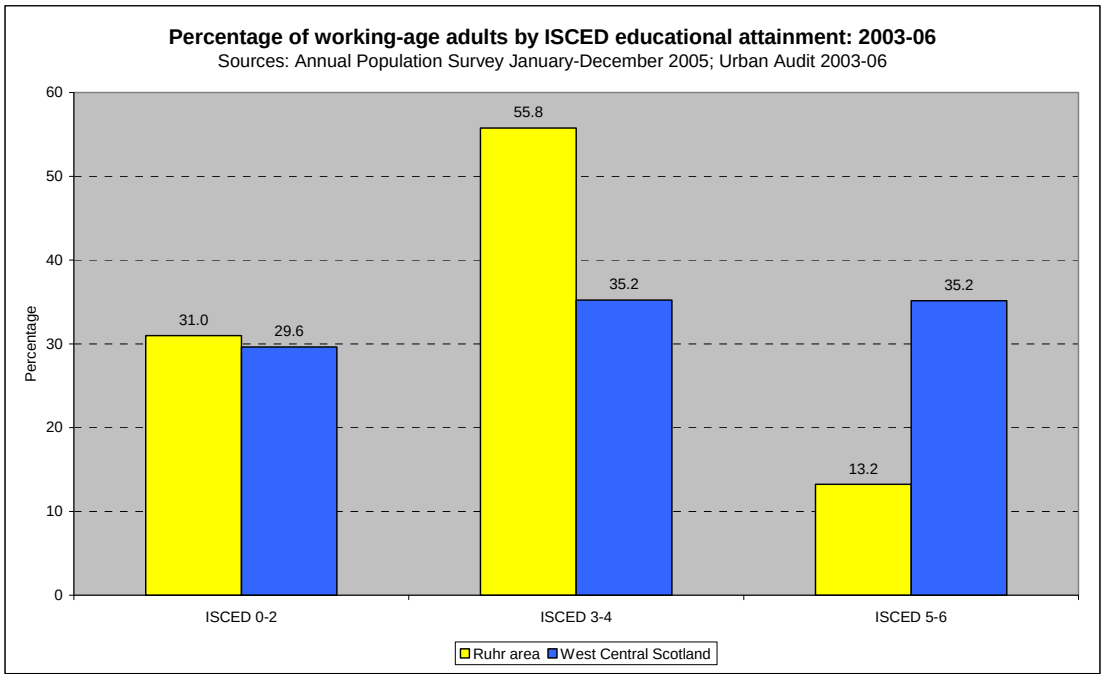
5.1 Education

Educational attainment is associated with clear differences in health, but making international comparisons of education is not straightforward. The International Standard Classification of Education (ISCED)[xiv] framework has been used in the past to overcome this challenge. The main report presents two indicators based on ISCED – the percentage of adults with no or low level qualifications (ISCED Level 0-2) and the percentage with tertiary (post-secondary) level qualifications. It shows that North-Rhine Westphalia (used here as a proxy for the Ruhr), had a lower proportion of adults aged 25-64 qualified to tertiary level but also a lower proportion with low or no qualifications, compared with South Western Scotland (used here as a proxy for West Central Scotland). In this section, we attempt to use more precise geographies to compare educational attainment in the Ruhr and WCS directly.

[xiv] International Standard Classification of Education, November 1997. Available at: http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm.

Figure 40 shows the distribution of working-age adults in the Ruhr area and WCS by the highest level of ISCED qualification attained[xv]. Both regions have a similar level of working-age adults with the lowest level of attainment. The differences are in the percentage of working-age adults with intermediate level qualifications (much higher in the Ruhr area: 56% vs. 35%) and those with higher-level qualifications (much higher in WCS: 35% vs. 13%).

Figure 40

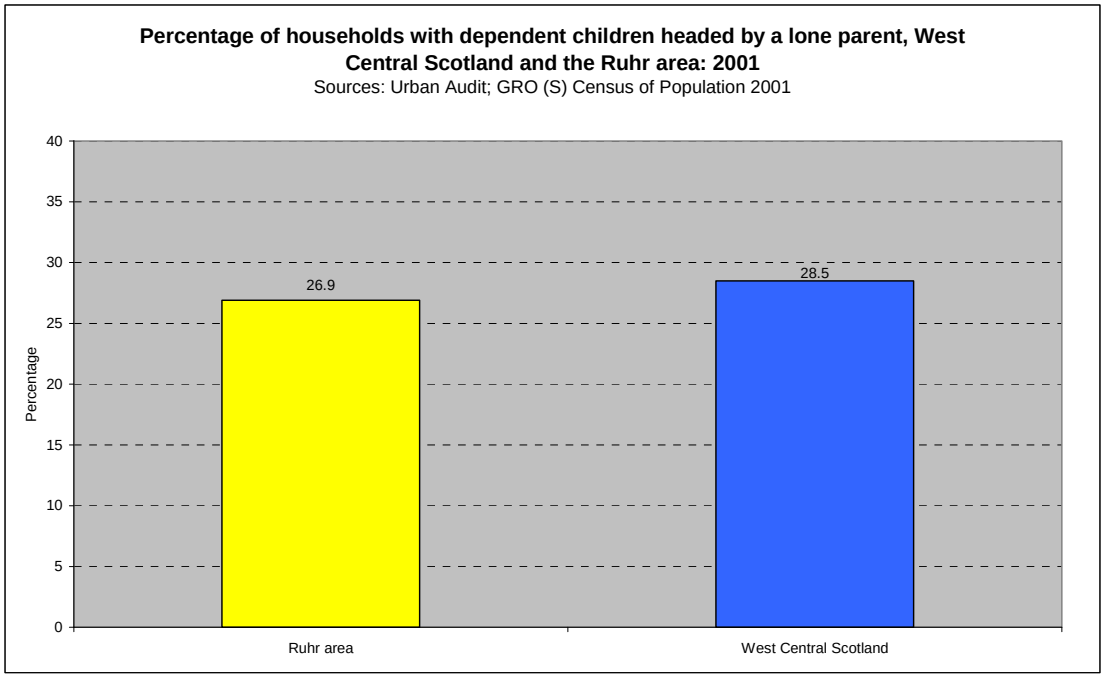


[xv] Three levels of qualification were examined: low or no qualifications (ISCED 0-2), intermediate (upper secondary school qualifications, ISCED 3-4) and higher-level (tertiary level qualifications, ISCED 5-6). UK qualifications were mapped to ISCED levels as follows: no qualifications & NVQ Level 1=ISCED 0-2; NVQ Level 2, 3 and Trade apprenticeships=ISCED 3-4; and NVQ 4+ and other qualifications=ISCED Level 5-6.

5.2 Lone parent households

This indicator shows the proportion of households with dependent children headed by a lone parent. This is a slightly narrower measure than that used in the main report, where the measure used was households with children regardless of whether those children were dependent[xvi]. It is clear, though, that the percentage of lone parent households is similar in both regions (26.9% vs. 28.5%, Figure 41).

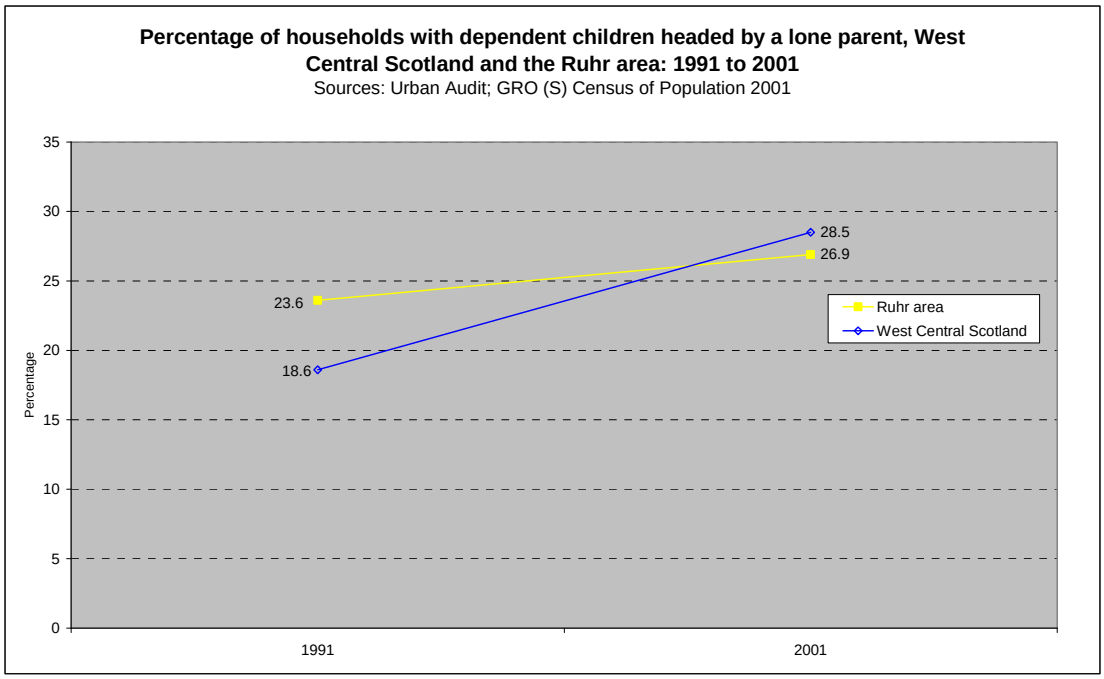
Figure 41



During the 1990s, the percentage of lone parent households increased in both regions, but the growth of lone parent households occurred at a faster pace in WCS. While the concentration of lone parent households was five percentage points higher in the German region at the start of the 1990s, the gap had been closed by the end of the decade (Figure 42).

[xvi] The percentages were 31.1% (WCS) and 32.3% (The Ruhr area, estimated from Urban Audit and Federal Statistics Office data).

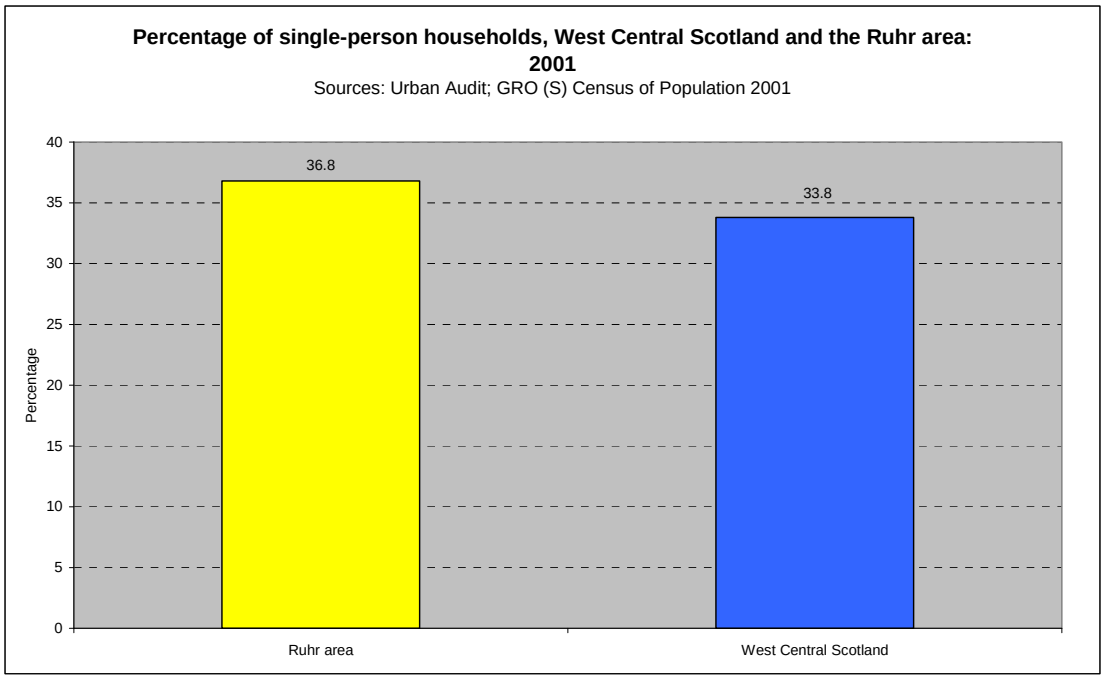
Figure 42



5.3 Single person households

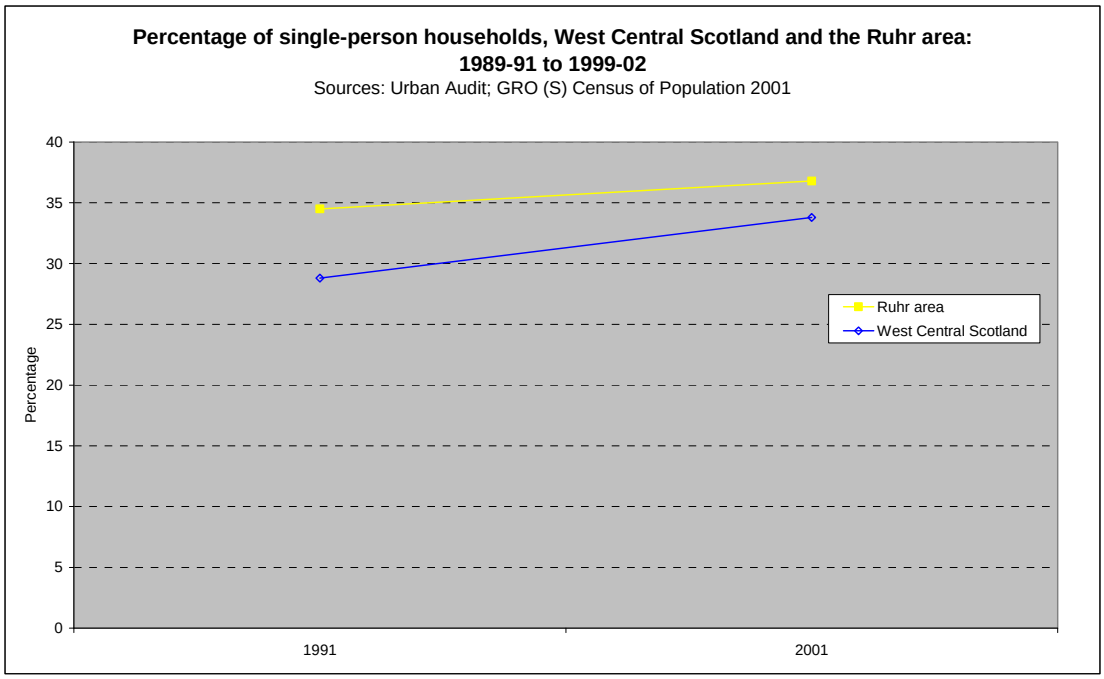
This analysis looks at the percentage of single person households in the Ruhr and WCS. In 2001-02, the percentage of single-person households was slightly higher in the Ruhr than in WCS (36.8% vs. 33.8%, Figure 43).

Figure 43



As with lone parent households, the percentage of single-person households in both regions increased in the 1990s, but again there is evidence that the rate of increase was faster in WCS. The Scottish region narrowed the gap with the Ruhr in terms of single-person households over the decade (Figure 44).

