The Aftershock of Deindustrialisation

Trends in mortality in Scotland and other parts of post-industrial Europe

April 2008

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SUMMARY

Post-industrial decline (and its many associated factors) is frequently cited as one of the major underlying reasons behind the poor health profile of Scotland and, especially, the West of Scotland. It is instructive to know, therefore, how other post-industrial areas in Europe have fared in respect of recent health trends.

This research, as a first stage of an ongoing process to gain a better understanding of Scotland's (and particularly the West of Scotland's) continuing poor health status relative to other comparable areas, identified a total of 20 regions in the UK and mainland Europe which had suffered similar levels of deindustrialisation in the latter half of the 20th century. Detailed mortality and population data were obtained for each region to allow meaningful comparisons of mortality based trends (life expectancy, and age, sex, and cause specific death rates) over the last 20-25 years. These data are presented alongside brief and simple descriptions of each area in terms of their industrial history, socio-economic profile, and current health status in relation to their parent countries.

The key result is that mortality in Scotland (but especially the West of Scotland) is high and rates of improvement are relatively slow compared to other areas in the UK and Europe that have also experienced industrial decline. This finding is complicated by the fact that the Scottish areas appear to compare relatively favourably with other regions in terms of socio-economic factors such as wealth, unemployment and educational attainment.

Possible explanations for Scotland's/the West of Scotland's relative poor rate of health improvement are explored, and it is hoped that more insight will be gained from detailed collaborative research with a small number of regions. This is now planned as the second stage of the project.

PART ONE:
INTRODUCTION

Scotland – the 'sick man of Europe'?

Scotland has acquired an unwelcome reputation for being what the press dubs the 'sick man of Europe'. This judgement is based on international comparisons of life expectancy, disease rates and a variety of other indicators. The stereotype does have some justification as recent analyses show that Scotland has the highest levels of mortality of any western European country for both males and females[1,2].

Nonetheless, such national comparisons are inherently problematic: countries vary substantially in their population size and within any country (especially larger ones) there is enormous heterogeneity, both in terms of health status – with some regions enjoying much better health than others – and in terms of history, character and culture. More meaningful comparisons can arguably be made between areas, regions or smaller countries where smaller scale is usually associated with less heterogeneity.

It is also important to bear in mind the factors that shape the population health of any country or region. Health is created and destroyed by the complex interaction of a vast number of diverse factors – socio-economical, environmental, behavioural, genetic, cultural – played out at different geographical levels (global, national, regional, local) over long periods of time. Thus, the economy, culture and ecology of a region will shape health outcomes through many complex and interacting pathways.

How does Scotland understand its own poor health? Within Scotland, the post-industrial parts of the West of Scotland have the worst health profiles in the country. These areas suffer from high levels of socio-economic deprivation resulting, it is argued, from the region having suffered profoundly from post-industrial decline in recent decades. Decline of industry associated with material deprivation and high rates of health damaging behaviours is the most commonly promoted explanation for Scotland's comparatively poor health compared to the rest of Western Europe[3, 4, 5, 6]. Since areas like the West of Scotland have suffered more industrial shocks that most other parts of Europe in recent decades[7, 8, 9] it is highly plausible that this history has impacted on health and wellbeing. However, it would be interesting to know how Scotland as a whole, and the West of

Scotland in particular, have fared compared to other comparable post-industrial parts of Europe. Have all post-industrial regions experienced a similar fate?

Aims

To enhance our understanding of the role of post-industrial decline on the health of Scotland, in this report we make comparisons between Scotland – and particularly the West of Scotland[i] – and other areas of Europe which have experienced a shared history of industrialisation and subsequent deindustrialisation. Ultimately, it is our ambition to make comparisons between a range of health outcomes and determinants of health. As a first stage in this process, this project aimed to:

- identify comparable post-industrial European regions; and
- analyse long term trends in mortality in these regions for a range of causes.

Scotland vs. the West of Scotland

Although the issue of post-industrial decline is particularly relevant to the West of Scotland, data are also presented for the whole of Scotland. This approach reflects our judgement that deindustrialisation is relevant to the whole country, given that:

- almost half the population of the country is resident in the West of Scotland – thus, issues affecting the West will impact on the health status of the country as a whole; and
- there are a number of other parts of Scotland (but outwith the West) to which these comparisons are especially relevant, given their similar post-industrial experiences (e.g. Dundee, West Lothian, Fife).

Data, therefore, are presented on a national (Scotland) and regional (West of Scotland) basis. In some instances, sub-regional data for the Greater Glasgow & Clyde NHS Board area are also presented.

[i] For the purposes of this report, we define the West of Scotland in terms of eleven local authority areas, namely: East Ayrshire, East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, and West Dunbartonshire. This is the same definition used in the recent 'Let Glasgow Flourish report' , published by the Glasgow Centre for Population Health in 2006.

'Post-industrial' regions

Throughout the report we refer to 'post-industrial' areas, and areas which have undergone 'post-industrial' decline. As Section 2.2 and Part Four point out, however, although all the regions have been selected on the basis of a shared history of deindustrialisation, some areas have been deindustrialised to a lesser or greater extent than others; and some (e.g. Northern Moravia in the Czech Republic), despite the loss of much of their industrial base, still have an important industrial element to their economies. Part Four discusses the extent to which this may affect the health profiles of the different regions.

Note also that throughout the report we use the term 'region' in its general sense of an area within a country. This includes not only areas which are political/administrative regions (e.g. German federal states, French *régions*), but also other areas which are not (e.g. the West of Scotland, Northern Moravia).

Structure and content of report

Part Two of the report describes 20 regions in the UK and mainland Europe which were identified as having undergone a similar process of deindustrialisation as Scotland, and particularly the West of Scotland. This description includes a very brief industrial history, an overview of some basic socio-economic indicators, and an outline of how each region compares to its parent country in terms of current levels of mortality. Finally, this part of the report includes a detailed analysis of trends in life expectancy for each region compared to Scotland, the West of Scotland and the Greater Glasgow and Clyde area. **Part Three** presents a more detailed analysis of trends in mortality for the West of Scotland compared to a subset of 10 of these post-industrial regions, while **Part Four** discusses a range of possible hypotheses to explain some of the trends presented in Parts Two and Three. Some overall conclusions are outlined in **Part Five**.

PART TWO:
TWENTY POST-INDUSTRIAL REGIONS IN EUROPE

2.1 Identification of regions

The first aim of the project was to identify regions in Europe which satisfied the principal selection criterion i.e. that they were industrial areas which had undergone a process of deindustrialisation in recent decades similar to that experienced in Scotland and, especially, the West of Scotland.

An initial set of 20 regions was selected in two ways:

a) A group of regions in mainland Europe (i.e. non-UK regions) was identified through a lengthy consultation process involving experts in the fields of European history and public health. From this, thirteen areas were identified as matching the principal selection criterion. These were:

- The Ruhr area; Saxony including the specific sub-regions around Chemnitz and Leipzig; Saxony-Anhalt (all in Germany)
- Wallonia (in Belgium)
- Lorraine, including its sub-region ('departement') of Moselle; Nord-Pas-de-Calais; Alsace (all France)
- Silesia (Poland)
- Northern Moravia (Czech Republic)
- Limburg (Netherlands)

It should be noted that one or two commentators suggested that Alsace in France, and Limburg in the Netherlands were, arguably, less analogous to the West of Scotland than the other regions. Also, after detailed discussions with contacts in Poland, the Silesia region was re-defined as Katowice (the industrial heartland of Silesia). More details of all these regions are contained later in this section of the report.

b) Seven additional areas in the UK were also identified. This was achieved through analysis of changes in population and workplace employment in industrial[ii] sectors, at a

[ii] Defined as employment in utilities, mining and manufacturing.

'NUTS 2' regional[iii] level, using Census data from 1981-2001[iv]. The regions initially chosen were:

- Northumberland & Tyne and Wear; Tees Valley & Durham (both North East England)
- Merseyside; Greater Manchester (North West England)
- West Midlands
- Swansea & South Wales Coalfields in Wales (*excludes* Cardiff and the Vale of Glamorgan)
- Northern Ireland[v].

Table 2.1 below lists the final selection of 20 regions. Please note that Appendix 1 shows the geographical composition of each area in terms of their sub-geographies and administrative make-up.

The locations of the regions are also presented in Figure 2.1.

Note that Table 2.1 also includes the year in which industrial employment peaked in each region's parent country in the latter half of the 20th century[vi]. While the Western European regions had all begun to shed industrial employment from the early 1970s, deindustrialisation in the (ex-Communist) East European regions was delayed until the late 1970s or 1980s. Variation can also be seen between individual countries within these parts of Europe: for example Poland's deindustrialisation occurred earlier than that of the

[iii] NUTS stands for the 'Nomenclature of Territorial Units for Statistics' system and is the geographical system of national and sub-national geographies used by Eurostat. There are three main levels: NUTS1, with an *average* population size range of 3 to 7 million; NUTS2 (800,000 to 3 million); and NUTS3 (150,000 – 800,000). Further details of NUTS and their use and application in relation to this report are included in Appendix 1.

[iv] Deindustrialisation was of course already well underway in Britain by 1981. Additional analysis was therefore used to verify the choice of area, based on their loss of manufacturing employment 1971-81. This was done using the Linking Census through Time database and the methodology proposed by Wabe (see: Wabe J. S. The regional impact of de-industrialization in the European Community, Reg. Studies 20, 27-36, 1986). The results confirmed that those British areas selected were among the most severely affected in the previous decade.

[v] For simplicity, we refer to Northern Ireland as one of the 'regions' analysed in the project. Clearly, however, in Northern Ireland's case, and in a UK context, the term 'country' also applies.

[vi] Based on analysis from 1960.

Czech Republic, and Britain's before that of France. The next section describes the industrial history of each region in more detail.

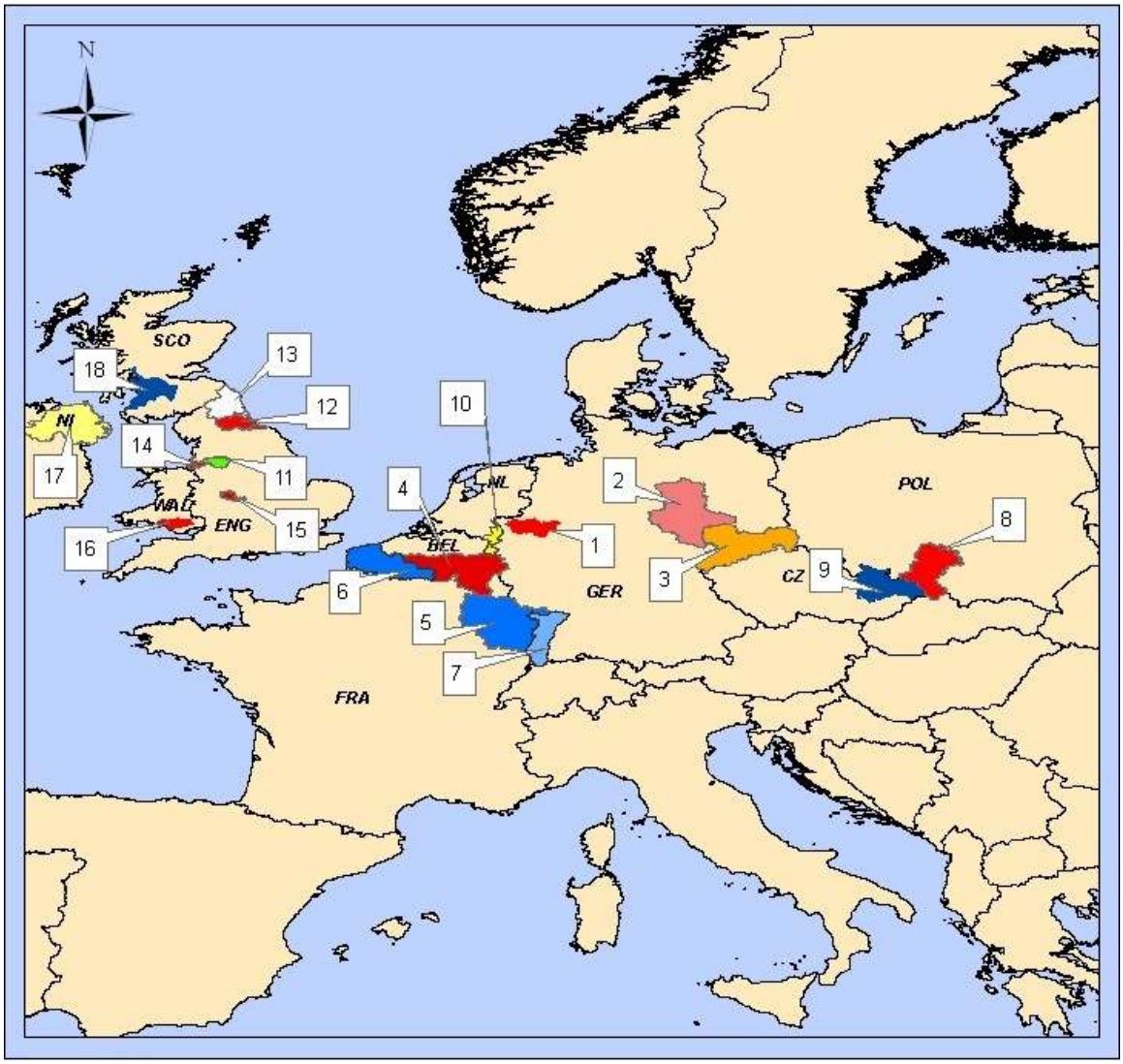
Table 2.1: the 20 selected post-industrial regions, together with – for comparison – Scotland and the West of Scotland.

Region	Country	Population[vii]	Industrial Employment Peak[viii]
The Ruhr area	Germany	5.3m	1970 (West Germany)
Saxony-Anhalt	Germany	2.5m	1985 (GDR)
Saxony	Germany	4.3m	1985 (GDR)
Chemnitz (in Saxony)	Germany	1.5m	1985 (GDR)
Leipzig (in Saxony)	Germany	1.1m	1985 (GDR)
Wallonia	Belgium	3.4m	1971
Lorraine	France	2.3m	1974
Moselle	France	1.0m	1974
Nord-Pas-de-Calais	France	4.0m	1974
Alsace	France	1.8m	1974
Katowice (Silesia)	Poland	4.1m	1977
Northern Moravia	Czech Republic	1.9m	1986
Limburg	Netherlands	1.1m	1965
Greater Manchester	England	2.5m	1965
Tees Valley & Durham	England	1.1m	1965
Northumberland & Tyne and Wear	England	1.4m	1965
Merseyside	England	1.4m	1965
West Midlands	England	2.6m	1965
Swansea & South Wales Coalfields	Wales	1.1m	1965
Northern Ireland	Northern Ireland	1.7m	1965
Scotland	Scotland	5.1m	1965
West of Scotland	Scotland	2.1m	1965

[vii] Population at 2005 for all regions except those in France, for which the year is 2003. See Appendix 4 for sources of population data.

[viii] NB As stated in the text, this relates to the employment peak of the parent country, rather than the region.

Figure 2.1.



Key to Figure 2.1

1. Ruhr	*2. Saxony-Anhalt*	*3. Saxony (incl. Chemnitz and Leipzig regions)*	*4. Wallonia*	*5. Lorraine (incl. Moselle)*	*6. Nord-Pas-de-Calais*
7. Alsace	*8. Silesia (incl. Katowice)*	*9. N. Moravia*	*10. Limburg*	*11. Greater Manchester*	*12. Tees Valley & Durham*
13. Northumb'd, Tyne & Wear	*14. Merseyside*	*15. West Midlands*	*16. Swansea & S. Wales coalfields*	*17. N. Ireland*	*18. West of Scotland*

2.2 The regions and their industrial heritage

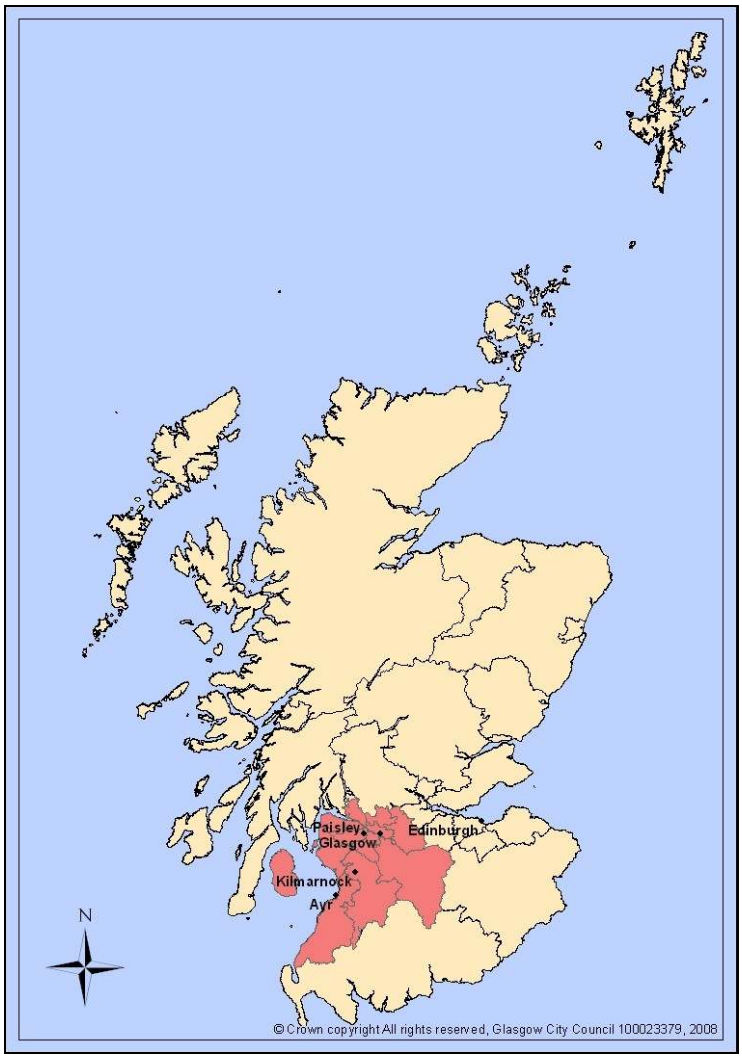
Before we briefly describe the 20 regions listed above, it is worth reminding ourselves of the history of industrial growth and decline in Scotland, and, specifically, the West of Scotland.