Figure 44

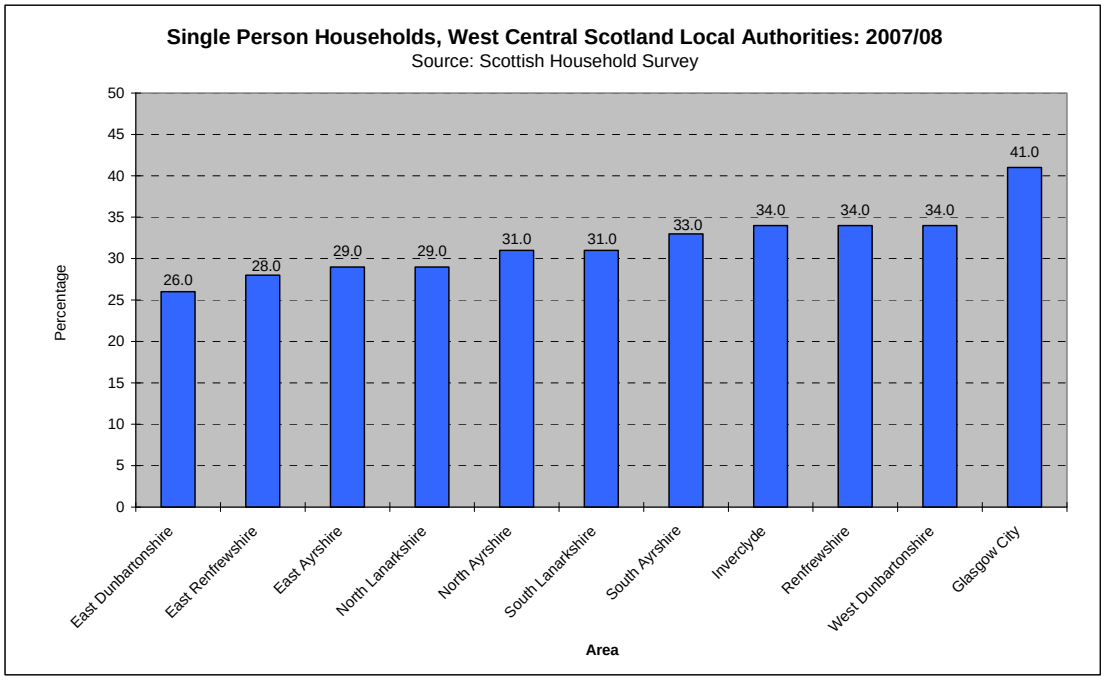


The growth in single-person households reflects a long-term trend. As discussed by Palmer (2006) [13], this raises a number of areas of potential concern:

- Single-person households may not have the same capacity to adjust to sudden changes in financial circumstances (e.g. loss of a job), increasing the risks to individuals.
- Rising proportions of people living alone may result in increasing inequality, social isolation and poverty.

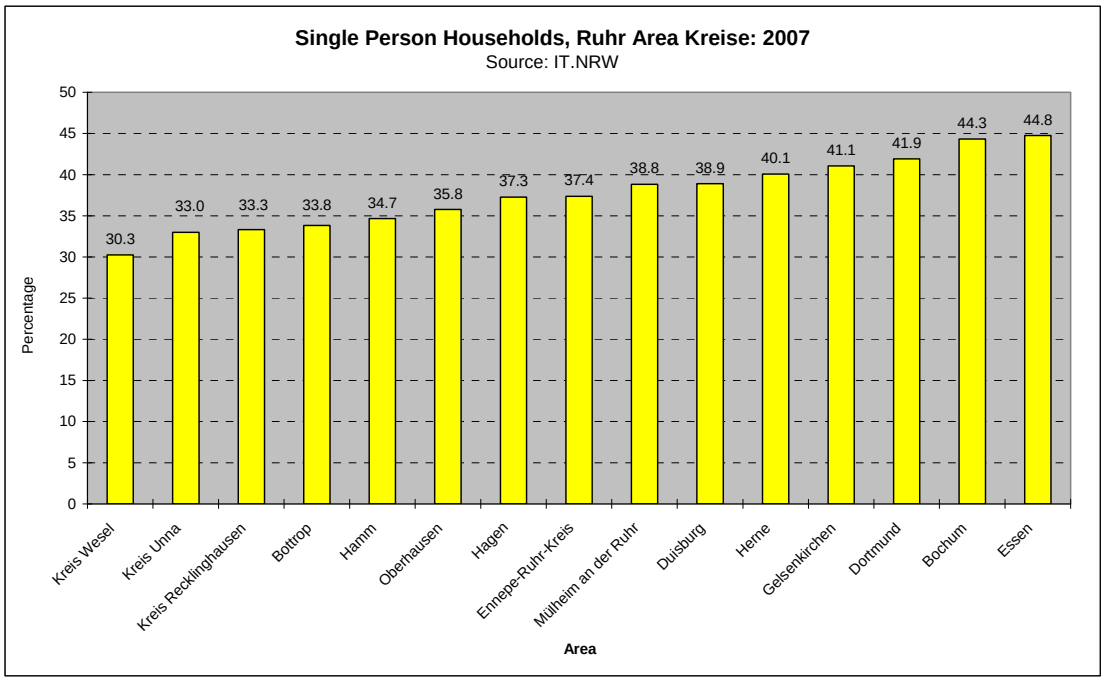
More recent data allow us to analyse this indicator at a sub-regional level. In Scotland, the average proportion of households occupied by a single person in 2007-08 was 33%. Across the WCS local authority areas (excluding Glasgow City) the figures range from 26% in East Dunbartonshire to 34% in West Dunbartonshire. Glasgow City stands apart from the other districts with 41% of households occupied by a single person, 15 percentage points more than in East Dunbartonshire (Figure 45).

Figure 45



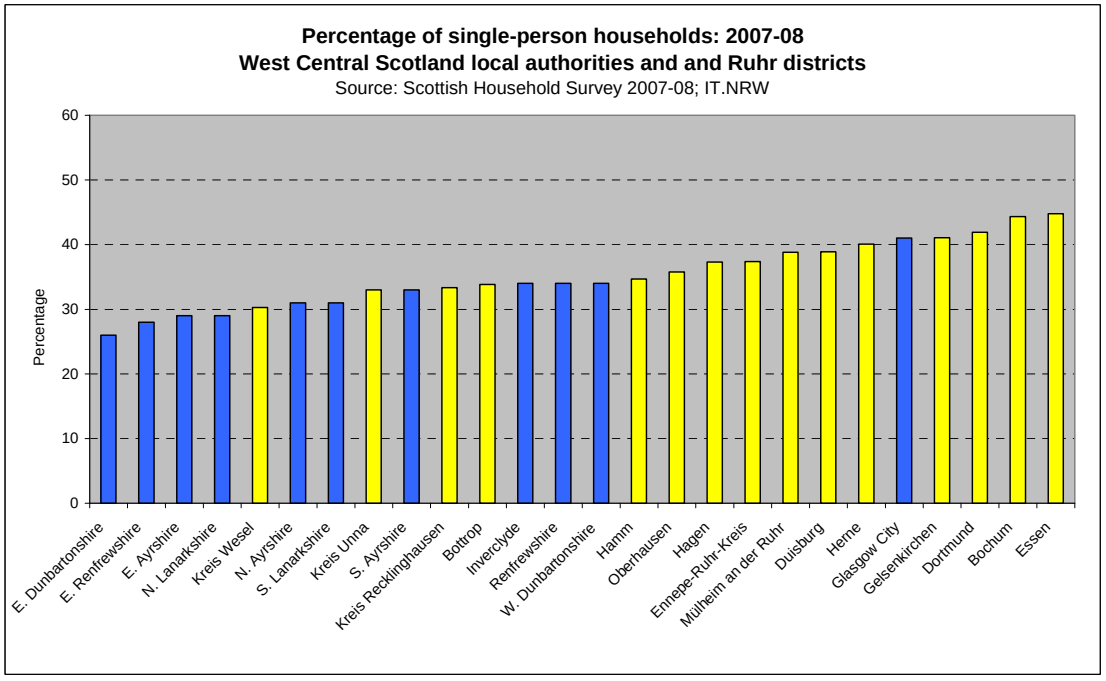
In the Ruhr there is also a difference of 15 percentage points across the kreise: Wesel has 30.3% single person households while Essen has 44.8%. The overall state average proportion of single person households was 37%; this is similar to the German average of 39%[17] (Figure 46).

Figure 46



It can be seen from Figure 47 that, in general, the proportions of single person households in the Ruhr kreise were greater than those of WCS local authorities.

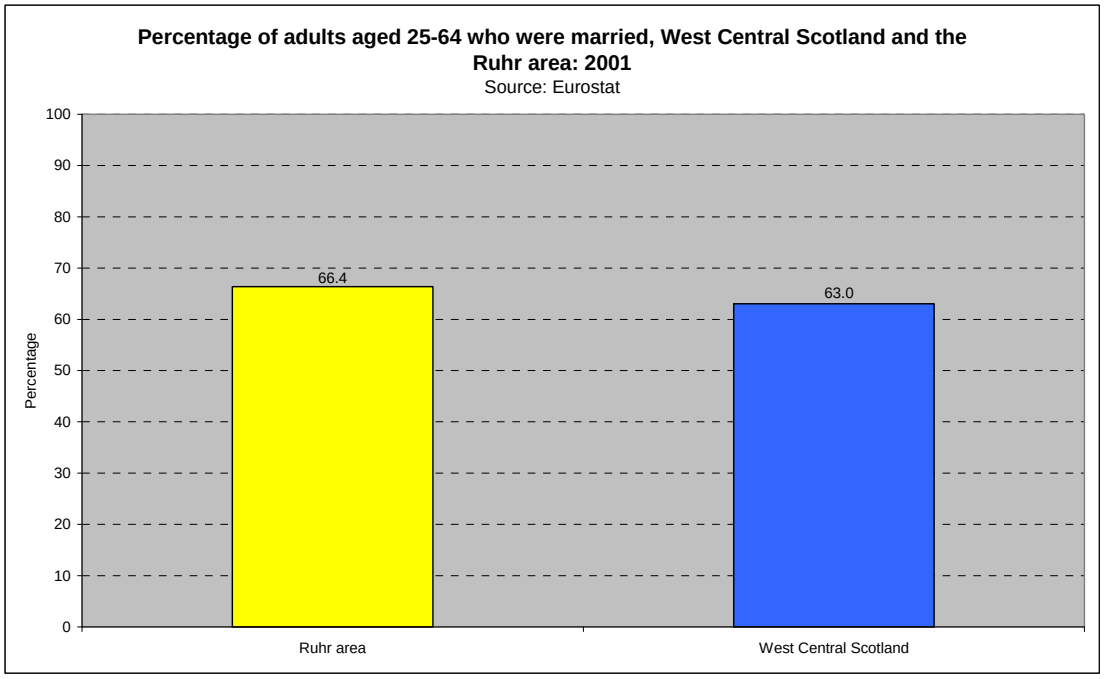
Figure 47



5.4 Marital status

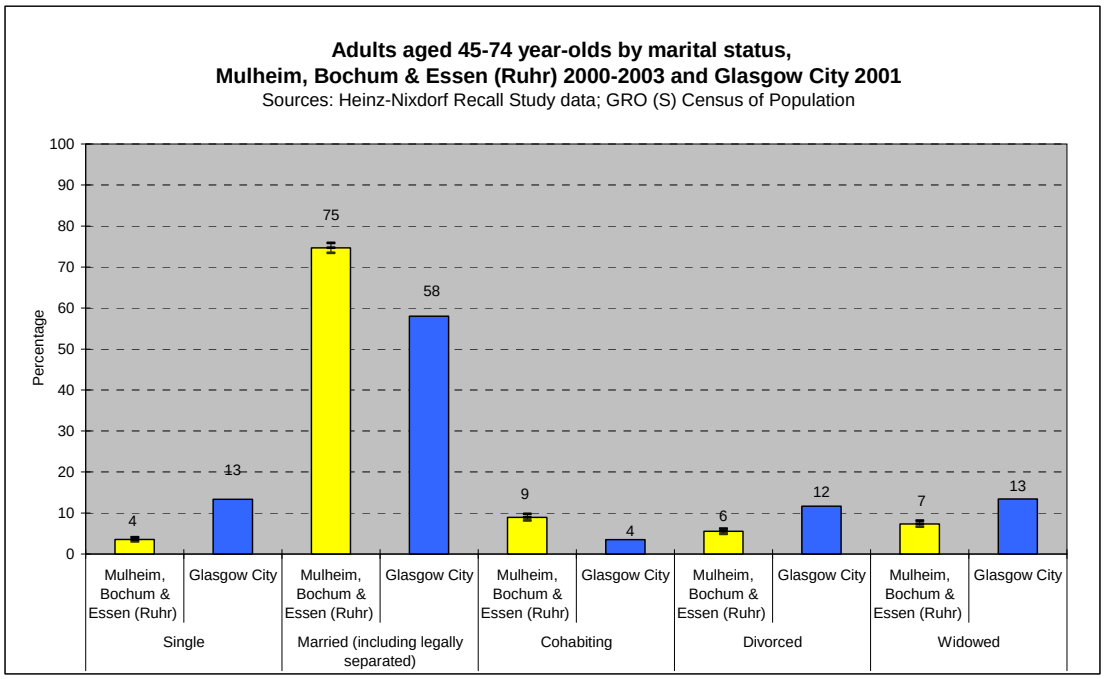
This indicator is calculated from 2001 Census data published by Eurostat. It shows the percentage of adults aged 25-64 who were legally married (including those who were separated). As shown in Figure 48, the percentage of adults in this age group defined as legally married in both regions was marginally higher in the Ruhr than in WCS (66% vs. 63%, Figure 48).

Figure 48



The Heinz-Nixdorf Recall Study cohort allows us to compare marital status for older middle-aged residents (aged 45-74) in the three cities of the Ruhr and Glasgow City (Figure 49).

Figure 49



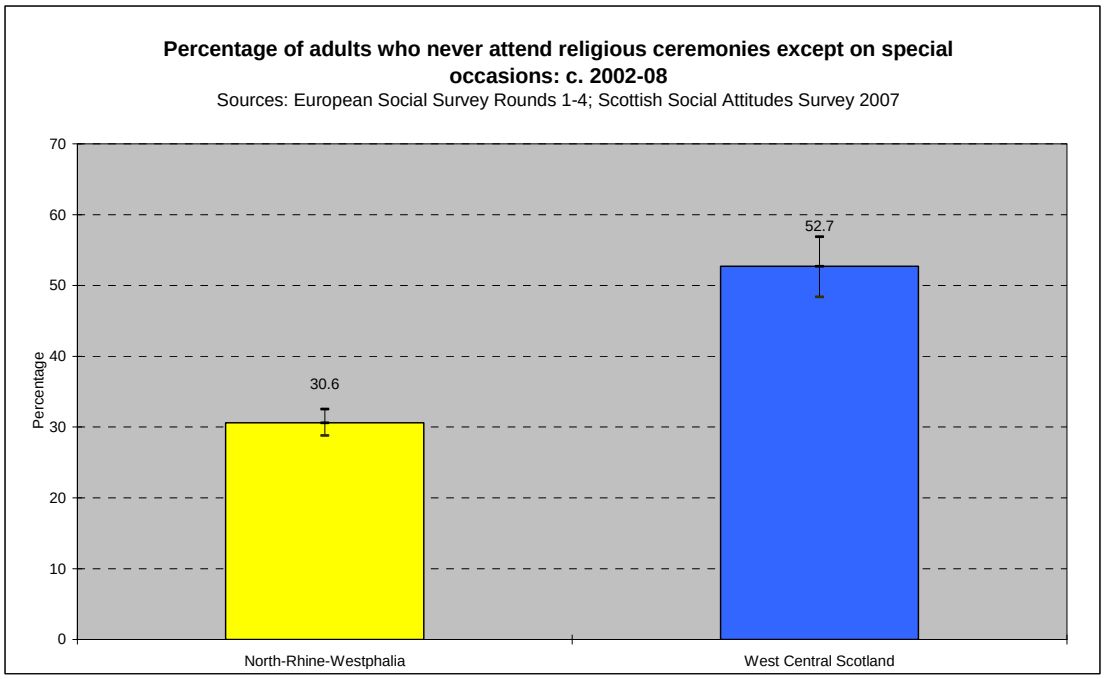
Sample sizes: HNRS 2000-03 (three cities) – 4802 adults.

Glasgow City residents in this age group were substantially less likely to be married (58% vs. 75%) or cohabiting (4% vs. 9%) and substantially more likely to be divorced, single or widowed compared to their counterparts in the three Ruhr cities.

5.5 Social capital: religious affiliation

Religious affiliation appears to be higher in the German region than WCS. Survey data show that half the adult population of WCS reported that they never attended religious ceremonies except on special occasions, significantly higher than the figure reported for North-Rhine Westphalia (used here as a proxy for the Ruhr area) (Figure 50).

Figure 50



Sample sizes: North-Rhine Westphalia=1863, West Central Scotland=444 adults.

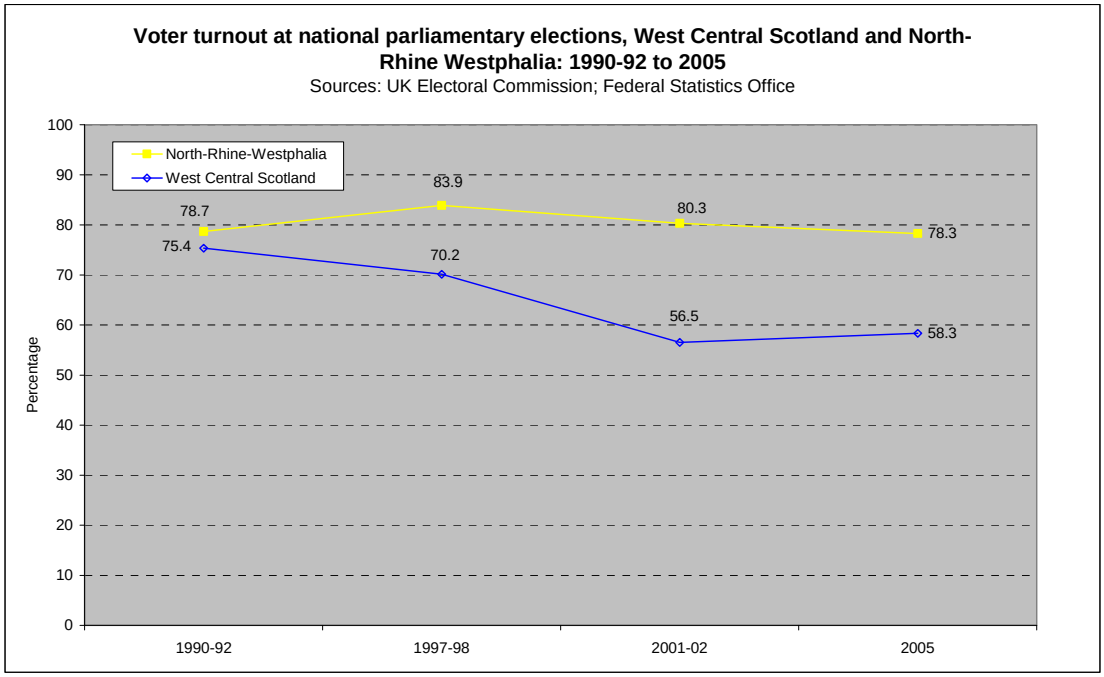
5.6 Social capital: voter turnout

Our last indicator of the social environment in the two regions is voter turnout, used as a crude proxy for social capital. Voter turnout in Scotland is calculated by dividing the number of people who voted in an UK election by the electorate (i.e. those registered and entitled to vote). The Federal Statistical Office of Germany calculates voter turnout by dividing the number of people who voted by the total population over 18 years. This discrepancy may underestimate the difference between the two regions: since the registered electorate will be smaller in number than the total population aged 18 years or over, German voter turnout may appear less than if the electorate were the rate denominator.

Note also here that voter turnout in Scotland is measured (and, therefore, here presented) by constituency, rather than local authority.

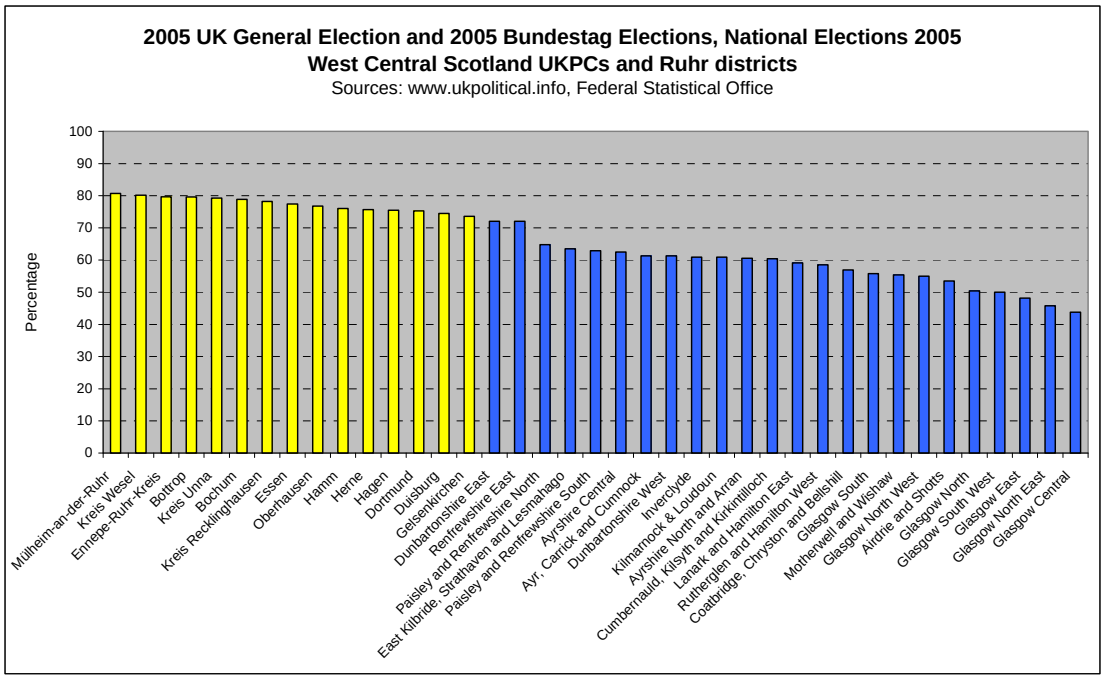
In 2005, voter turnout at parliamentary elections in North-Rhine Westphalia (used here as a proxy for the Ruhr area) was much higher than for WCS: 78.3% vs. 58.3%. Furthermore, although turnout in WCS has fallen over time, rates in the German region remained largely unchanged, increasing the gap between the regions over time (Figure 51).

Figure 51



An analysis of the sub-regional data in both regions for 2005 highlights two clear differences: first that there is a much greater variation in voter turnout across the WCS constituencies compared to what is seen in the Ruhr area; and second, that voter turnout was consistently higher in all of the Ruhr kreise compared to the WCS constituencies. This is despite the denominator for the German data being larger (the total population aged 18 years and over); the real difference may be expected to be even greater. These data are shown in Figure 52.

Figure 52


2005 UK General Election and 2005 Bundestag Elections, National Elections 2005
West Central Scotland UKPCs and Ruhr districts
Sources: www.ukpolitical.info, Federal Statistical Office
Percentage
100
90
80
70
60
50
40
30
20
10
0
Mülheim-an-der-Ruhr
Kreis Wesel
Ennepe-Ruhr-Kreis
Bottrop
Kreis Unna
Bochum
Kreis Recklinghausen
Essen
Oberhausen
Hamm
Herne
Hagen
Dortmund
Duisburg
Gelsenkirchen
Dunbartonshire East
Renfrewshire East
Paisley and Renfrewshire North
East Kilbride, Strathaven and Lesmahago
Paisley and Renfrewshire South
Ayrshire Central
Ayr, Carrick and Cumnock
Dunbartonshire West
Inverclyde
Kilmarnock & Loudoun
Ayrshire North and Arran
Cumbernauld, Kilsyth and Kirkintilloch
Lanark and Hamilton East
Rutherglen and Hamilton West
Coatbridge, Chryston and Bellshill
Glasgow South
Motherwell and Wishaw
Glasgow North West
Airdrie and Shotts
Glasgow North
Glasgow South West
Glasgow East
Glasgow North East
Glasgow Central

Summary: Social environment

- Among working-age adults, WCS and the Ruhr have a similar proportion of adults with a low level of **educational attainment**. The Ruhr has a much higher proportion of adults with intermediate level qualifications, while WCS has a much higher proportion with high level qualifications.
- The percentage of **single-person households** is marginally higher in the Ruhr than WCS, while both regions have a relatively high percentage of lone-parent households.
- In relation to **marital status**, the percentage of adults aged 25-64 who were married was marginally higher in the Ruhr than in WCS. Among older middle-aged adults, the percentage that were married was far higher, and the percentage who were single or divorced lower, in three key Ruhr cities compared to Glasgow City.
- Two proxy measures of **social capital** were analysed. Adults in North-Rhine-Westphalia (used as a proxy for the Ruhr) were significantly less likely than those in WCS to report they never attended religious ceremonies except for special occasions. Voter turnout was also consistently higher in North-Rhine-Westphalia compared to WCS. This was also true at a sub-regional level, with voter turnout in Ruhr kreise higher than in almost every West Central Scotland constituency.
- Overall, comparisons of social determinants in the two regions of health present a mixed picture. The messages on educational attainment are ambivalent and the two regions have a similar level of vulnerable (lone parent and single person) households. On the other hand, marriage rates among the middle-aged are higher in the Ruhr and some measures of social capital may be rather stronger in the German region relative to WCS.

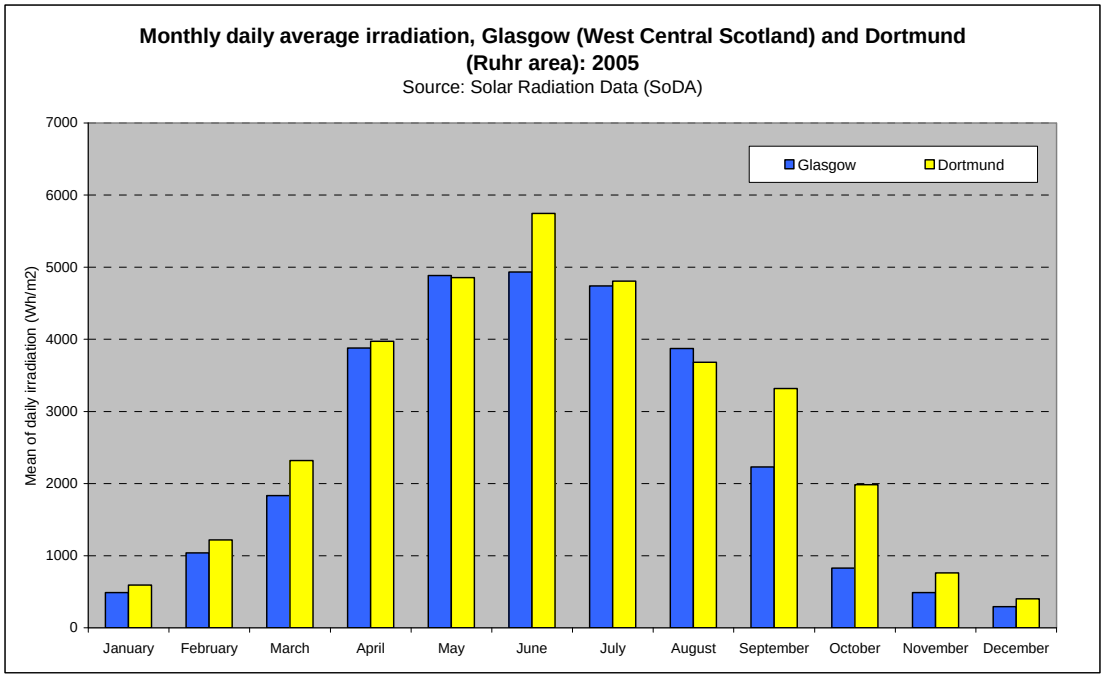
6.0 Physical environment

This section briefly discusses aspects of the physical environment for WCS compared to the Ruhr. Data limitations mean the analyses here are confined to: measures of climate; recorded levels of crime per capita; and perceived neighbourhood safety.

6.1 Climate

Climate, and more specifically lower levels of Vitamin D resulting from less sunshine, has been suggested as one reason for Scotland's enduring poor health status[14]. Lower levels of Vitamin D have been linked with a range of diseases, including a number of different forms of cancer. In 2005 Glasgow (the largest city in West Central Scotland) received less sunshine ('daily irradiation') than Dortmund (the largest city in the Ruhr) in 10 out of the 12 months of the year[xvii] (Figure 53).

Figure 53



[xvii] Unfortunately, data are only available for 2005. Using one year's data may of course present a skewed picture, and it would be preferable to show data average over several years were such information available.

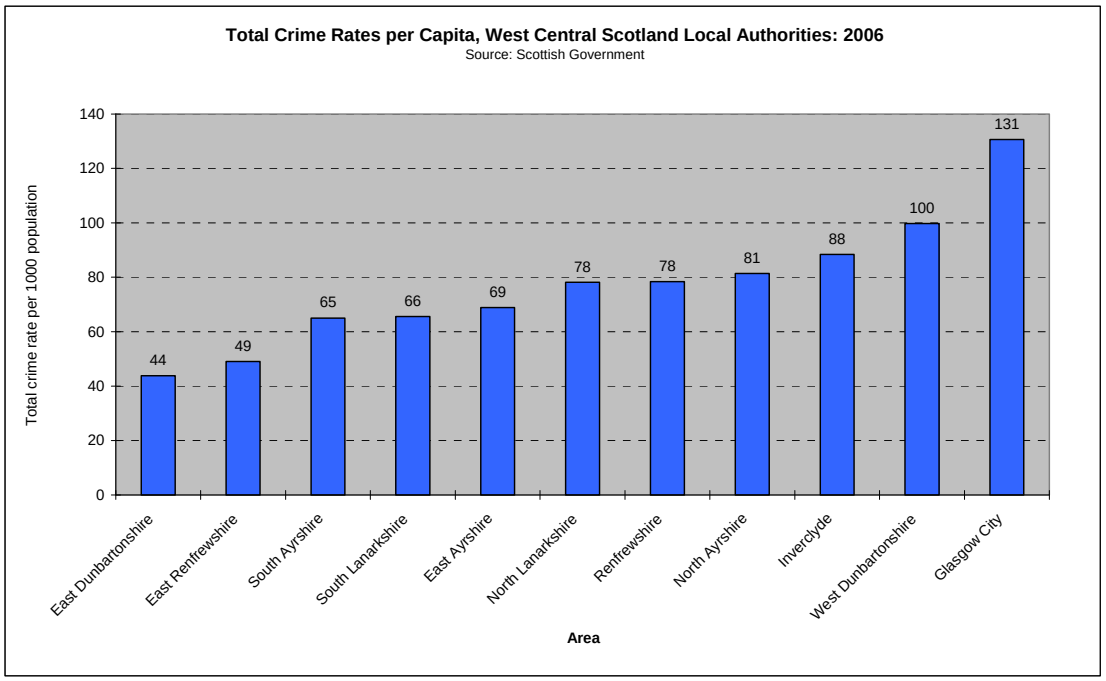
However, it is difficult to draw any firm conclusions about the impact of this without a dedicated study which could compare not only levels of Vitamin D deficiency (Hypovitaminosis D) among the two populations, but which could also control for the effects of a whole range of confounding factors (diet, socio-economic status, family history etc.). As such a study does not exist, we must remain cautious in interpreting any climate related data for the regions.

6.2 Recorded Crime

Our second measure of the physical environment is recorded crime. The total number of crimes recorded by the police per head of population is presented here for each district, region and state/country.