The **West of Scotland** (Figure 2.2) played an important part in the British industrial revolution, leading the world in the early development of the steam engine and triple-expansion engine[10]. In 1801, one in five Scots lived in the region, but economic growth boosted the population, so that by the middle of the 20th century this had increased to nearly one in two. Over the course of the 19th century, the region's industrial base expanded. Numerous shipyards sprang up along the River Clyde: by the eve of the First World War, 56,000 people were employed in shipbuilding in the region, producing a fifth of the world's ships[ix, 10]. This was paralleled by the growth of support industries (iron, coal and engineering), with other sectors such as textiles also maintaining a presence[11].

However, the Depression of the inter-war years, together with reluctance to adapt to changed circumstances, proved very damaging to the region's economic base, which was only checked by the demands of a Second World War. Growth in industrial employment continued during the 1950s: by 1961, 549,000 people (51% of the total in employment) worked in industry[x]. This appears to have been the high watermark of the industrial West of Scotland. From the 1960s, the number of West of Scotland residents employed in industry began to decline. By 2006, close to two-thirds (65%, 358,500) of industrial jobs were gone[xi].

[ix] The 1911 Census recorded 56,151 West of Scotland residents working in shipbuilding.
[x] 1961 Census of Population (residence based employment).
[xi] Based on a comparison of resident-based employment by sector at the 1961 Census of Population and the 2006 Annual Population Survey.

Figure 2.2



Deindustrialisation had serious and long-lasting consequences for the West of Scotland. While total demand for labour remained stable and relatively high between 1951 and 1971, it fell sharply in the 1970s and further still in the 1980s. Only in the 1990s did employment begin to rise, and by 2006 quantitative labour market demand was on a par with that last seen in the period under Bretton Woods[xii, xiii]. On the other hand, there is some evidence that prospects for males have yet to recover to the levels last seen in the

[xii] A broadly consistent measure of jobs density was created for the West of Scotland between 1951 and 2006 by dividing the total workplace employment (number of jobs in the area) by the number of people of working age (men aged 15-59 and women aged 16-64).

[xiii] Bretton Woods was the international monetary system that existed between 1946 and 1973. Based on fixed exchange rates and free trade (with the US as its most powerful member and the dollar as the most important currency), the system coincided with a long period of virtually full employment in Britain.

early 1970s, although this may reflect social changes[xiv] as much as lack of jobs. While the industrial sectors had been devastated (just 2,000 people worked in shipbuilding on the Clyde by 2002; more than a quarter of a million manufacturing jobs outside shipbuilding had vanished by 2006) new sources of employment had expanded greatly. The banking, finance and insurance sector now employs one in five West of Scotland residents, having grown from less than 3% in 1911, with the share of employment in distribution, hotels and restaurants expanding from 16% to 20%[xv].

Nonetheless, the region continues to face a range of social and economic challenges. In the period 1970-2000, the West of Scotland remained the poorest region in the UK[xvi]. In 2004, SLIMS[xvii] estimated that for the region to achieve the 80% employment rates enjoyed by the seven most prosperous counties in the South East of England, 131,000 jobs would have to be created[12].

Clearly, the West of Scotland can be regarded as having been the industrial heartland of the country. As mentioned in the introduction, however, heavy industry has not been confined to the West. **Scotland** as a country built up an early lead in the industrial revolution thanks in part to the successful exploitation of plentiful sources of water and coal *right across* its central lowlands. Although the country remained a place of economic contrasts, with the border regions, many lowland towns and villages and rural Aberdeenshire remaining agrarian in character, more than half of employed Scots were working in industry by 1911[xviii]. These developments were not confined to Clydeside: for example, by 1850 Dundee was known as a producer and exporter of linen and jute while coal mining became well established across Fife and the Lothians[13].

[xiv] Such as increased female participation, sectoral change and the rise of sickness-related hidden unemployment.

[xv] Based on a comparison of resident-based employment by sector at the 1911 Census of Population and the 2006 Annual Population Survey, adjusted to produce broadly comparable industry groups. Shipbuilding employment data comes from the Clyde Shipbuilding Taskforce Report (2002).

[xvi] Consistently, between a quarter and a third of the region's households were living in relative poverty in 1970, 1980, 1990 and 2000. Data published by Dorling et al. Poverty, wealth and place in Britain 1968 to 2005: Understanding the transformation of the prospects of places. Sheffield: Sheffield Hallam University; 2007 and NHS Health Scotland analysis.

[xvii] SLIMS are a not for profit company, specialising in economic and labour market analyses in Scotland.

[xviii] Based on the 1911 Census of Population, industries of Scots adults in employment.

We now turn our attention to the industrial history of the 20 regions shown in Table 2.1. Beginning with Germany, the **Ruhr** area (highlighted in Figure 2.3), located in the state of North-Rhine Westphalia (NRW) in West Germany, is an older industrial region built on coal mining, iron and steel. Its 'golden age' spanned the period 1840-1914, but from the inter-war period onwards, the Ruhr underwent numerous crises and experienced long-term economic decline. Although checked somewhat in the 1950s, when coal and steel acted as a motor for the West German 'Wirtschaftswunder' (economic miracle), the 1974 steel crisis triggered an especially difficult adjustment. In turn, this led to renewed attempts to revitalise the region with new technology, diversification of industry and small business start-ups. This approach continued into the 1990s when, following a brief boom, re-unification brought further serious loss of industrial employment[14]. Since 1970, the Ruhr area has lost nearly 700,000 industrial jobs (a decrease of almost 55%).

Figure 2.3

The Federal State of **Saxony** (also shown in Figure 2.3) industrialised early (before 1830) and, prior to the Second World War, was more productive in economic terms than the Ruhr region[15]. Before the implosion of the German Democratic Republic (GDR), it accounted for almost half of East Germany's industrial output (specialising in steel, construction, engineering and textiles) and was the centre for East German car production[15, 16]. Despite a highly skilled workforce, it experienced sharp reductions in industrial output (-52%) and employment (-28%) between 1989 and 1990, a process that continued into the 1990s. Between 1991 and 2005, industrial employment in Saxony halved once again, with the loss of more than 500,000 industrial jobs. At present,

economic development in the region is rather uneven, with evidence of a divide opening up between the North West and Centre of the state and the more disadvantaged East. Within its borders, **Chemnitz** (to the South) was known as the 'Manchester of Saxony' on account of its extensive textile manufacturing industry, while **Leipzig**, historically a trading and publishing centre, was also involved in the production of chemicals and machine tool production under communism[17].

The second of the 'New Länder'[xix] included in the analysis, **Saxony-Anhalt**, was endowed with brown coal and other natural resources that allowed it to develop an early lead in the chemicals industry. Since 1989, it has undergone a particularly extreme adjustment and "has almost completely de-industrialised"[18]. Although pay levels have risen over the last decade and a half, non-employment – particularly among the young – remains high. However, like Saxony, the population is highly educated[19].

Moving west to the Benelux countries, the large **Wallonia** region encompasses the southern half of Belgium (Figure 2.4). Industrialising early (the first steam engine in Europe was installed near Liège in 1720), Wallonia concentrated on mining, metal working and textiles for nearly 200 years, translating its economic wealth into political primacy over the Flemish region[20]. However, since 1970, it has lost nearly 40% of its industrial employment base (from more than 460,000 industrial jobs in 1970 to less than 285,000 in 2005). To the north, **Limburg** (also presented in Figure 2.4), a province in the Southern Netherlands, is a former coal-mining area. In line with the rest of Holland, its peak in industrial employment took place in the mid-1960s[21]. Early deindustrialisation does not seem to have destroyed its economy: indeed, since 1970 its losses in industrial employment have been relatively small (-16%), helped in part by attracting light (and high-technology) manufacturing to the province[22].