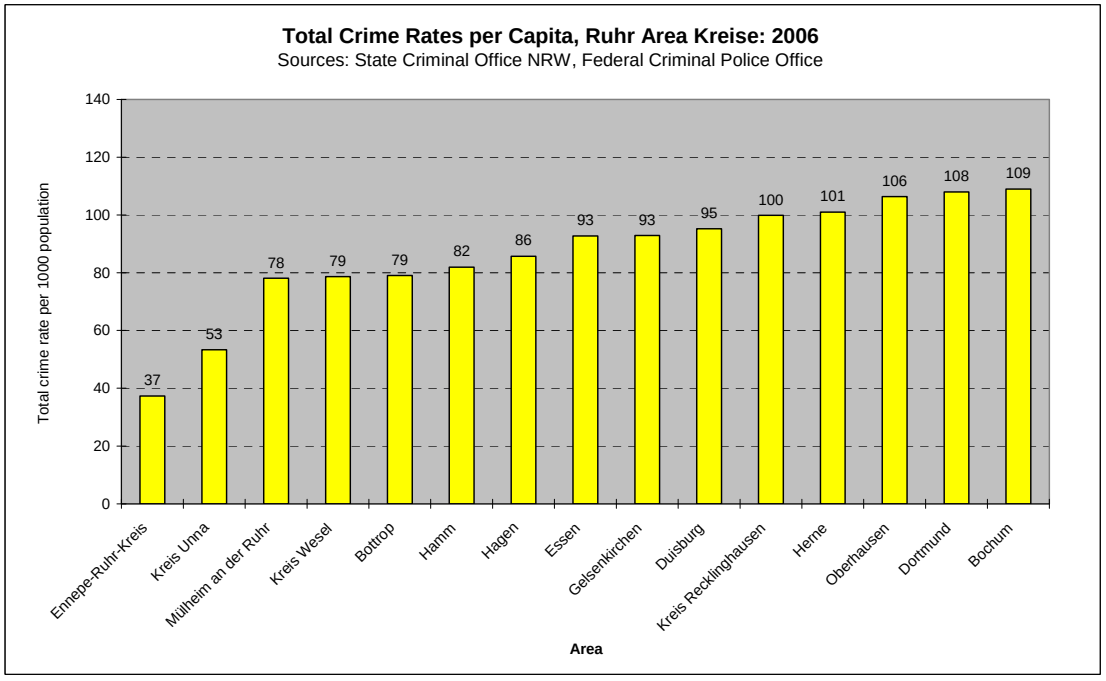
In 2006 WCS police recorded, on average, a higher number of crimes per capita than did all Scottish forces; 88 per 1000 and 82 per 1000, respectively. There was wide variation between the local authorities in a range from 44 per 1000 in East Dunbartonshire to 131 per 1000 in Glasgow City (Figure 54).

Figure 54



In NRW state there were 83 recorded crimes per 1000 in 2006; in the Ruhr area overall, there were 94 per 1000. Crime rates in the kreise ranged from 37 per 1000 in Ennepe-Ruhr-Kreis to 109 per 1000 in Bochum (Figure 55).

Figure 55

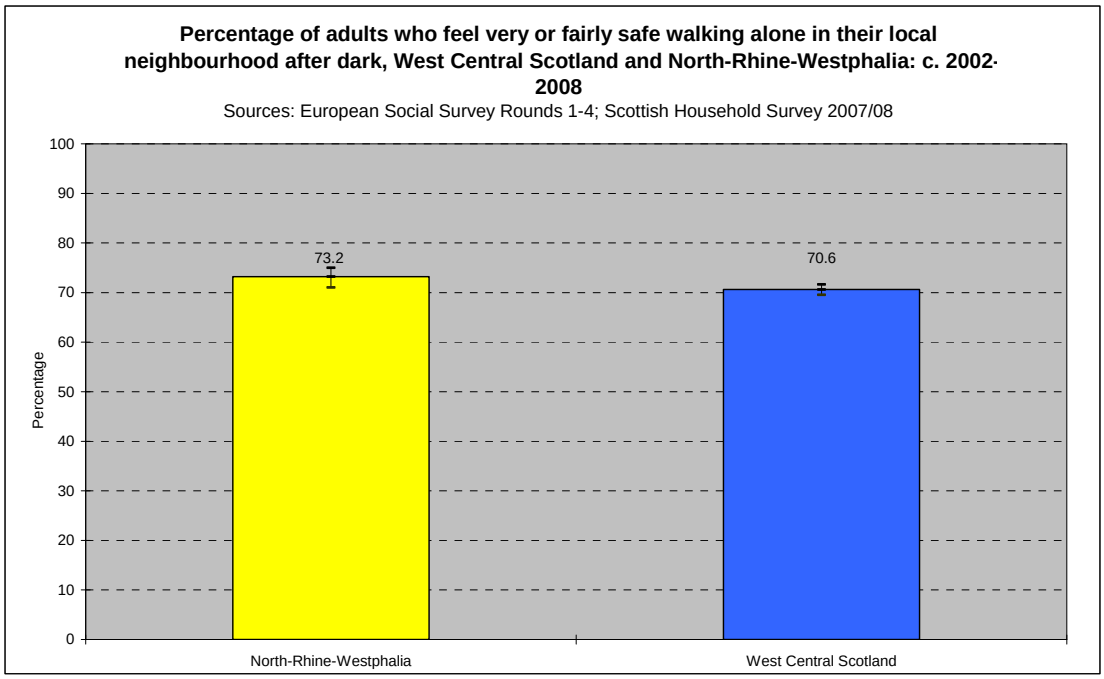


The number of crimes per capita in the Ruhr and WCS regions was quite similar: 94 per 1000 and 88 per 1000, respectively. We should, however, be cautious about making comparisons purely on the basis of recorded crime in the two regions, given potential differences in recording practices between the two regions. For example, in Germany multiple offences against the same victim or without a victim are counted as one offence and multiple offences against different victims are counted as two offences[15], while in Scotland all the offences are counted, regardless of the number of victims[16].

6.3 Perceived neighbourhood safety

We can contrast these administrative data on recorded crime with subjective, survey-based measures of neighbourhood safety. The first indicator compares the percentage of adults who felt safe or very safe walking alone after dark in North-Rhine-Westphalia (used as a proxy for the Ruhr area) and WCS (Figure 56). Perceptions of neighbourhood safety did not vary significantly between these two regions.

Figure 56

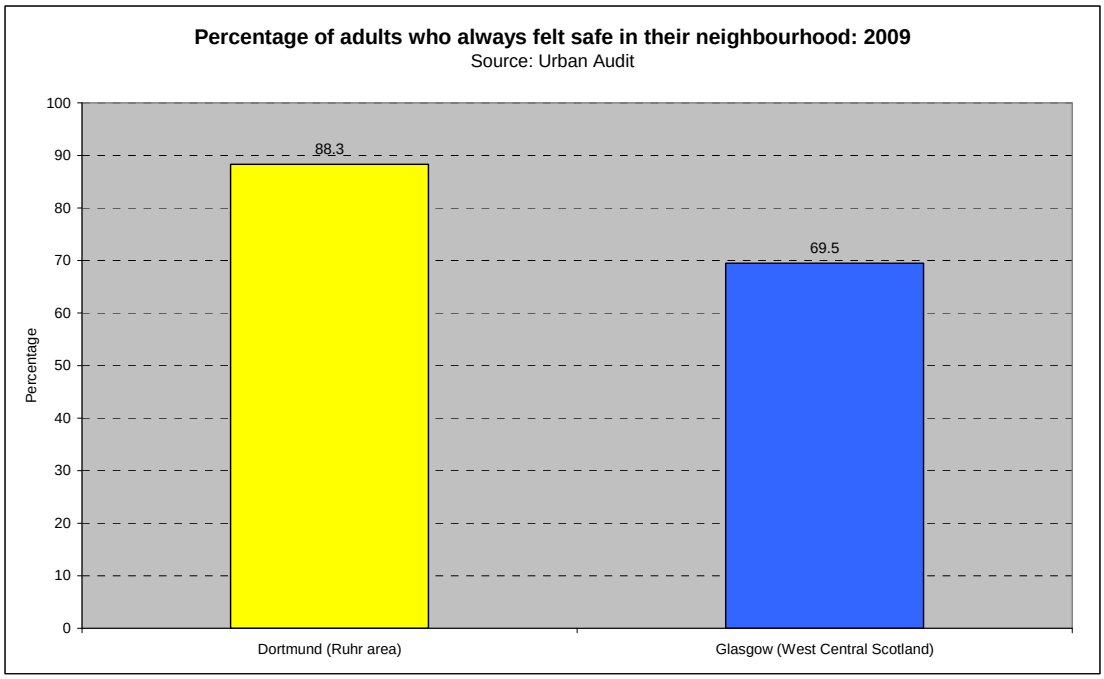


Sample sizes: North-Rhine-Westphalia=1854; WCS=6692.

The second source of data is taken from Urban Audit 2009 and compares the percentage of adult residents of Dortmund and Glasgow City who always felt safe in their neighbourhood (Figure 57). The percentage of adults reporting this was the case in Glasgow (69.5%) was much lower than in Dortmund (88.3%).

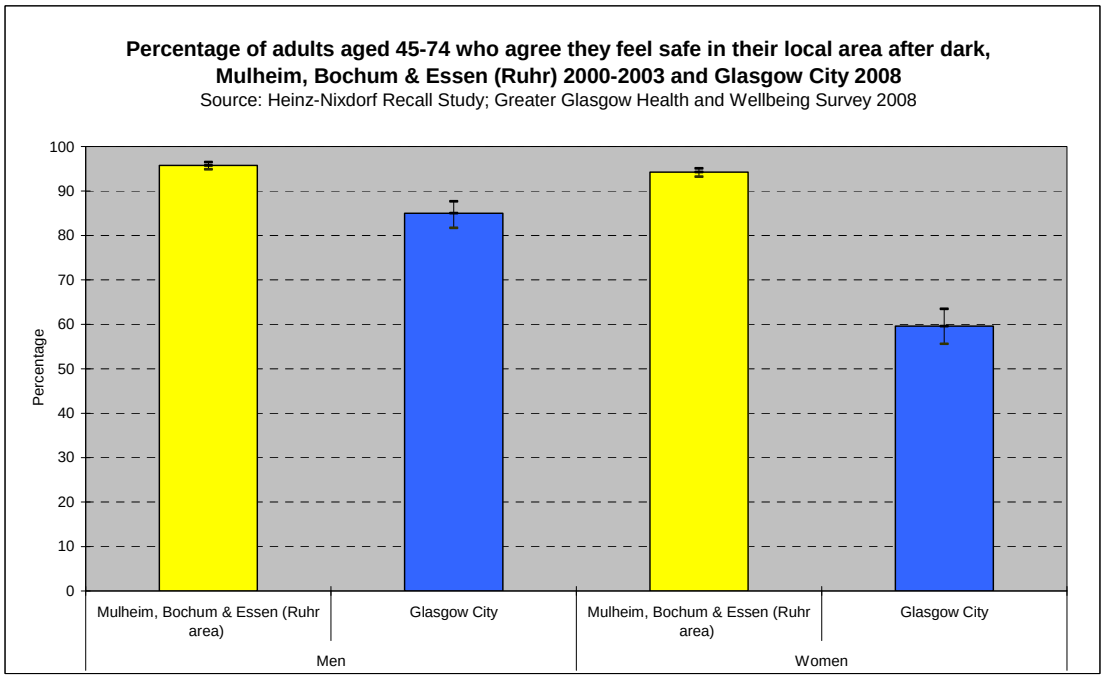
The final piece of evidence on this comes from the Heinz-Nixdorf Recall Study and Greater Glasgow Health and Well-being Survey 2008 (Figure 58). Older working-age adults in Glasgow City were significantly less likely to report feeling safe in their local neighbourhood after dark than their peers in Bochum, Essen and Mulheim-an-der-Ruhr. The gap was particularly noticeable for women (59.6% vs. 94.3%).

Figure 57



Sample sizes: Dortmund=505; Glasgow=500.

Figure 58



Sample sizes: HNRS 2000-03 (three cities) – 2385 men and 2416 women; Greater Glasgow Health and
Well-being Survey (Glasgow City) – 523 men and 677 women.

Summary: Physical environment

- In 2005, Glasgow received less daily solar irradiation (**sunshine**) on average than Dortmund (largest city in the Ruhr) for 10 out of 12 months of the year
- Levels of recorded **crimes** per capita were fairly similar in the Ruhr area and WCS: 94 per 1000 and 88 per 1000 respectively. Some caution should be attached to comparisons of these data, though, due to international differences in how crimes are recorded.
- Reported levels of (subjective) **neighbourhood safety** in WCS were similar to those in North-Rhine-Westphalia. However, residents of Glasgow City were less likely to report feeling safe in their local neighbourhood than their counterparts in the largest cities of the Ruhr, with the difference especially marked for women.

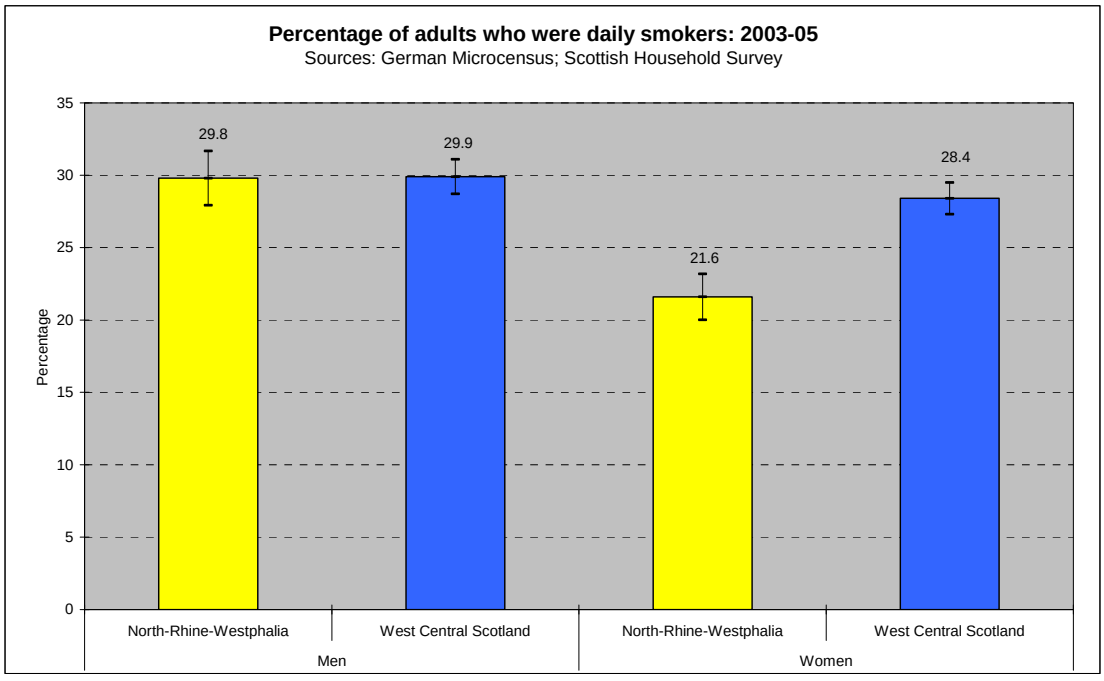
7.0 Health behaviours

Data on health-related behaviours are presented here for smoking prevalence, alcohol consumption, body mass index and physical activity. All data have been collected via health surveys.

7.1 Smoking

Smoking status described here is self-reported via survey for both German and Scottish data. Figures 59 compares adult smoking rates in WCS and North-Rhine-Westphalia (used here as a proxy for the Ruhr area) in 2003-05. Male smoking rates were almost identical in the two regions. However, female smoking rates were significantly higher in WCS than in the German region.

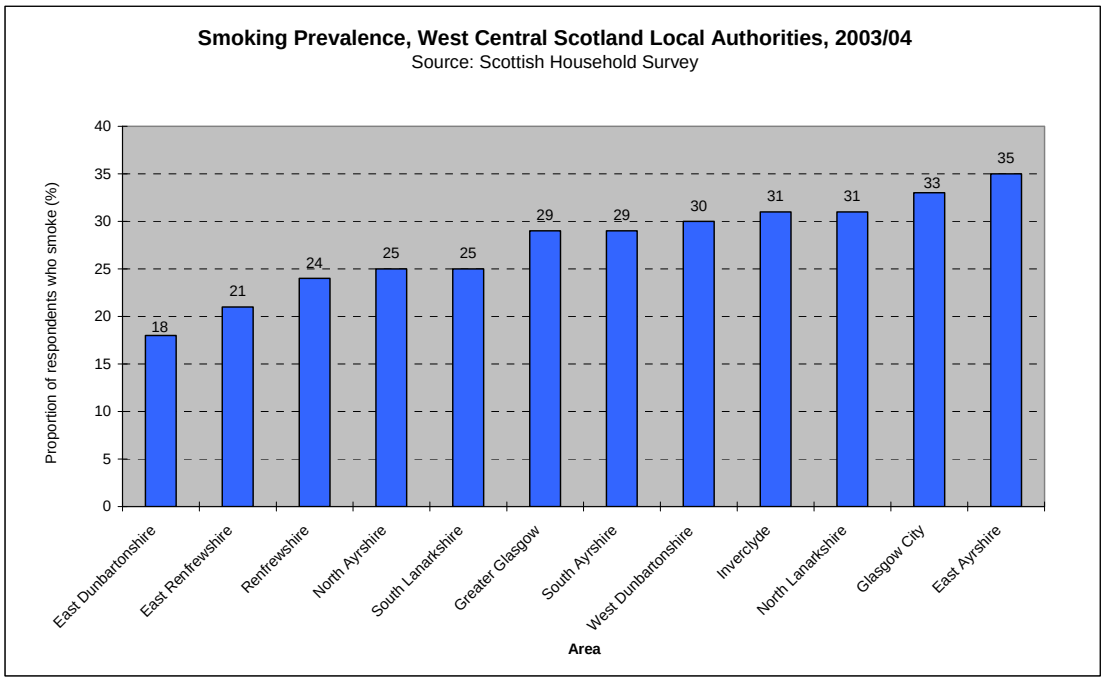
Figure 59



Samples sizes: North-Rhine Westphalia – 2283 men and 2591 women; West Central Scotland – 4685 men and 6498 women.

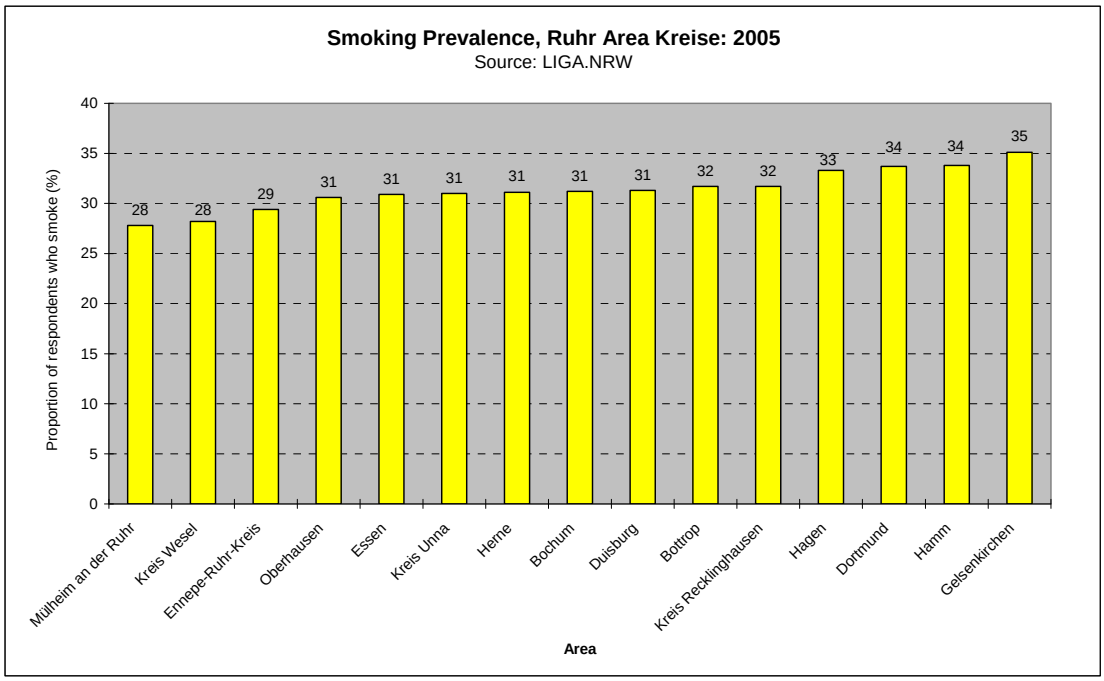
In Scotland, 27% of adult respondents to the Scottish Household Survey were smokers in 2003-04. There was wide variation in WCS, with only 18% of smoking adults in East Dunbartonshire while 35% were smokers in East Ayrshire (Figure 60).

Figure 60



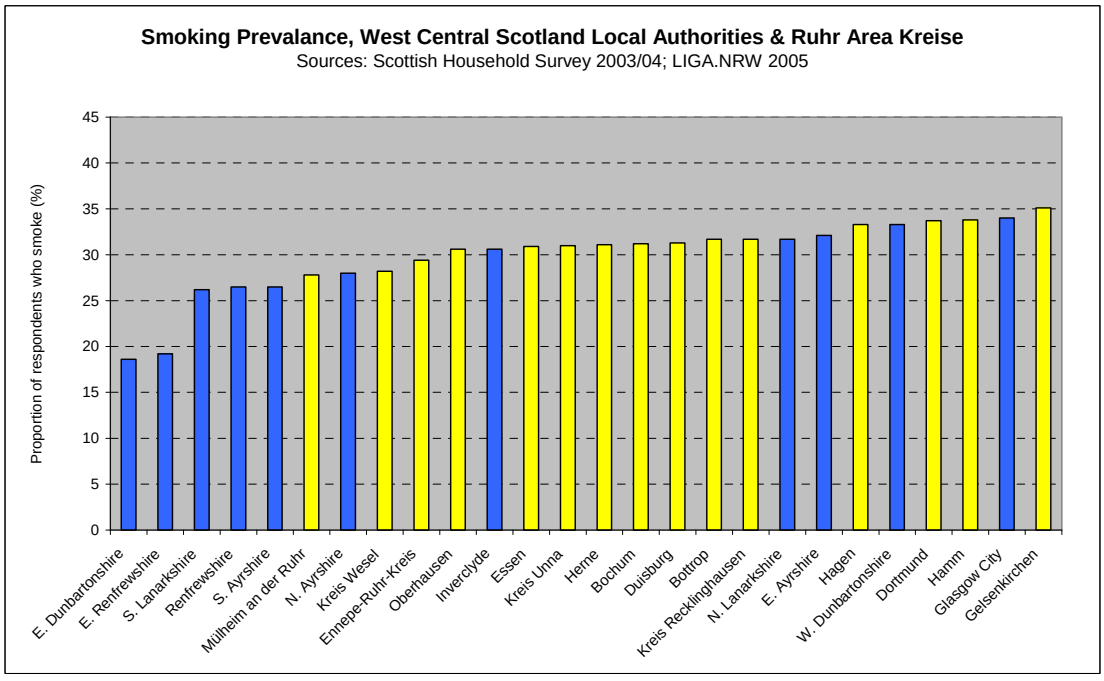
Smoking prevalence among adults in North Rhine-Westphalia was estimated at 29% by a 2005 health survey. Variation between kreise was less than that observed in WCS local authorities: across the Ruhr kreise, rates ranged from 28% of adults in Mulheim an der Ruhr to 35% of adults in Gelsenkirchen (Figure 61).

Figure 61



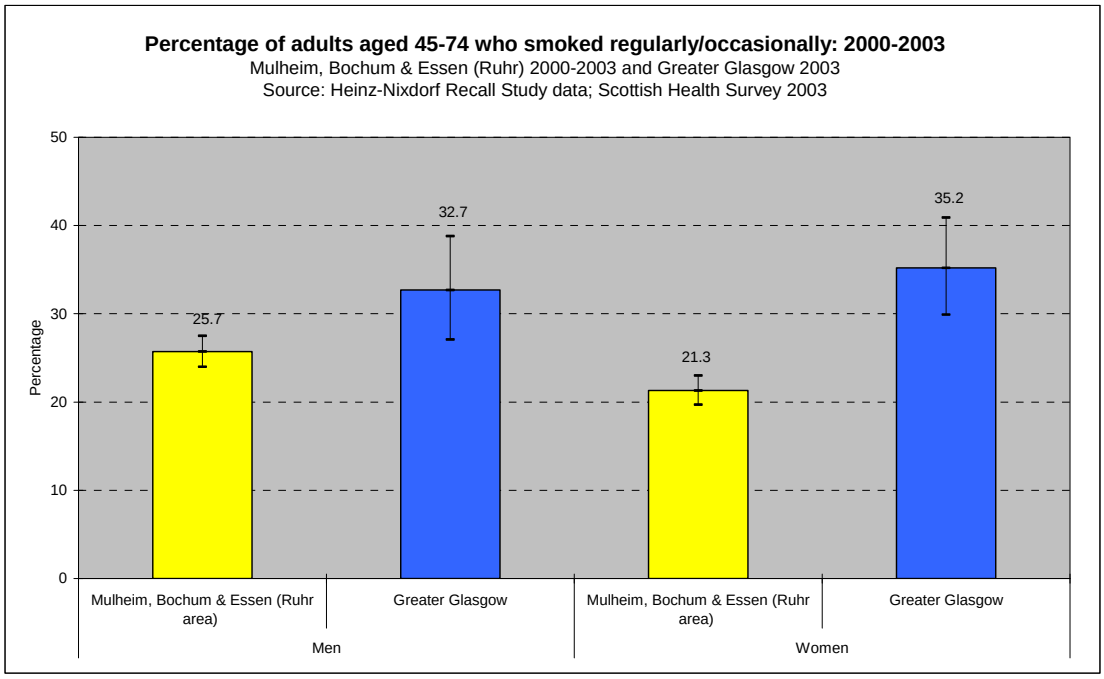
Those districts with the smallest proportions of reported smokers are in WCS, and those with the highest are mostly in the Ruhr (Figure 62). However, in the majority of districts from both regions at least 25% of the adult population were estimated to be smokers.

Figure 62



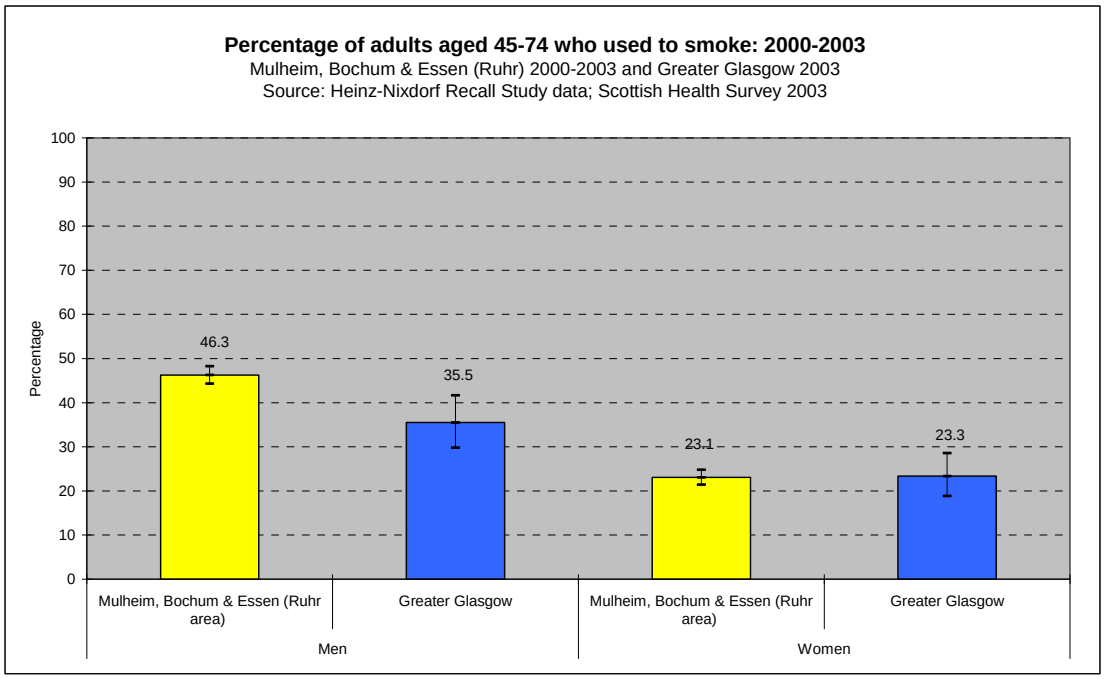
Smoking rates can also be compared for older working-age adults (aged 45-74), in the more urbanised sub-regions of Greater Glasgow and Mulheim, Bochum and Essen (Figure 63 – Figure 65). The results show that for this age group, Greater Glasgow had a higher proportion of current smokers, a lower percentage of male ex-smokers and a lower percentage of females who never smoked. As discussed in the main report, this suggests that not only are current smoking rates higher for the middle-aged in Greater Glasgow compared to the Ruhr area, they were also higher historically for women in the Scottish region.

Figure 63



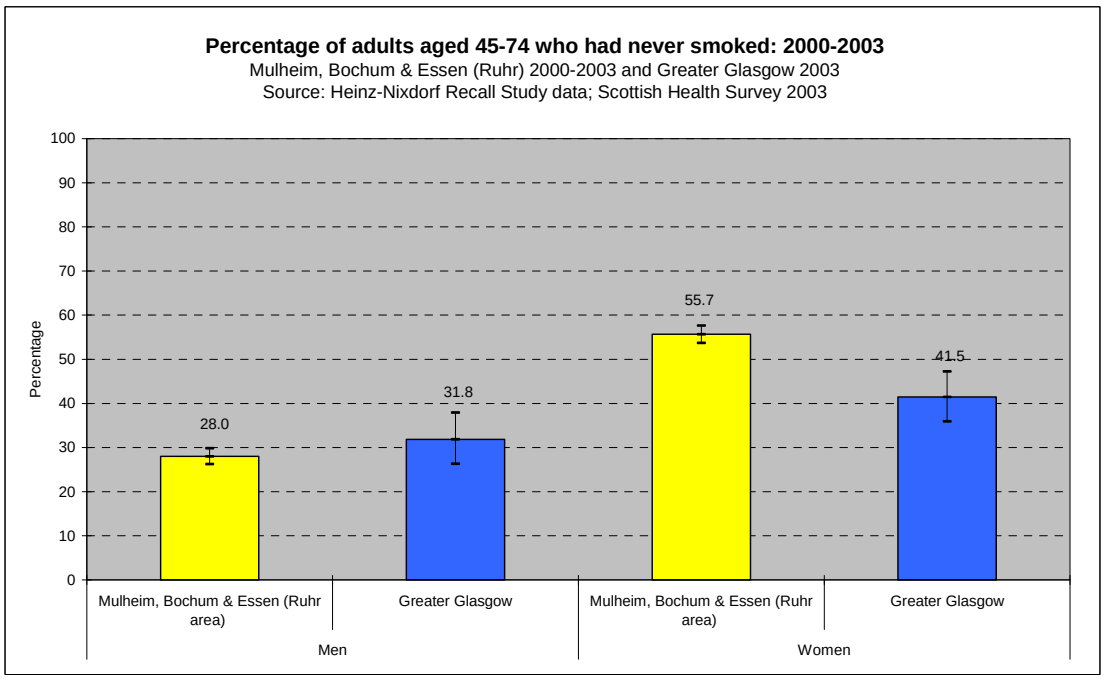
Sample sizes: HNRS 2000-03 (three cities) – 2388 men and 2416 women; Scottish Health Survey 2003 (Greater Glasgow) – 241 men and 317 women.

Figure 64



Sample sizes: HNRS 2000-03 (three cities) – 2388 men and 2416 women; Scottish Health Survey 2003 (Greater Glasgow) – 241 men and 317 women.