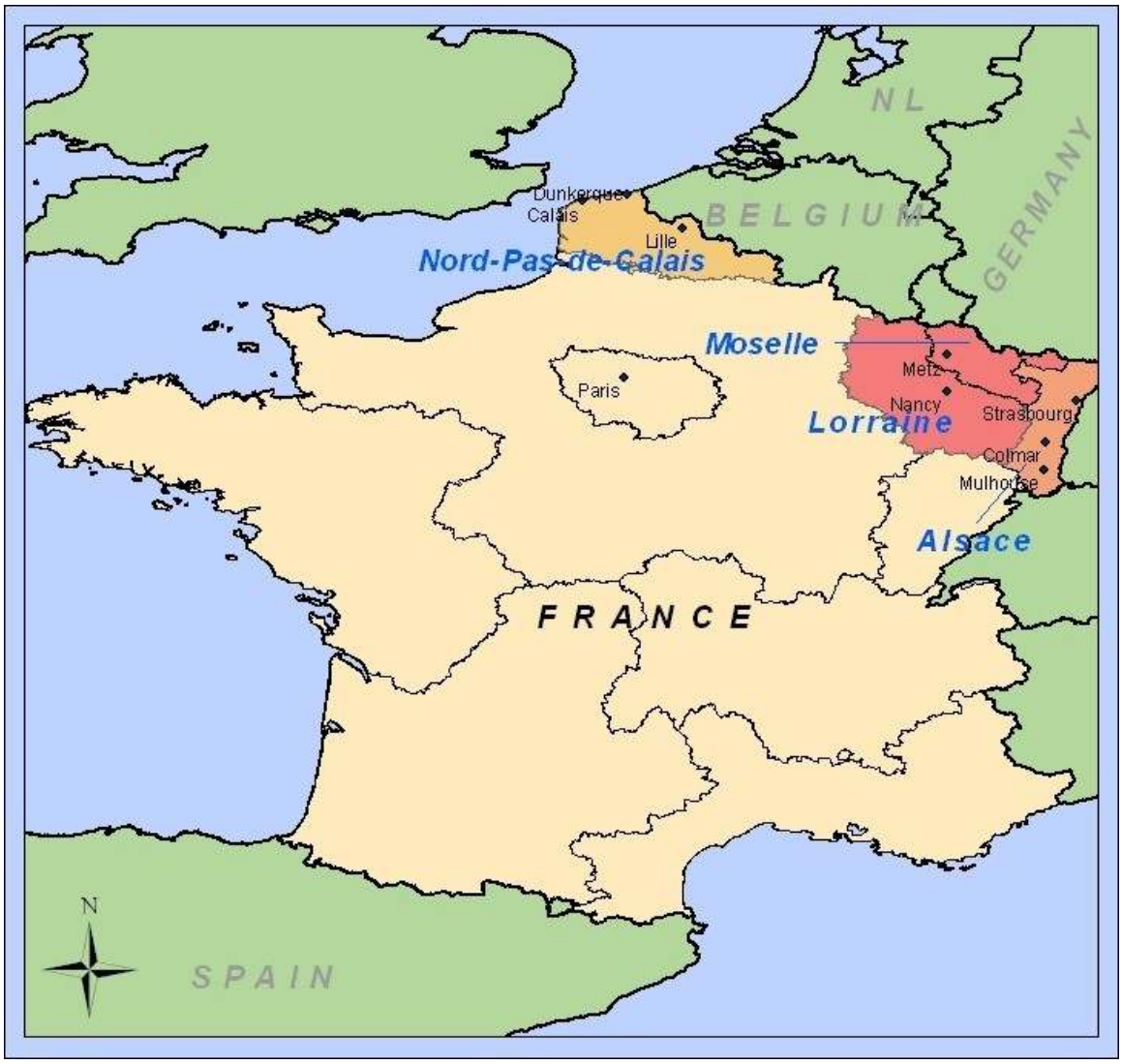
[xix] i.e. the states (Länder) of the former GDR that joined the Federal Republic of Germany upon reunification in 1990.

Figure 2.4

By the late 19th century **Nord-Pas-de-Calais** (NPdC) – shown alongside the other French regions of interest in Figure 2.5 – had become France's most important industrial region, focusing on coal, textiles and steel. Since the 1960s, NPdC has shifted its economic base towards services (especially finance, banking and insurance) concentrated in Lille, as well as light manufacturing (cars, chemicals, engineering, printing and publishing)[23]. The legacy of its heavy industrial heritage is still being felt: more than 10,000 hectares of industrial wasteland were identified in 1983[24], while 300,000 industrial jobs disappeared from the region between 1970 and 2005 – a 42% decline. Addressing the growing

economic disparity between the booming Lille metropolitan area (based on service industries) and former coalfield-based communities remains a key challenge for NPdC[25].

Figure 2.5



Bordering Germany, the industrial history of the French region of **Lorraine** mirrors that of Nord-Pas-de-Calais, in that a brief boom after WWII was followed by a thirty-year decline, and then stability in the 1990s. Between 1970 and 2005 the region suffered a loss of around 190,000 industrial jobs, a 42% reduction. The same broad historical profile holds true for **Moselle**, a sub-region of Lorraine, which has shifted from heavy industries towards light manufacturing and logistical support. **Alsace** seems to have weathered

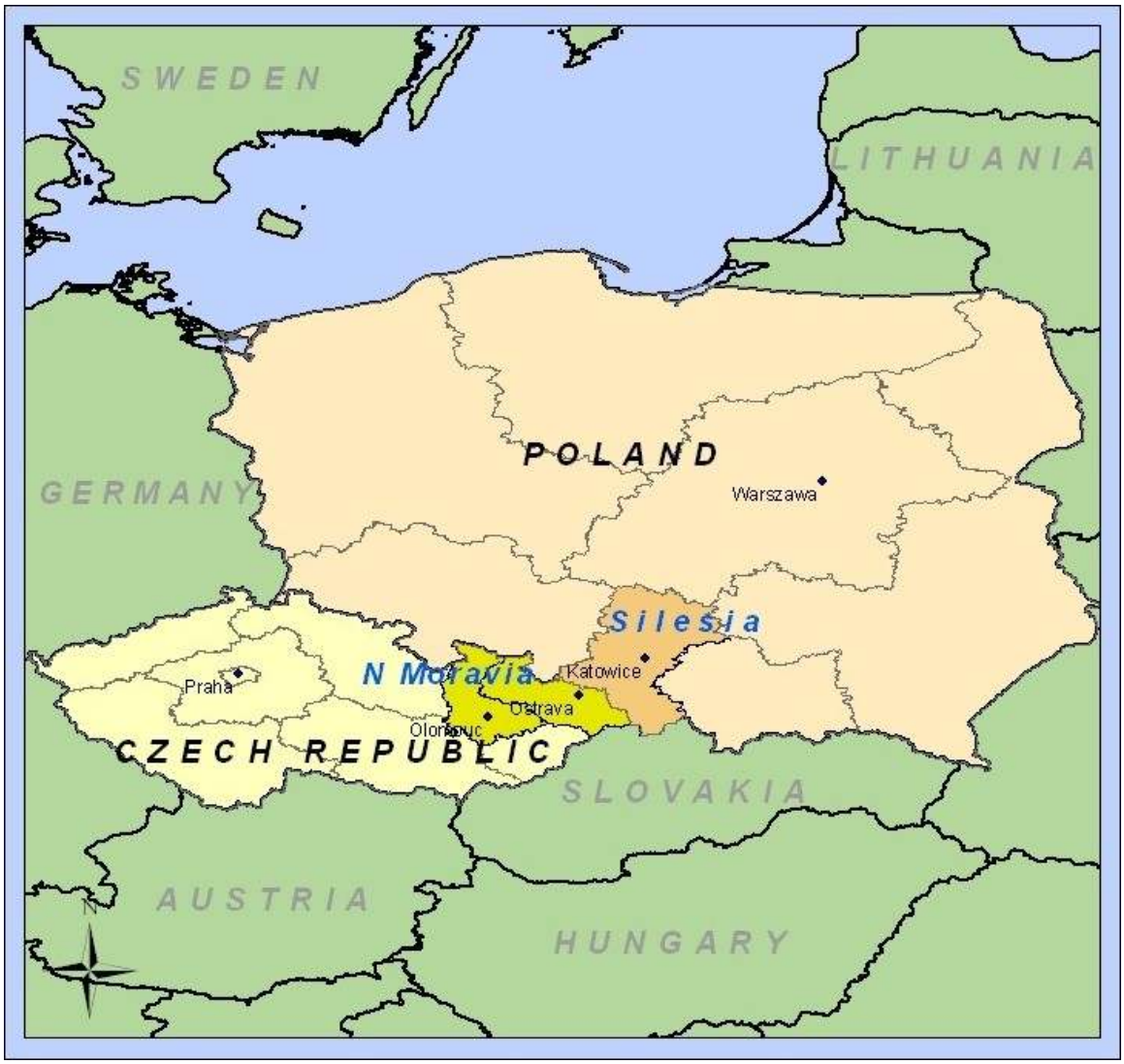
economic change rather better, thanks to more mixed economic development and a more mature network of service industries[26].