Figure 65

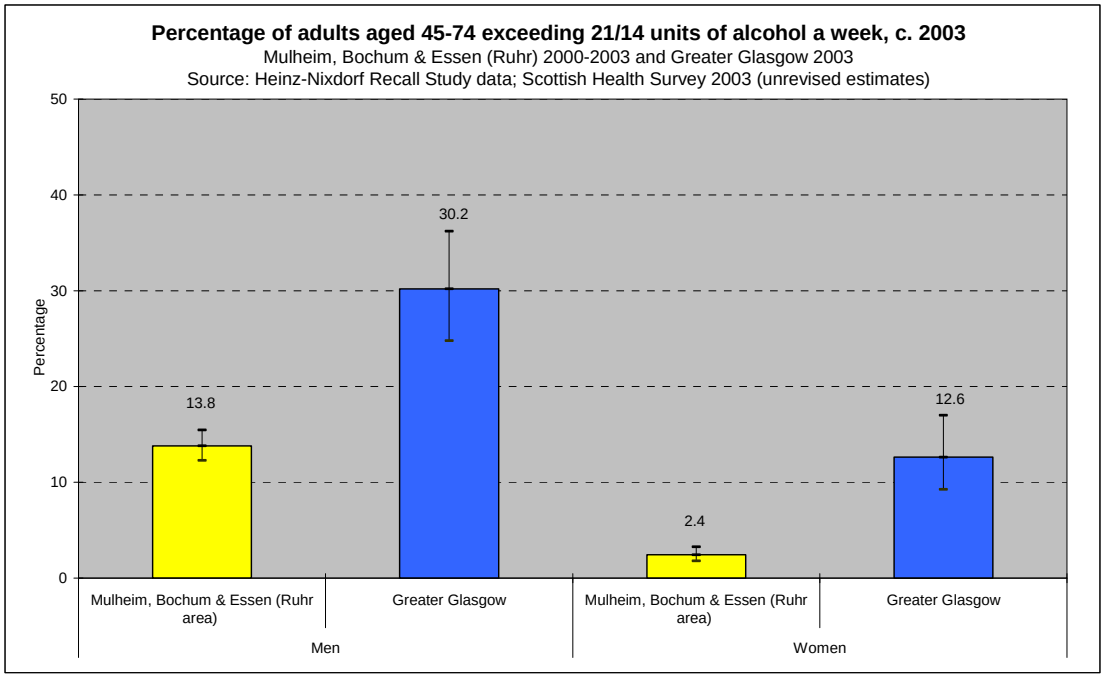


Sample sizes: HNRS 2000-03 (three cities) – 2388 men and 2416 women; Scottish Health Survey 2003 (Greater Glasgow) – 241 men and 317 women.

7.2 Alcohol consumption

Using data from the Heinz-Nixdorf Recall Study, we can compare reported levels of alcohol consumption in the two regions for adults aged 45-74 (Figure 66). This shows that older working-age adults in Greater Glasgow were substantially more likely to report that they exceeded the recommended weekly limits for alcohol consumption (21 units for men, 14 units for women) than those in the Ruhr cities.

Figure 66



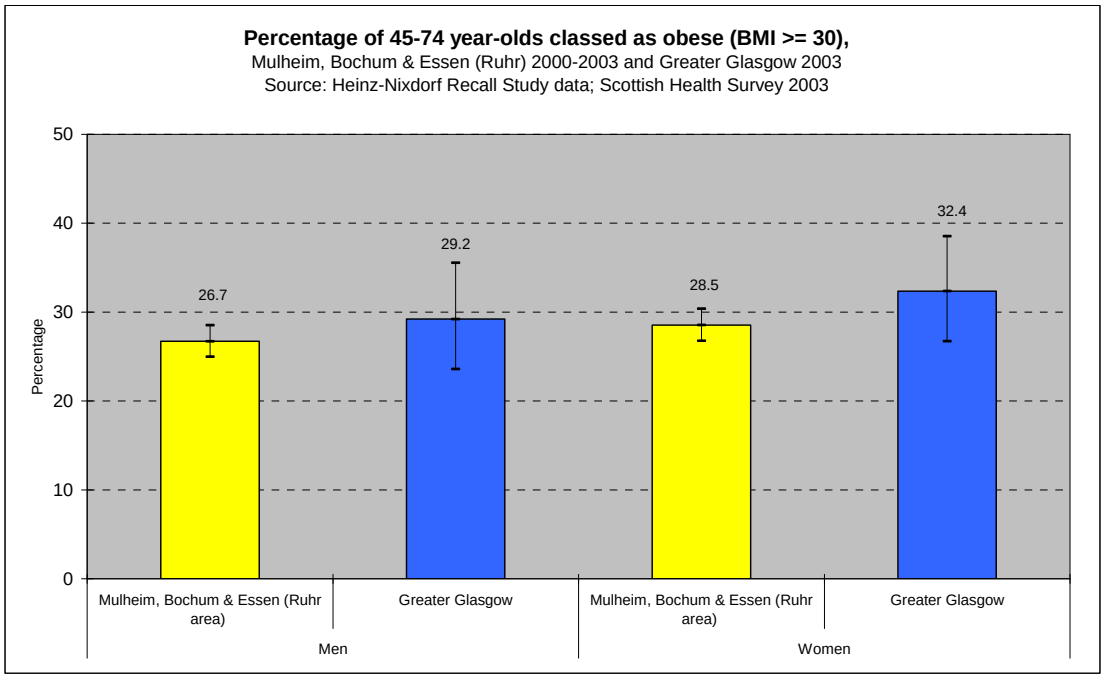
Sample sizes: HNRS 2000-03 (three cities) –1797 men and 1728 women; Scottish Health Survey 2003 (Greater Glasgow) – 241 men and 314 women.

7.3 Body mass index

Body mass index (BMI) is a convenient and widely used measure of obesity/overweight in a population. It is calculated by the following equation: weight in kilograms divided by height in metres squared (kg/m^2). Overweight is defined as a BMI between 25 and 30; obese is defined as a BMI over 30. This section presents data on BMI in the two regions.

The Heinz-Nixdorf Recall Study and Scottish Health Survey allow us to compare obesity levels among adults aged 45-74 in three cities of the Ruhr and Greater Glasgow. As shown in Figure 67 (below), levels of obesity did not vary significantly for this age group by region.

Figure 67



Sample sizes: HNRS 2000-03 (three cities) –2381 men and 2404 women; Scottish Health Survey 2003 (Greater Glasgow) – 213 men and 261 women.

Self-reported data on BMI by age and sex were also available for the adult population (aged 18+) at the state/country level from the national telephone health survey conducted by the Robert Koch Institute[xviii].

The proportion of individuals who were estimated to be overweight or obese in NRW state in 2005 was 65%. The range among the kreise varied from 66% in Bochum to 77% in Oberhausen (Figure 68). Figure 69 shows these data separated by the proportion of the population that is estimated to be overweight and those that are

[xviii] Note that these estimates are likely to understate the 'true' level of obesity in the population: as discussed in the main report, self-report tends to underestimate weight and overestimate height.

obese. The proportion of obese people ranged from 13% in Bochum to 19% in Oberhausen.

Figure 68

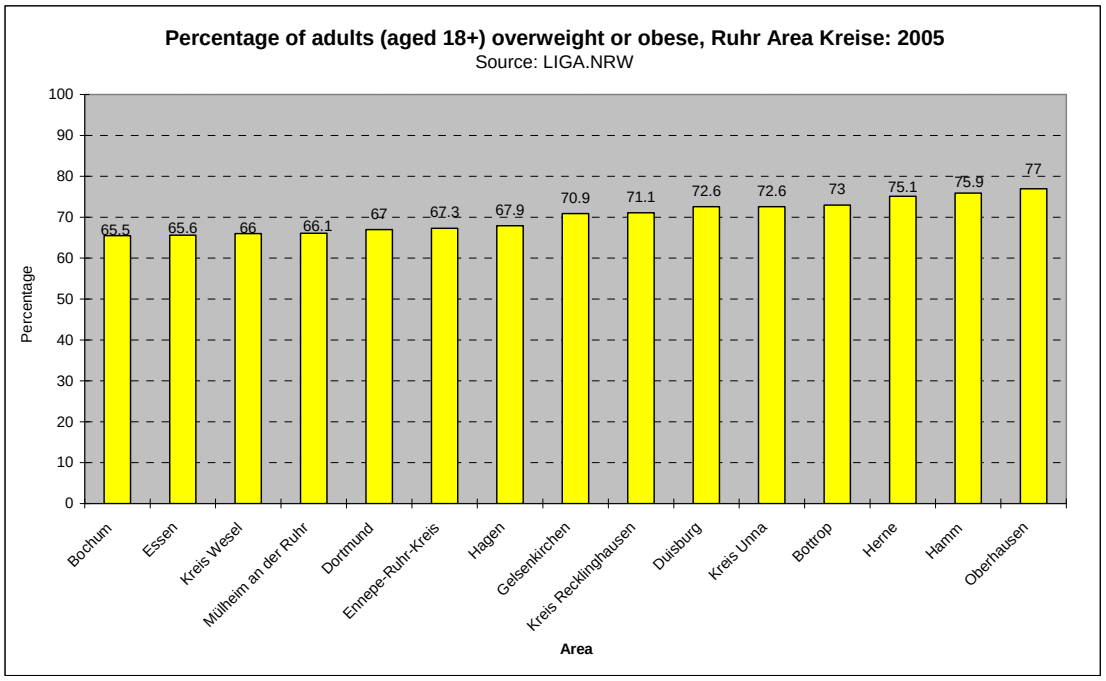
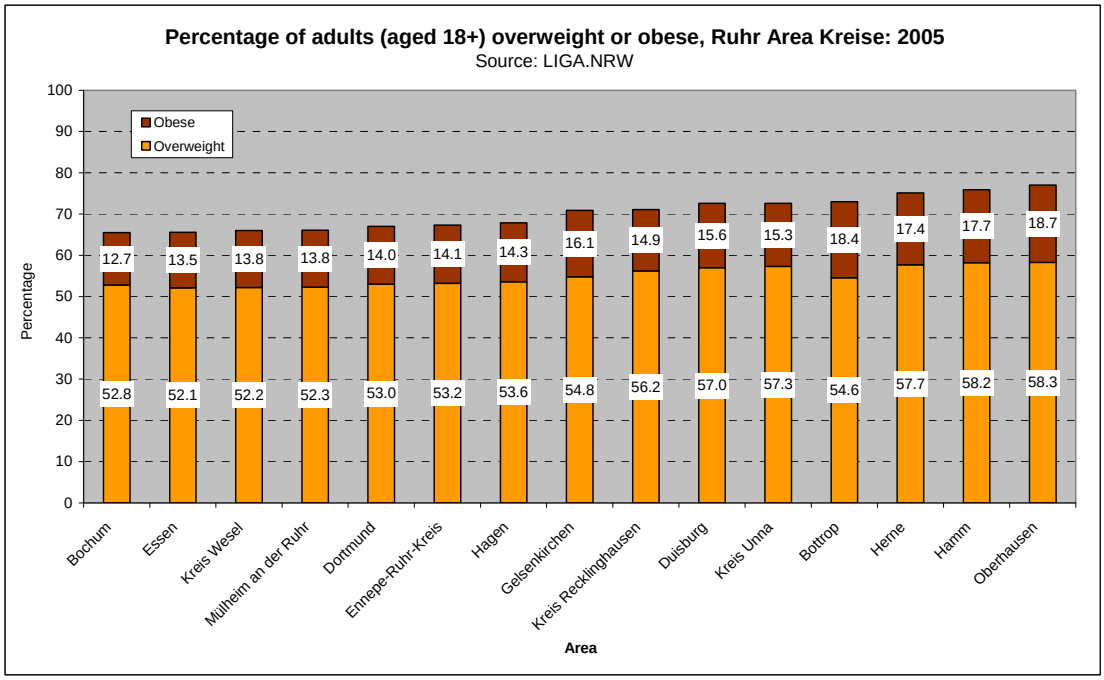


Figure 69



In NRW in 2003 there were a higher proportion of overweight or obese males than females: 67% of males and 53% of females. Equivalent data for Scotland were not available, but the proportion of males aged 16-64 who were estimated to be overweight or obese was 64%; the proportion of females aged 16-64 who were estimated to be overweight or obese was 57%.

Summary: Health behaviours

- Male **smoking** rates are similar in the two regions, but female smoking rates are considerably higher in WCS.
- Self-reported **alcohol consumption** suggest that adults in Greater Glasgow are much more likely than those in the three Ruhr cities to exceed recommended weekly drinking limits.
- Survey data suggest that levels of **obesity** among older working-age residents of Greater Glasgow and cities in the Ruhr are similar.

8.0 Child and maternal health

In this penultimate section, child and maternal health indicators are analysed. The indicators considered include: births to women under the age of 18; low birth weight babies; and terminations of pregnancy. These data were collected through reports by the health care systems in each country.

8.1 Births to mothers under the age of 18

Comparable data were available for the Ruhr and WCS on the number of live births to mothers under the age of 18. Figures shown here are expressed as the rate per 1000 females aged 15-17. In 2008, the rate of births to mothers < 18 was far higher in WCS (15.5 per 1000) than in the Ruhr area (5.1 per 1000). Figure 70 shows that this gap widened slightly between 2003 and 2008: while the rate of births to mothers < 18 fell slightly in the Ruhr area, it remained unchanged in the Scottish region.

Figure 70

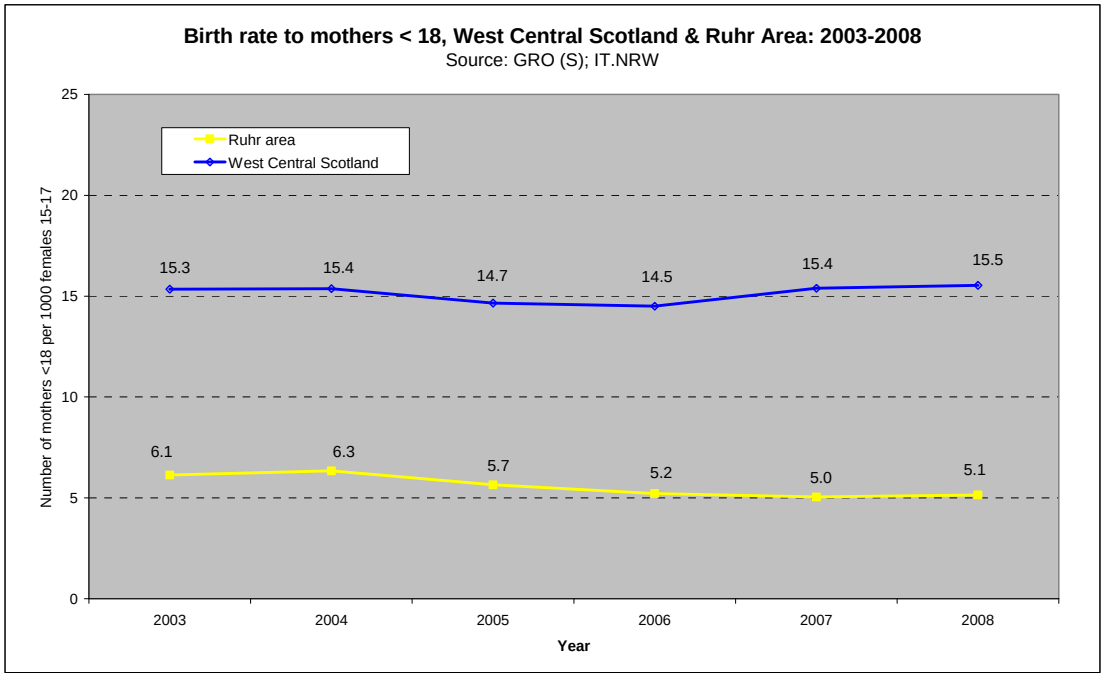
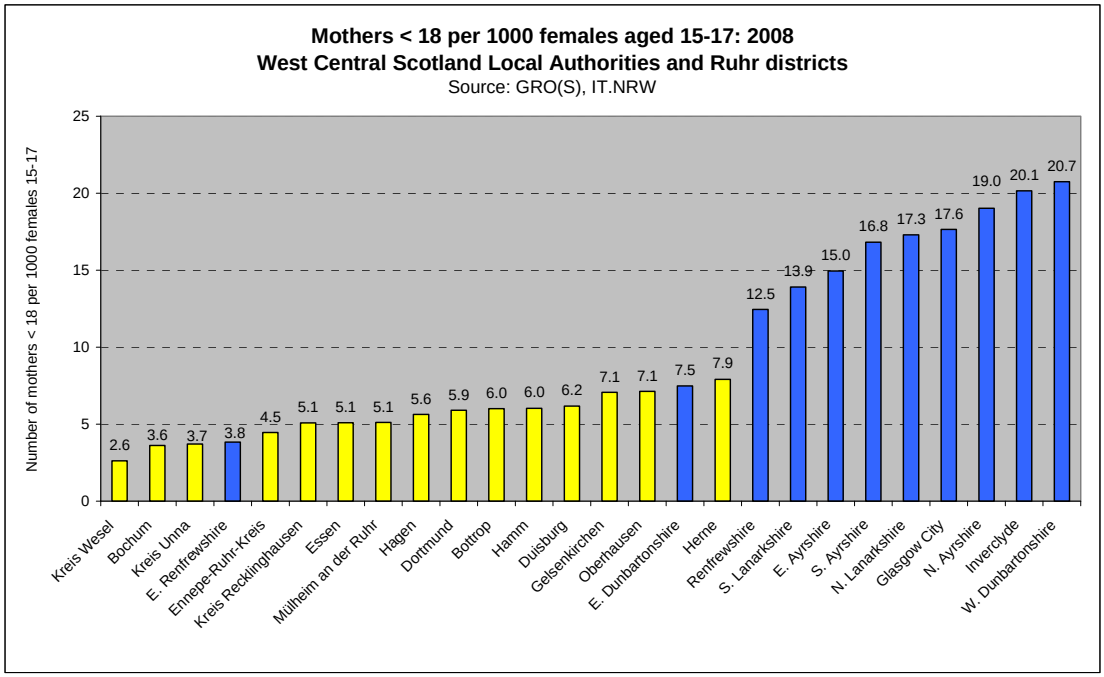