The Southern Polish region of **Katowice** sits within Silesia (Figure 2.6[xx]), where industrialisation began in the late 18th century, accelerating after WWII. Despite an attempt to de-concentrate heavy industry in the early 1950s, it was compelled under communism to deepen its investment in traditional sectors[27]. Coal and steel production peaked in the late 1970s and it was only then that employment in industry began to decline. As recently as 1994, the region produced 98% of Poland's coal, half of its steel and cars and all its lead and zinc – but at a heavy environmental cost. One in 10 of its 40,000 factories were classified as 'gross polluters' and with only 2% of the country's land mass, the province was producing a quarter of Poland's dust and gas emissions[28]. With 43% of the workforce still employed in industry in 2005, Katowice remains a heavily industrialised area[xxi]. Despite this, however, it is notable that between 1980 and the present day, the region has seen a 55% decrease in the number of industrial jobs (from 865,000 to 390,000).

[xx] Note that Figure 2.6 shows Silesia, rather than the slightly smaller region of Katowice. See Appendix 1 for the precise geographical definition of Katowice as used in this report.

[xxi] Based on analysis of 2005 data from the Polish Central Statistical Office Regional Databank, available at: http://www.stat.gov.pl/bdren_s/app/strona.indeks [accessed 10th October 2007].

Figure 2.6



Bordering Katowice, **Northern Moravia** in the Czech Republic (also shown in Figure 2.6) was already a heavily industrialised area before 1945, having laid the foundations as early as 1736 with the discovery of the first coalmines in the region[29]. Before World War II, it enjoyed a higher per capita output than France, with an economy based on light manufacturing (leather goods, armaments, motor vehicles and other luxury goods)[30]. Under Communism, industrial employment in this region expanded by almost 50,000[31]. However, specialisation in steel and coal (exemplified by the huge Gottwald Steelworks) imposed during the communist era diverted the economy of the region towards 'planned

obsolescence'. Although a fifth of industrial jobs were shed between 1993 and 2005 (80,000 from a total of 425,000), like Katowice the region remains heavily industrialised. The local mining company, OKD, is still the biggest employer in the region and the third largest in the Czech Republic[32].

The United Kingdom was the first European country to undergo an industrial revolution with the rise of textiles in the early 19th century and coal, steel and shipbuilding between 1850 and 1914[33]. **Northumberland & Tyne and Wear**'s industrial base, like the West of Scotland, was traditionally centred on shipbuilding and, to a lesser extent, steel. **Tees Valley & Durham** was more dependent on coalmining, steel and light manufacturing (especially chemicals and petrochemicals). As with Clydeside, the historical features of British shipbuilding (dependence on the home market, regional specialisation, limited investment and poor employer-worker relations) may well have contributed to its long-term decline. Although some of these losses in traditional employment have been offset by new investment – for example, by Nissan, Siemens and Samsung – and regeneration concentrated on the city of Newcastle-upon-Tyne, the region still suffers from low levels of educational attainment, and concentrations of poverty and worklessness[34, 35].

In the North West, the two metropolitan counties (**Greater Manchester** and **Merseyside**) appear superficially similar but have seen a rather different path of economic development. **Greater Manchester** grew up around the textile industry, but although its traditional economic base experienced a serious trauma during the 1970s and 1980s[36], it appears to have partially reinvented itself by building on sectors such as the media, sport and education[37]. Despite ongoing socio-economic disadvantage, it compares favourably on a range of indicators to its neighbour to the West. **Merseyside**'s status declined sharply with the shift towards east coast ports in the 1970s and 1980s, as trade with Europe and proximity to the North Sea oilfields became more important[38], although the very high levels of unemployment in the port trades were evident as early as the 1930s[39].

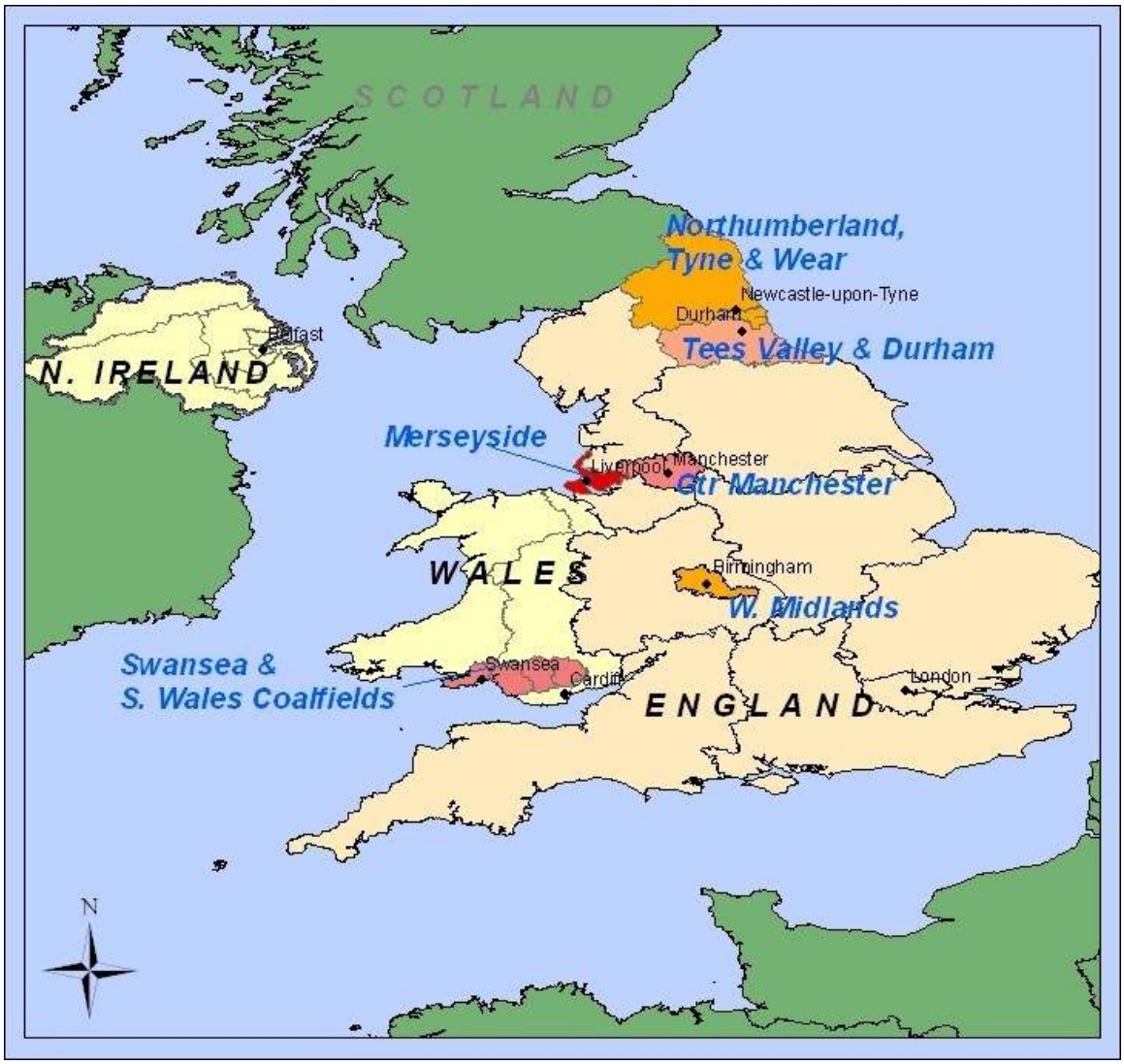
Moving further south in England, the **West Midlands** was already a centre for iron production before the 18th century and subsequently moved into engineering and vehicle

production[40]. The decline of the British automotive industry in the 1970s would have been devastating for the local economy if not for levels of foreign investment and the partial rehabilitation of brands such as Rover. However, recent developments (such as the closure of the Rover and then Peugeot car plants in 2005 and 2006) may mean that further deindustrialisation in the region has merely been deferred.

Across all five of the English regions above, industrial job losses of between 48% (Tees Valley & Durham) and 63% (Merseyside) were experienced between 1971 and 2005, with a combined total industrial job loss of more than 1.3 million.

The locations of all five English regions are shown in Figure 2.7.

Figure 2.7



Turning to Wales, the population of the **South Wales Coalfields** (also highlighted in Figure 2.7) area grew at an exponential rate between 1851 and 1911 in line with the demand for coal. Over this period, the population of Rhondda expanded from less than 2,000 to nearly 160,000[41]. Employment in the industry fell sharply in the inter-war years, and steadily after World War Two[42], although it was not until the failure of the miners' strike in 1984 that the coal industry totally collapsed, with national employment falling from 220,000 to 7,000 in 20 years. Sheffield Hallam University have calculated that the South Wales Coalfields still had to replace 22,000 male jobs by 2004, with the

jobs shortfall even more pronounced once initial unemployment rates, and other factors had been taken into account. Overall this area experienced a 50% decrease in industrial employment between 1971 and 2005. We have also included **Swansea** in this geography since the West of Scotland region includes a post-industrial city (Glasgow) and also because the Swansea district includes some coalfields territory. Cardiff, like Edinburgh, was more driven by the service economy (such as commerce, finance and insurance), and saw 'phenomenal' jobs growth in the 1990s[43].

The final area – **Northern Ireland** (also included in Figure 2.7) – was heavily dependent on shipbuilding, textiles and other manufactured goods (around the port of Belfast) [44]. Although more rural in character than the West of Scotland, nearly 40% of Northern Ireland's workforce were employed in industry in 1970, with this falling to less than 24% by 2005.

In summary, all the above areas have experienced shared histories of industrialisation and deindustrialisation which are comparable – to a greater or lesser degree – to the experience of Scotland and the West of Scotland. Although Katowice and Northern Moravia remain more industrial in character, they have undergone fundamental restructuring since the 1980s and employment in traditional sectors peaked some time ago for both. They are therefore included as 'post-industrial regions'. The question we address in the following section is: how do these regions now compare in modern day socio-economic terms?

2.3 Socio-economic profiles: how do the regions compare to Scotland and the West of Scotland?

To address this question, data were collected to provide a 'snapshot' of current levels of economic and social development in these regions. Six indicators were used to benchmark Scotland and the West of Scotland (WoS) against the other regions. These were: GDP per capita; economic activity; rates of unemployment, long-term unemployment, and male 'non-employment' among those aged 25+ (a combination of unemployment and economic inactivity to provide a more comprehensive measure of male 'worklessness' than unemployment alone); and the proportion of the adult population with tertiary level educational qualifications. Note that the intention here is merely to provide a very basic overview of the regions' socio-economic profiles, rather than an in-depth analysis.

Methodological note

To ensure comparability, statistics were retrieved from Eurostat[xxii], supplemented by countries' own regional publications where consistent data were available. Wherever possible, the geographies chosen mirror those regions shown in Table 2.1 (and as defined geographically in Appendix 1). For some indicators, however, data were not available at those geographies, and not all regions are represented in all six charts. In the case of GDP per capita, data for the Ruhr area, Swansea & the South Wales Coalfields, and Northern Moravia were derived crudely from the *average* of figures for the smaller geographical areas ('NUTS 3') which make up the three regions. These are clearly marked on the relevant graph.

Note particularly that for three of the selected indicators (GDP, long-term unemployment and educational attainment), the 'NUTS 2' region of South West Scotland, rather than our normal definition of the West of Scotland, has had to be used. As this includes the more affluent (but less economically productive) Dumfries & Galloway region, this is likely to impact to a degree on the rates presented.

[xxii] Eurostat is the statistical arm of the European Commission. See http://ec.europa.eu/eurostat.

Note also that Silesia in Poland is used here rather than the slightly smaller Katowice region.

What do the data show?

Analysis of these seven indicators reveals that:

- GDP per capita and economic activity rates are high in the Scottish areas relative to the other regions (Figures 2.8 and 2.9). Scotland has the highest rates of GDP per capita and economic activity of any of the areas surveyed.
- Scottish unemployment and long-term unemployment rates are low compared to the other post-industrial regions (Figure 2.10-2.11). While one in 20 adults in the West of Scotland is unemployed and seeking work, the figure is closer to one in five in Saxony-Anhalt and Silesia. Scotland as a whole is fairly similar to the West of Scotland in terms of unemployment, but has rather lower long-term unemployment rates. Less than 2% of the economically active population in South Western Scotland is long-term unemployed, compared to 6% in Nord-Pas-de-Calais and 12% or more in Silesia, Saxony-Anhalt and Leipzig.
- However, the more comprehensive measure of 'not in employment' shows that the West of Scotland has higher rates of male non-employment than a number of areas in England and France, as well as Limburg, Northern Ireland and Northern Moravia (Figure 2.12). It also has a notably higher rate than that of Scotland as a whole. However, the WoS rates are again significantly lower than those calculated for other areas in Eastern Europe i.e. Saxony and its sub-regions, Saxony-Anhalt, and Silesia in Poland (which contains the Katowice region).
- The (South) West of Scotland and Scotland also compare well with other regions in terms of tertiary education – only Saxony and its sub-regions had a greater proportion of adults educated to this level in 2005 (Figure 2.13).