Figure 71 compares birth rates to mothers under the age of 18 across the WCS local authorities and Ruhr area kreise. With the exception of East Dunbartonshire and East Renfrewshire, every one of the WCS local authorities had a birth rate to teenage mothers higher than that observed for the Ruhr districts. Despite being similar in population size, Glasgow City had a teenage birth rate almost three times that recorded in Dortmund City (17.6 per 1000 versus 5.9 per 1000).

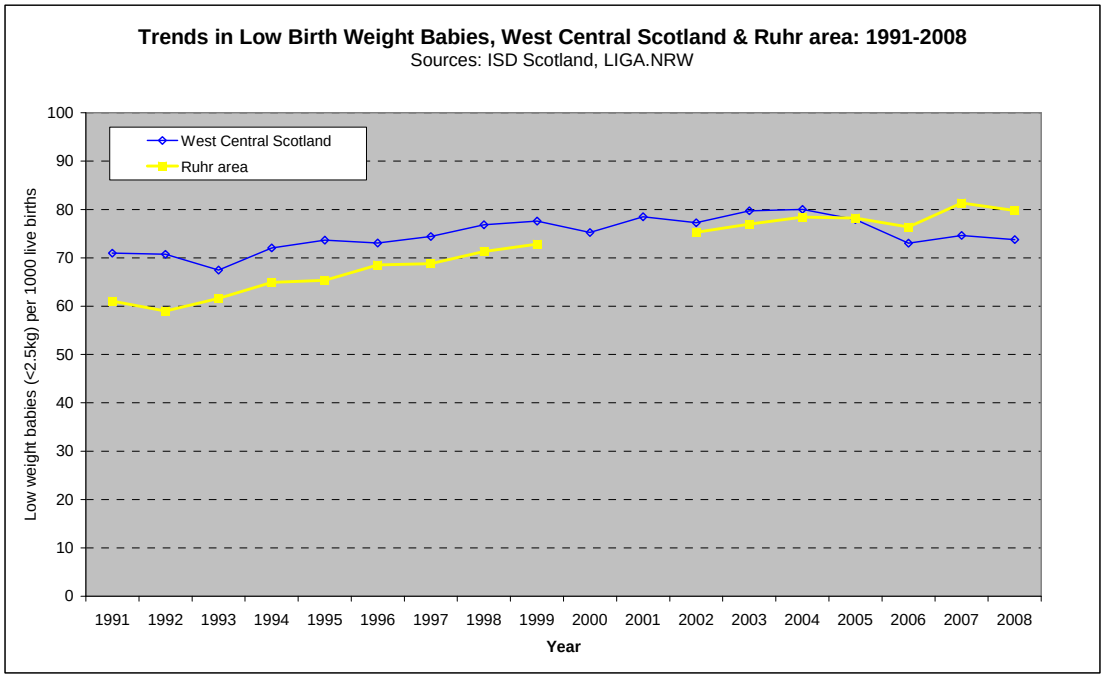
Figure 71



8.2 Low birth weight babies

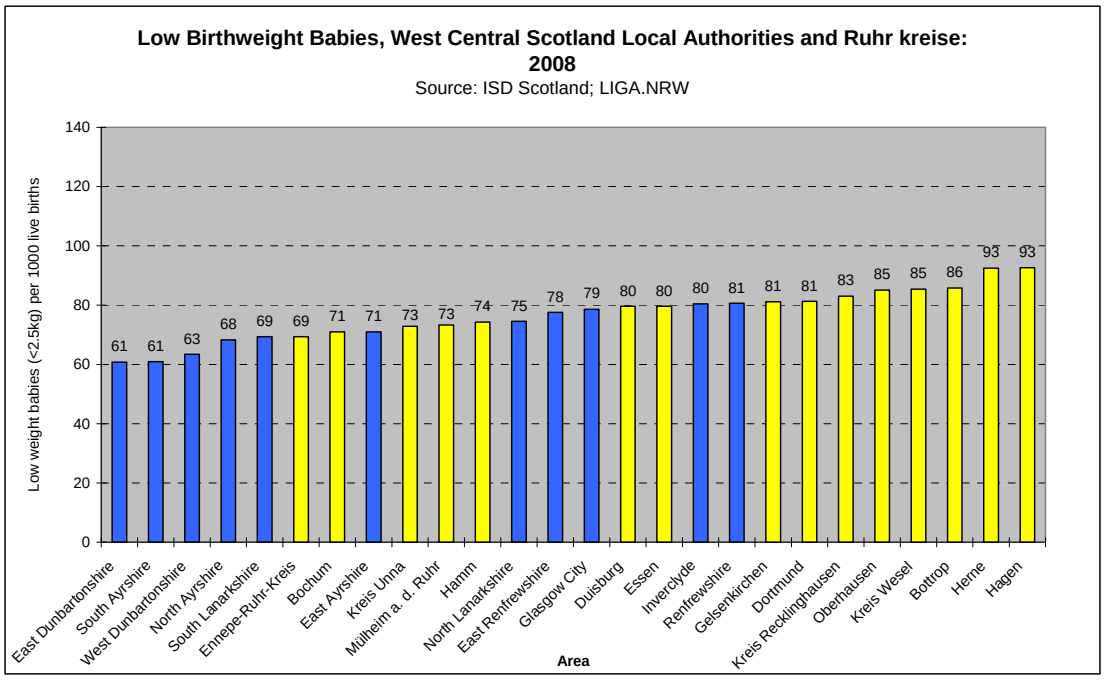
Low birth weight data refer to all babies born under 2.5kg, and this is expressed as a rate per 1000 all live births. In 2008, the rate of low-birth-weight babies per 1000 live births in WCS was 73.8 per 1000 live births, slightly lower than the rate for the Ruhr (79.8 per 1000). At the beginning of the 1990s, the rate of low birth-weight babies was lower in the Ruhr area than in WCS. However, rising rates in the German region meant that it had overtaken levels seen in WCS by the middle of the 2000s (Figure 72).

Figure 72



Sub-regional data on low birth-weight babies is shown for both regions in Figure 73. Within WCS, the rate of low birth-weight babies ranged from 61 per 1000 in East Dunbartonshire to 81 per 1000 in Renfrewshire The range was wider in the Ruhr: from 69 per 1000 in Ennepe-Ruhr-Kreise to 93 per 1000 in Hagen.

Figure 73

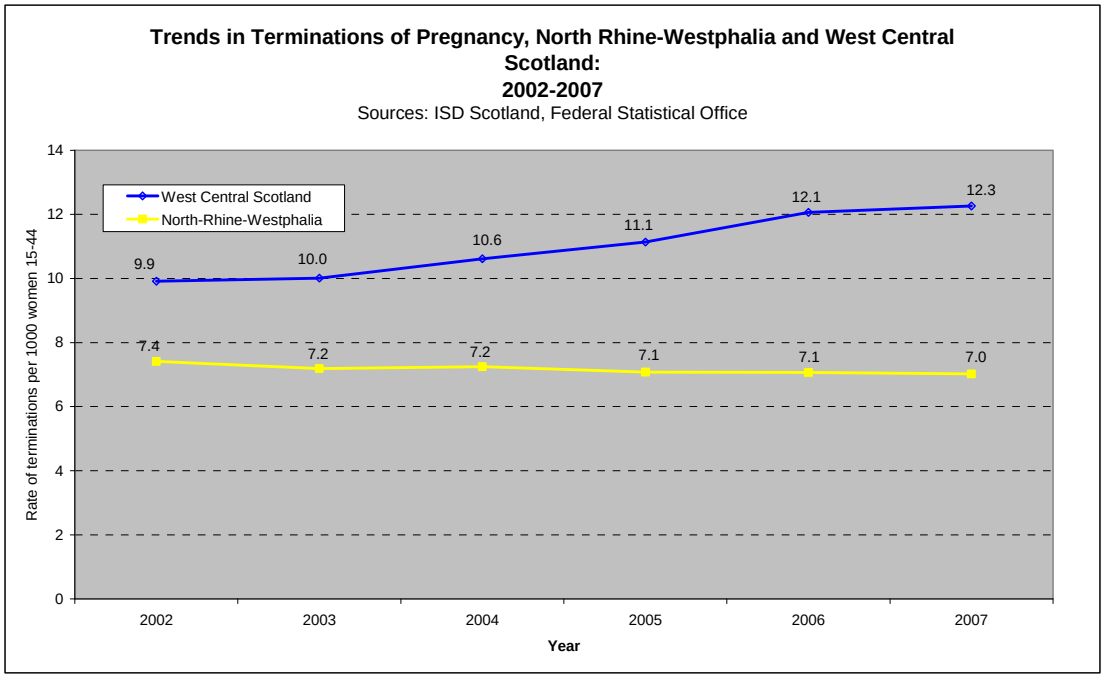


8.3 Termination of pregnancy

Termination of pregnancy is legal (and free through the NHS) in Scotland. It can be performed to avoid injury to the physical or mental health of the woman or her existing child(ren) up to 24 weeks gestation, and to save the woman's life, prevent grave injury to the woman, or if the child is likely to be severely handicapped at any time during the pregnancy. Over 90% of terminations are carried out within 12 weeks gestation (first trimester)[17]. The situation is quite different in Germany, where termination of pregnancy is illegal, but not punishable up to 12 weeks gestation if the woman attends counselling designed to discourage termination at least three days before the procedure is carried out. These terminations are not covered by medical insurance unless the woman has an income below a certain level. After the first trimester medical abortion is legal if there is a medical reason such as harm to the woman from continued pregnancy, or a severely deformed foetus[18].

With these legal aspects in mind, it is not surprising that the rate of terminations in NRW state (used as a proxy for the Ruhr) was considerably lower than in WCS. In 2007 there were seven terminations per 1000 women aged 15-44 in NRW, just over half the rate in WCS (12.3 per 1000 women aged 15-44). While the rate of terminations in NRW state remained level over the period 2002-07, in WCS there was a rate increase every year during the same period. This trend divergence can be seen in Figure 74.

Figure 74



Summary: Child and maternal health

- Rates of births to **teenage mothers** were far higher in WCS than in the Ruhr. The difference is even more marked at district level: in 2008 the rate of births to teenage mothers was three times higher in Glasgow city than in Dortmund, a city of comparable size.
- The Ruhr area had a higher rate of **low birth-weight babies** than WCS in 2008. This is in contrast to the early 1990s, when the reverse was the case. This reversal was driven by steady increases in the proportion of underweight babies born in the German region in the last 18 years.
- **Termination of pregnancy** rates among women aged 15-44 were much higher in WCS than in North-Rhine Westphalia in 2007. Rates also rose year-on-year between 2002 and 2007, in contrast to the German region where they remained level. However, these differences may be partly accounted for by the stricter conditions and potentially higher costs attached to obtaining a termination of pregnancy in Germany, as well as cultural differences.

9.0 Conclusions

This case study has compared a range of routinely available indicators of health and its determinants in the Ruhr area of Germany and WCS, in an attempt to answer two research questions:

1. Can WCS's relatively poorer health status be explained purely in terms of socio-economic factors (poverty, deprivation etc.)?
2. Do comparisons of other health determinant information identify important differences between WCS and other regions?

In relation to the first question, this remains unproven. Compared to the Ruhr area, WCS has lower current levels of unemployment and higher levels of employment for men and women. There is also evidence that labour market opportunities (measured by the unemployment and employment rates) have improved relative to the German region over time. Although WCS compares less favourably to the North-Rhine Westphalia (used here as a proxy for the Ruhr) in terms of relative poverty and family affluence, levels of income inequality and the perceived adequacy of household income are similar in the two regions.

In relation to the second question, a number of interesting differences between the regions have been shown. For example, the evidence on self-reported measures of health is at odds with objective measures of health: despite life expectancy being higher in the Ruhr than WCS, adults in the German region are less likely to rate their health as good, and in general report lower levels of life satisfaction compared to their counterparts in WCS. This 'disconnect' between subjective and objective measures of health is also discussed in the main report, with an 'over-estimation' of health status appearing to be a feature of the Scottish, as well the WCS, population.

The overall picture for social determinants and aspects of health is ambivalent. The Ruhr and WCS have similar concentrations of households that might be thought of as 'vulnerable' (lone parent, single person). However, marriage rates and indicators of social capital (regular attendance at religious ceremonies; voter turnout) do appear to be higher in the Ruhr area compared to WCS. We might speculate that adults in the German region might have access to alternative support networks, which might act to protect their health in some way, though exploring this is clearly beyond the scope of this project.

Some differences are also evident in relation to child and maternal health, for example the much lower rate of teenage pregnancies and pregnancy terminations in the Ruhr area compared to WCS. Variation was observed in relation to aspects of the physical environment (climate) and some aspects of health behaviours. Levels of sunlight reaching the ground are lower in the WCS compared to the Ruhr area. While male smoking rates are similar in the two regions, other aspects support a more familiar narrative: female smoking rates and reported levels of alcohol consumption are much higher in WCS than in the Ruhr.

Figure 75 presents an at-a-glance summary of key indicators presented within the case study. It is a (very crude) attempt to summarise the extent to which health and its determinants (or at least data on health and its determinants that are available from routine data sources) differs between these two post-industrial regions: WCS and the Ruhr area. It illustrates domains where WCS is 'better' than the Ruhr (self-rated health, labour market participation, tertiary education); those for which WCS is 'worse' (life expectancy, female smoking, alcohol consumption, relative poverty and some aspects of social capital and child and maternal health) and those where the regions are very similar (vulnerable households, income inequality and perceived adequacy of income).

As with the main report and the other three case studies, these analyses have identified some important differences between the Scottish and West German post-industrial regions. However, it is difficult to quantify their impact on health outcomes, or on the rate of improvement in health outcomes. Nonetheless, these results add to the evidence that economic issues alone do not appear to be the principal issue. Further research is required, focussing not on routine administrative data, but based on the collation of new data to test specific hypotheses – and this is now being undertaken as part of a programme of work focussing on the key WCS city, Glasgow, and its most comparable post-industrial cities in the UK, Liverpool and Manchester. The results of that research will be complete in 2012.