Figure 2.8

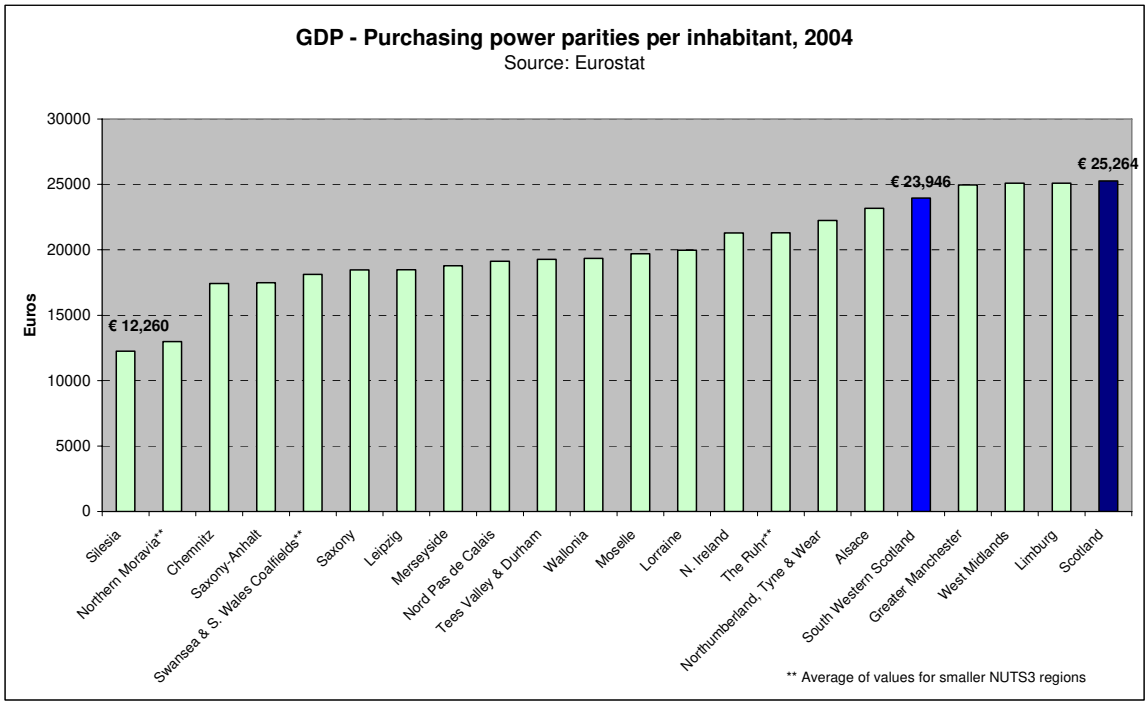


Figure 2.9

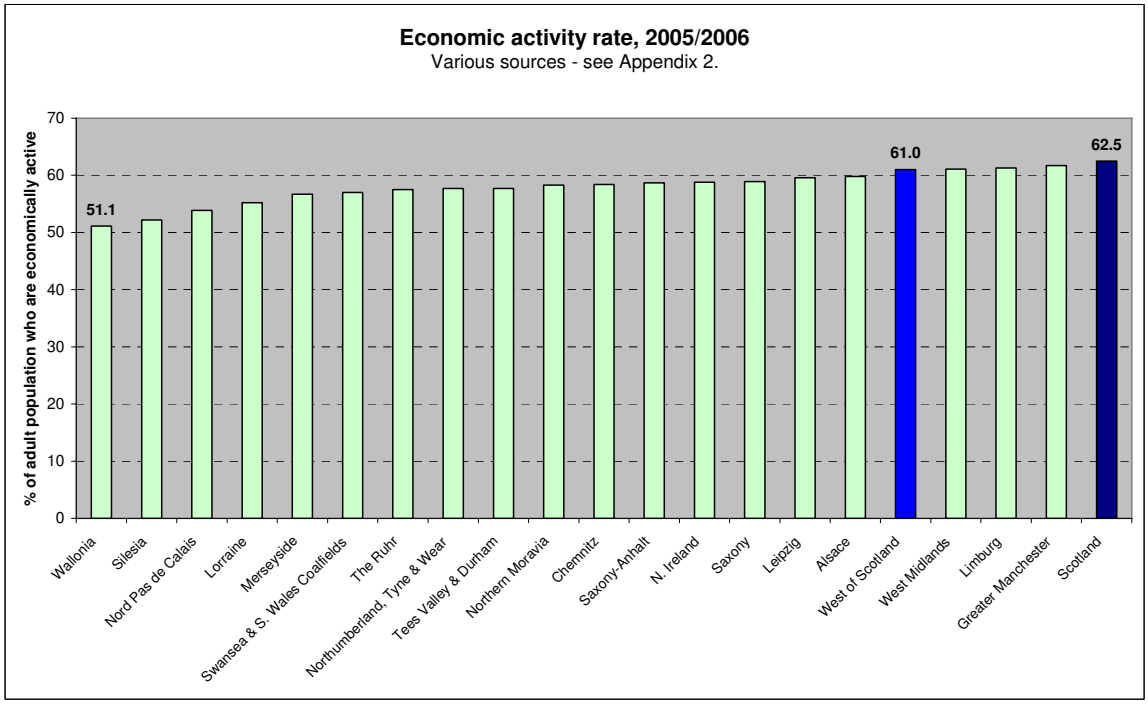


Figure 2.10

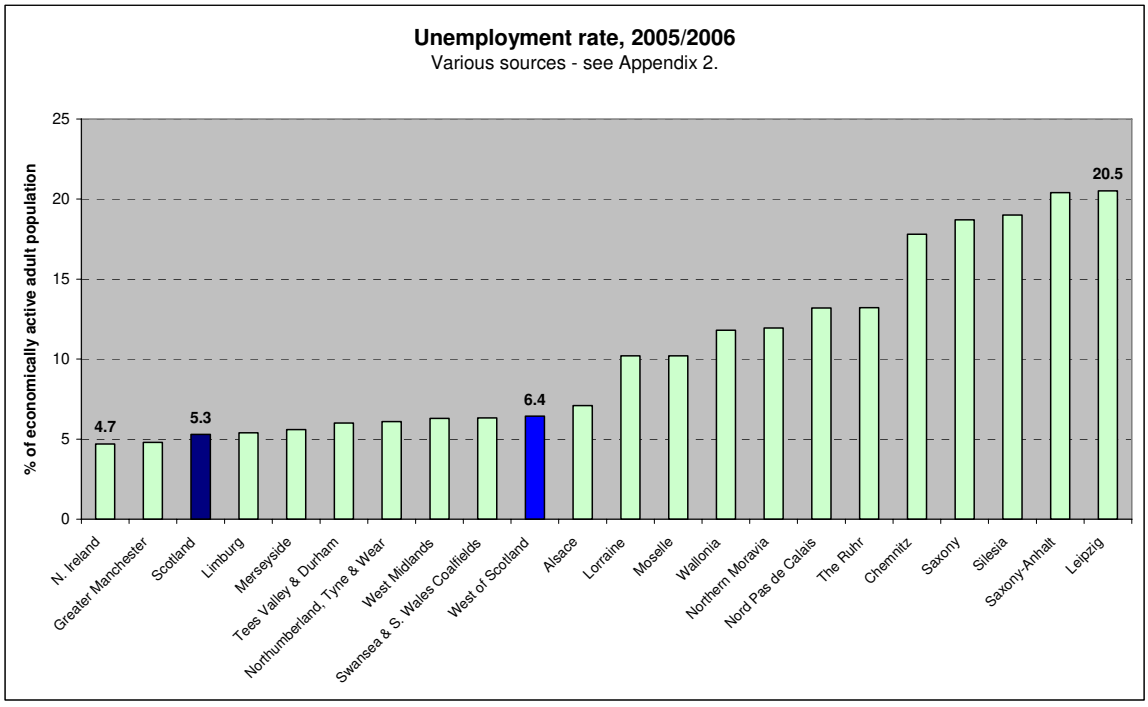


Figure 2.11

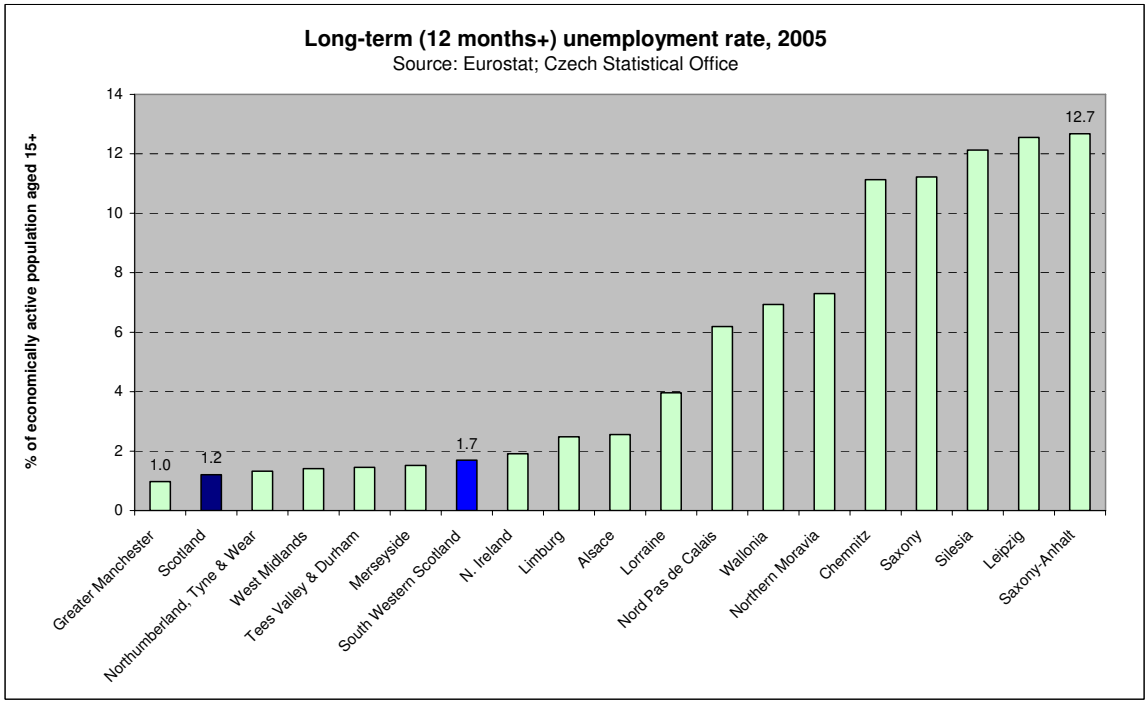


Figure 2.12

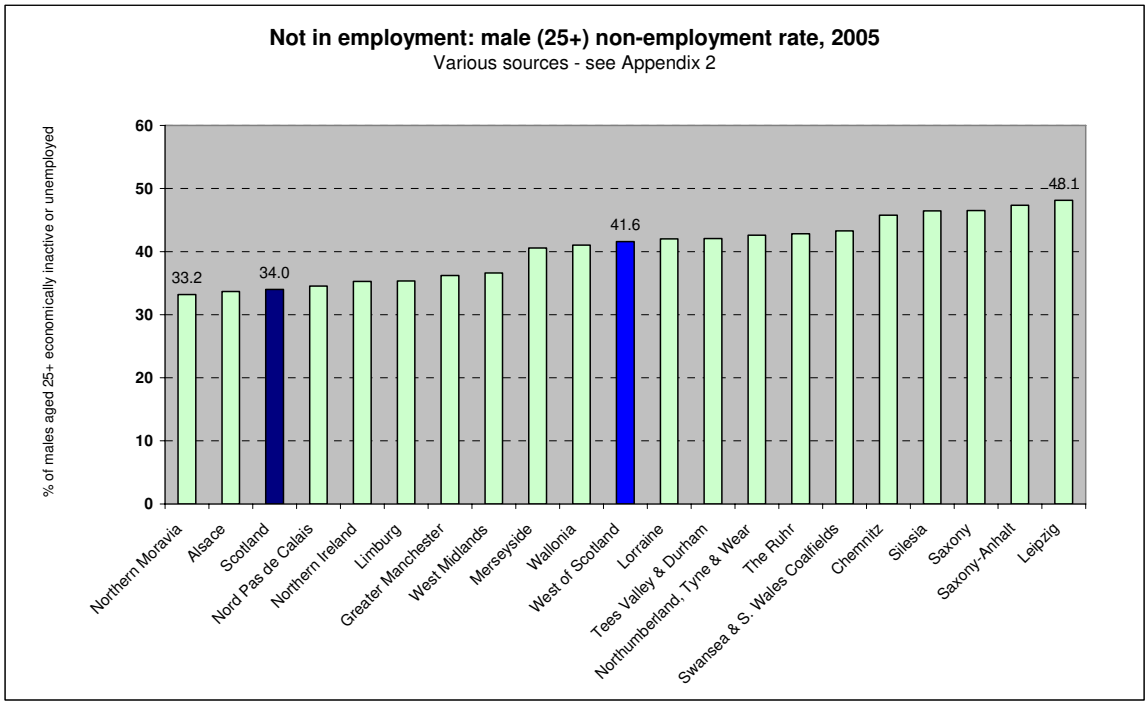
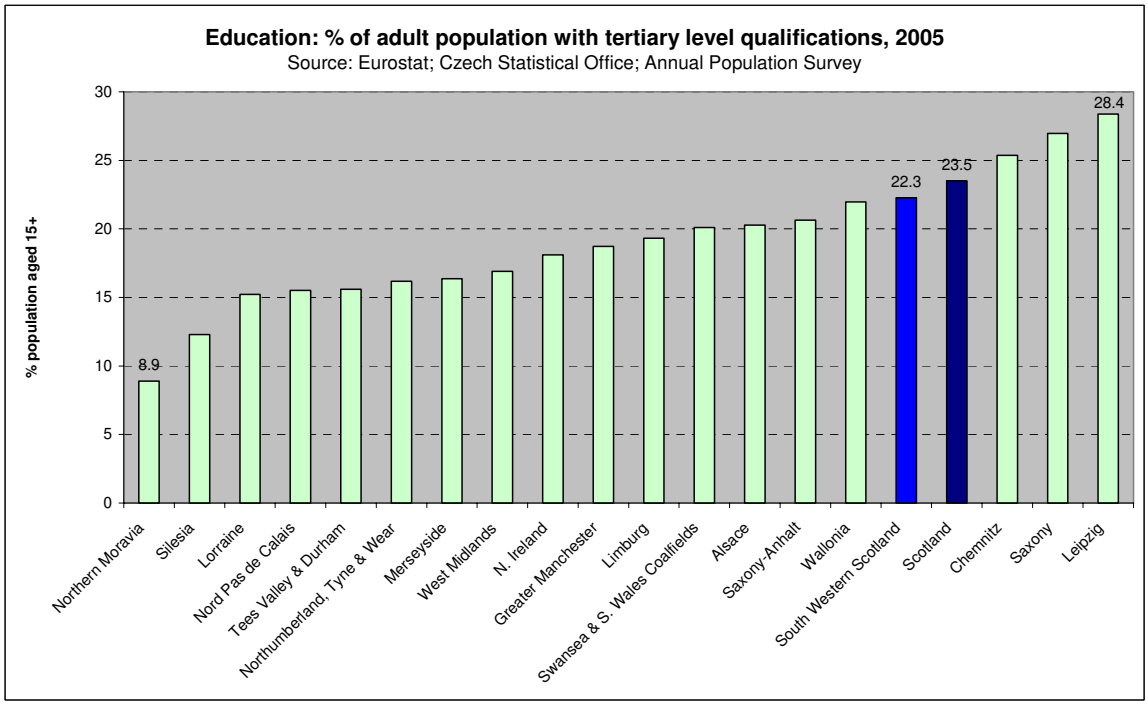


Figure 2.13



In summary, the available data suggest that the Scottish areas analysed generally compare favourably with the majority of the other regions in terms of GDP, unemployment, educational attainment and economic activity. This leads to the tentative conclusion that Scotland, and the West of Scotland, are relatively affluent, and invoking poverty as the cause of their poorer health outcomes is not supported by these data. Clearly, however, this information only presents us with a regional overview, and does not provide us with a picture of how these indicators vary within regions. In other words we lack information on the level and role of socio-economic inequalities in the regions. A more sophisticated set of data, and more sophisticated analytical approach would be required to untangle these issues, and this lies outwith the scope of this report, the focus of which is primarily an analysis of mortality. However, we will return to the issue of inequalities in Part Four.

How these socio-economic issues presented in Figures 2.8 to 2.13 above translate into the regions' respective health profiles is the focus of the next two sections of the report.