Figure 75 Selected indicators for WCS compared to the Ruhr area

Is WCS worse than, similar to, or better than the Ruhr?							
Domain	**Indicator**	**WCS vs. the Ruhr**	**WCS**	**The Ruhr**	**Measure**	**Region**	**Time Period**
Health & Function	Life expectancy - males		72.8	75.1	yrs	WCS	2003-05
	Life expectancy - females		78.3	80.7	yrs	WCS	2003-05
	Adults aged 45-74 in good/v. good health		59.0	51.0	%	GG	2000-03
	Females aged 45-74 in good/v. good health		57.0	44.0	%	GG	2000-03
	Mean life satisfaction (0-10)		7.3	6.8	Av.	GG & C	2008
Prosperity & poverty	Male employment rate		72.0	67.0	%	WCS	2008
	Female employment rate		64.0	54.0	%	WCS	2008
	Unemployment rate		5.8	10.9	%	WCS	2008
	Perceived adequacy of income *		11.4	14.4	%	WCS	2002-08
Inequalities	Population living in relative poverty *		18.9	11.0	%	S.W. Scot	1994-01
	Income inequality *		0.30	0.29	Gini	WCS	2003-04
Social Environment	Education: tertiary (level 5/6) qualifications, working age		35.2	13.0	%	WCS	2003-06
	Education: no/low (<level 3) qualifications, working age		29.6	31.0	%	WCS	2003-06
	Lone parent households		33.8	36.8	%	WCS	2001-03
	Single person households		33.8	36.8	%	WCS	2001-03
	Adults (25-64) who are married		63.0	66.4	%	WCS	2001
	Social capital - not reg. attend. church *		52.7	30.6	%	WCS	2002-08
	Social capital - voter turnout *		58.3	78.3	%	WCS	2005
Physical Environment	Climate - average annual irradiance		2805	3019	w	G	2005
	Crimes per capita		88.0	94.0	Cr1	WCS	2006.0
Behaviour	Male smoking prevalence *		29.9	29.8	%	WCS	2003-05
	Female smoking prevalence *		28.4	21.6	%	WCS	2003-05
	Male obesity (45-74)		29.2	26.7	%	GG	2000-03
	Female obesity (45-74)		32.4	28.5	%	GG	2000-03
	Males (45-74) drinking > 21 units a week		30.2	13.6	%	GG	2000-03
	Females (45-74) drinking > 14 units a week		12.6	2.4	%	GG	2000-03
Child & Maternal	Births to teenage mothers (< 18)		15.5	5.1	Cr2	WCS	2008
	Low birth-weight babies		73.8	79.8	Cr3	WCS	2008
	Terminations of pregancies *		12.3	7.0	Cr4	WCS	2007

* NRW used as proxy for the Ruhr area.

Note: For survey data, 95% confidence intervals (and Chi-square test for proportions) used to determine if difference significant.

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Appendix 1: Definitions and sources of data presented in the case study

Table/Figure No.	Description	Source	Notes
Figure 1a.	Map showing location of Ruhr area within North Rhine-Westphalia and Germany	Map produced using boundaries provided with ESRI ArcGIS 9 software.	
Figure 1b.	More detailed map of the Ruhr area	Map produced using boundaries provided with ESRI ArcGIS 9 software.	
Figure 2	Map of West Central Scotland local authorities	Map produced using EDINA UKBORDERS with the support of ESRC/JISC © Crown copyright.	
Figure 3	Bar chart showing ranked population of 11 West Central Scotland local authorities and 15 Ruhr area kreise, 2008.	General Register Office for Scotland (WCS) and Federal Statistics Office (Ruhr).	A German 'kreis' is a district or county; kreise is the plural.
Figure 4	Line chart showing male life expectancy in Ruhr area vs. Germany and WCS vs. Scotland between 1991-93 and 2003-05.	General Register Office for Scotland (WCS) and NRW LIGA (Ruhr area), plus ScotPHO Health for All Database.	
Figure 5	Line chart showing female life expectancy in Ruhr area vs. Germany and WCS vs. Scotland between 1991-93 and 2003-05.	General Register Office for Scotland (WCS) and NRW LIGA (Ruhr area), plus ScotPHO Health for All Database.	
Figure 6	Bar chart showing ranked male life expectancy at birth, 15 Ruhr area kreise, 2006-08.	NRW LIGA (Ruhr area).	

Figure 7	Bar chart showing ranked male life expectancy at birth, for 11 West Central Scotland local authorities and 15 Ruhr area kreise, 2006-08.	General Register Office for Scotland (WCS) and NRW LIGA (Ruhr area).	
Figure 8	Bar chart showing ranked female life expectancy at birth, for 11 West Central Scotland local authorities and 15 Ruhr area kreise, 2006-08.	General Register Office for Scotland (WCS) and NRW LIGA (Ruhr area).	
Figure 9	Percentage of adults aged 45-74 who rate their general health as good or very good, by gender, Mulheim, Bochum & Essen (2000-03) and Greater Glasgow (2003).	Heinz Nixdorf Recall Study (Mulheim, Bochum & Essen) and Scottish Health Survey 2003 (Greater Glasgow).	
Figure 10	Bar chart showing mean life satisfaction scores for adults aged 15+/16+, by gender, Greater Glasgow & Clyde Health Board area (2008) and Ruhr area (2008).	German Socio-Economic Panel (SOEP) for the Ruhr area (2008) and Scottish Health Survey 2008 for Greater Glasgow & Clyde.	
Figure 11	Percentage of adults aged 45-74 reporting that they have been diagnosed by a doctor (or equivalent) with high blood pressure, by gender, Mulheim, Bochum & Essen (2000-03) and Greater Glasgow (2003).	Heinz Nixdorf Recall Study (Mulheim, Bochum & Essen) and Scottish Health Survey 2003 (Greater Glasgow).	

Figure 12	Percentage of adults aged 45-74 reporting that they have been diagnosed by a doctor (or equivalent) with diabetes, by gender, Mulheim, Bochum & Essen (2000-03) and Greater Glasgow (2003).	Heinz Nixdorf Recall Study (Mulheim, Bochum & Essen) and Scottish Health Survey 2003 (Greater Glasgow).	
Figure 13	Bar chart showing ranked ILO unemployment rates, for 11 WCS local authorities, 2007.	Annual Population Survey.	
Figure 14	Bar chart showing ranked ILO unemployment rates, for 15 Ruhr area kreise, 2007.	Eurostat.	
Figure 15	Bar chart showing ranked ILO unemployment rates, for 11 WCS local authorities and 15 Ruhr area kreise, 2007.	Annual Population Survey (WCS) and Eurostat (Ruhe area).	
Figure 16	Line chart showing standardised trends in unemployment rates (as percentage of economically active adults), South Western Scotland and the Ruhr area.	Overman and Puga (S.W Scotland, 1986-96) Esch and Langer (Ruhr area, 1985-00, selected years. Eurostat (S.W Scotland, 1986-08) Federal Statistics Office (Ruhr area, 2005 & 08).	

Figure 17	Crude male employment rate=All males in employment/all males aged 15-64, except for 1986-1991 WCS when rates directly calculated from Labour Force Survey.	**West Central Scotland** Population data Mid- year population estimates, GROS. Employment data 1995-2003: total in employment (Labour Force Survey); 2005 (Annual Population Survey) **Ruhr area** Population data 1980-2005: North-Rhine Westphalia Institute for Work and Health (LIGA) Employment data 1979-2005: employees in employment (Regionalverband Ruhr)	
Figure 18	Crude female employment rate=All females in employment/all males aged 15-64.	See above	
Figure 19	Bar chart showing percentage of households with no access to a car, Ruhr area (2001-03) and WCS (2001).	German Socio-Economic Panel (SOEP) for the Ruhr area (2001-03) and GRO (S) Census of Population (2001).	
Figure 20	Cars per Capita: Total number of cars divided by the population expressed as a percentage.	Federal Statistical Office of Germany; German Institute for Economic Research, World Bank (WDI) for German data.	Total number of cars divided by the population expressed as a percentage.
Figure 21	Bar chart showing percentage of households not owning their own home, Ruhr area (1999-02) and WCS (2001).	Urban Audit 1999-02 for the Ruhrgebeit LUZ, via Eurostat, and GRO (S) Census of Population (2001).	

Figure 22	Line chart showing percentage of households not owning their own home, Ruhr area (1991-01) and WCS (1991-01).	Urban Audit 1991 and 2001 for the Ruhrgebeit LUZ, via Eurostat, and GRO (S) Census of Population 1991 and 2001.	
Figure 23	Bar chart showing percentage of adults aged 15+/16+ reporting that they found it difficult to manage on their household income nowadays , West Central Scotland 2007) and North-Rhine-Westphalia (2002-08 average).	European Social Survey Rounds 1-4 (2002/03 to 2008/09) for North-Rhine-Westphalia. Scottish Social Attitudes Survey 2007 for West Central Scotland.	
Figure 24	Bar chart showing percentage of children aged 11-15 living in high and low affluence households, West Central Scotland and North-Rhine-Westphalia region: 2006.	HBSC data calculated and supplied by University of Bielefeld (North-Rhine-Westphalia) and University of Edinburgh (West Central Scotland).	For more detail on the family affluence scale, see: Boyce et al. The Family Affluence Scale as a Measure of National Wealth: Validation of an Adolescent Self-Report Measure. Social Indicators Research (2006) 78: 473–487.
Figure 25	Percentage of population living in relative poverty (< 60% of median national income), South Western Scotland and North-Rhine-Westphalia.	Lemmi et al. Regional Indicators to reflect social exclusion and poverty VT/2003/43. Final Report. Original source is the European Community Household Panel, pooled data from 1994-01 inclusive.	South Western Scotland used as proxy for West Central Scotland. NUTS II Relative poverty rates calculated by national figure (Table A.2) by figures in Table A.3 and Table A.5 where appropriate: the relevant variable is HCR_c.

Figure 26	Gini coefficient for household incomes, West Central Scotland and North-Rhine-Westphalia.	Luxemburg Income Study 2004 (North-Rhine-Westphalia). Scottish Household Survey 2003-04 (WCS).	
Figure 27	Absolute population change per 1000 people compared to previous year, West Central Scotland and North-Rhine-Westphalia: 1996-08.	GRO (S) Mid-year population estimates and Federal Statistics Office.	
Figure 28	Ranked change in population 1995-08, as a percentage of 1995 population, for 11 West Central Scotland local authorities.	GRO (S) Mid-year population estimates.	
Figure 29	Ranked change in population 1995-08, as a percentage of 1995 population, for 15 Ruhr area kreise.	Federal Statistics Office.	
Figure 30	Ranked net migration 1995-07, as a percentage of 1995 population, for 11 West Central Scotland local authorities.	GRO (S) Mid-year population estimates.	
Figure 31	Ranked net migration 1995-2007, as a percentage of 1995 population, for 15 Ruhr area kreise.	Federal Statistics Office.	
Figure 32	Ranked net migration 1995-2007, as a percentage of 1995 population, for 15 Ruhr area kreise and 11 WCS local authorities.	General Register Office for Scotland (WCS) and Federal Statistics Office (Ruhr).	

Figure 33	Bar chart showing ranked population density (persons per square km) for 11 West Central Scotland local authorities and 15 Ruhr area kreise: 2008.	General Register Office for Scotland (WCS) and Federal Statistics Office (Ruhr).	
Figure 34	Stacked bar chart showing population distribution by three groups (<15, 15-64 and 65+) for 11 West Central Scotland local authorities: 2007.	General Register Office for Scotland (WCS).	
Figure 35	Stacked bar chart showing population distribution by three groups (<15, 15-64 and 65+) for 15 Ruhr area kreise: 2007.	Federal Statistics Office (Ruhr).	
Figure 36	Line chart showing dependency ratio for WCS and Ruhr area, 2003-2007. Dependency ratio = (65 + and Under 15)/(Population aged 15-64).	General Register Office for Scotland (WCS) and Federal Statistics Office (Ruhr).	
Figure 37	Bar chart showing ranked dependency ratio for 11 West Central Scotland local authorities and 15 Ruhr area kreise: 2007.	See above.	
Figure 38	Line chart showing fertility rate for WCS and Ruhr area, 2003-2008. Rate shown is all births/female population aged 15-44 in each region.	General Register Office for Scotland (WCS) and Federal Statistics Office (Ruhr).	

Figure 39	Bar chart showing ranked dependency ratio for 11 West Central Scotland local authorities and 15 Ruhr area kreise: 2008.	See above.	
Figure 40	Bar chart showing percentage of working-age adults by highest banded ISCED education attainment level achieved: ISCED 0-2, 3-4 and 5-6. Scottish data mapped to ISCED as follows: No qualifications & NVQ 1: ISCED Level 0-2 NVQ Level 2,3 & Trade apprenticeships: ISCED 3-4. NVQ 4+ and other: ISCED 5-6.	Urban Audit 2003-06 for the Ruhrgebeit LUZ, via Eurostat (Ruhr area). Annual Population Survey January-December 2005 (West Central Scotland).	Age bands 16-64 for the Ruhr area, 16-64 for West Central Scotland.

Figure 41	Bar chart showing percentage of households with dependent children headed by a lone parent for WCS and Ruhr area 1999-02.	Urban Audit 1999-02 for the Ruhrgebeit LUZ, via Eurostat (Ruhr area). GRO (S) Census of Population 2001 (WCS).	Scottish definition=all lone parents with dependent children/all families with dependent children. In WCS, a dependent child is a person aged 0 – 15 in a household (whether or not in a family) or aged 16 – 18, in full-time education and living in a family with his or her parent(s). German definition=all lone parents households with at least one child under 18 years old/all households with at least one adult and at least one children under 18.
Figure 42	Line chart showing percentage of households with dependent children headed by a lone parent for WCS and Ruhr area 1989-91 to 1999-02.	Urban Audit 1989-91 and 1999-02 for the Ruhrgebeit LUZ, via Eurostat (Ruhr area). GRO (S) Census of Population 1991 and 2001 (WCS).	See above.
Figure 43	Bar chart showing percentage of single person households for WCS and Ruhr area 1999-02.	Urban Audit 1999-02 for the Ruhrgebeit LUZ, via Eurostat (Ruhr area). GRO (S) Census of Population 2001 (WCS).	All single person households/all households.
Figure 44	Line chart showing percentage of single person households for WCS and Ruhr area 1989-91 to 1999-02.	Urban Audit 1989-91 and 1999-02 for the Ruhrgebeit LUZ, via Eurostat (Ruhr area). GRO (S) Census of Population 1991 and 2001 (WCS).	See above.

Figure 45	Bar chart showing ranked percentage of single person households, for 11 WCS local authorities, 2007-08.	Scottish Household Survey 2007-08.	
Figure 46	Bar chart showing ranked percentage of single person households, for 15 Ruhr area kreise, 2007.	IT.NRW.	
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Figure 51	Line chart showing voter turnout at German and UK parliamentary elections, West Central Scotland and North-Rhine-Westphalia. 1990-92, 1997-98, 2001-02 and 2005-07.	UK Electoral Commission (West Central Scotland). Federal Statistics Office (North-Rhine Westphalia).	Parliamentary Election years were: 1992, 1997, 2001 and 2005 for UK 1990, 1998, 2002 and 2005 for Germany.
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Figure 56	Bar chart showing percentage of adults aged 15+/16+ who feel very/fairly safe walking alone in their neighbourhood after dark, by gender, Scottish Household Survey (2007-08) and North-Rhine Westphalia (2002-08 average).	European Social Survey Rounds 1-4 (2002/03 to 2008/09) for North-Rhine-Westphalia. Scottish Household Survey 2007-08 (West Central Scotland).	
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Limburg

Merseyside

Nord-Pas-de-Calais

Northern Ireland

North Moravia

Ruhr

Saxony

Saxony-Anhalt

Silesia

Swansea & South Wales Coalfields

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