2.4 Mortality overview: how do the regions compare within their own countries?

The next step in the project was to review the health position of each region as compared to their parent country. As already mentioned (and discussed further below), areas in the West of Scotland have the highest mortality rates in the country. The question we ask here is: do the other post-industrial regions compare as unfavourably within their own countries?

Methodological note

European age-standardised rates (EASRs) for all-cause mortality for the 20 regions were compared with rates for other regions within their parent countries. To ensure comparability, all data was accessed from Eurostat at NUTS 1 or NUTS 2 geographies. The only exceptions to this were Welsh local authority data, and rates for the Ruhr in Germany, which were obtained from different sources.

Note that in this section the geographical definitions of the areas do not always exactly match those specified in Part Two: for example, the current Polish province of Silesia is used instead of the slightly smaller Katowice area, and data for the two administrative regions that make up Northern Moravia are presented separately.

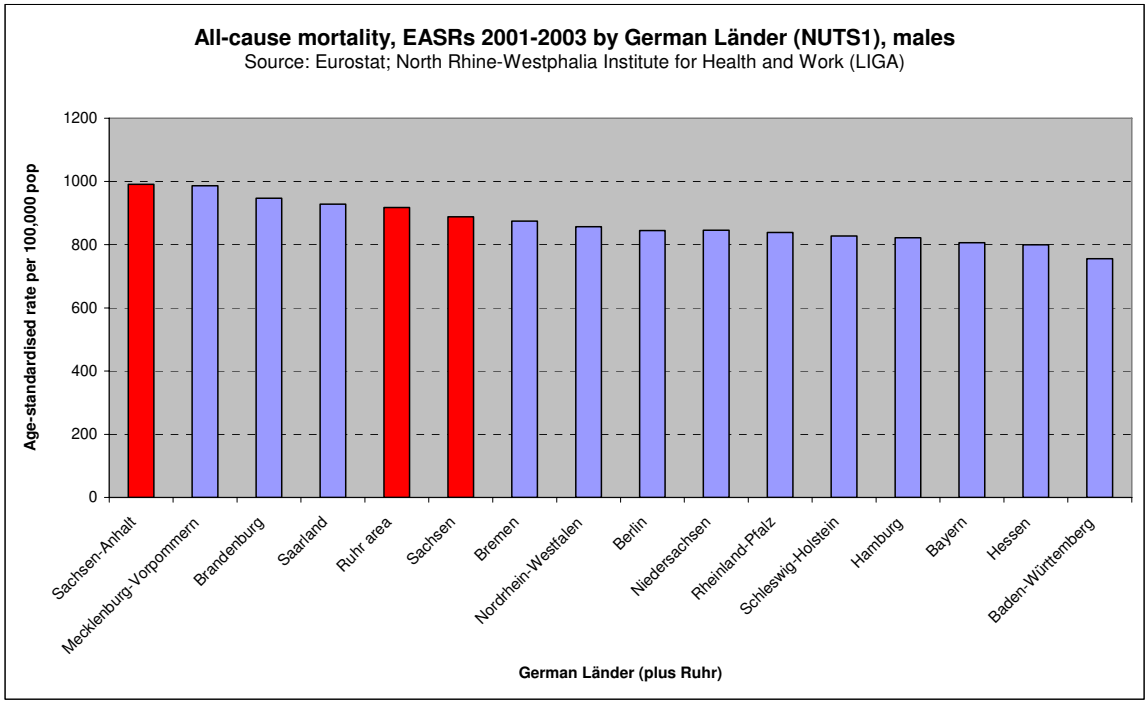
Further details of all of the above are included in Appendix 2.

Results

The results of these analyses are summarised below. For brevity, figures are presented graphically principally for males. Unless otherwise specified, the distribution for females tended to follow a similar pattern.

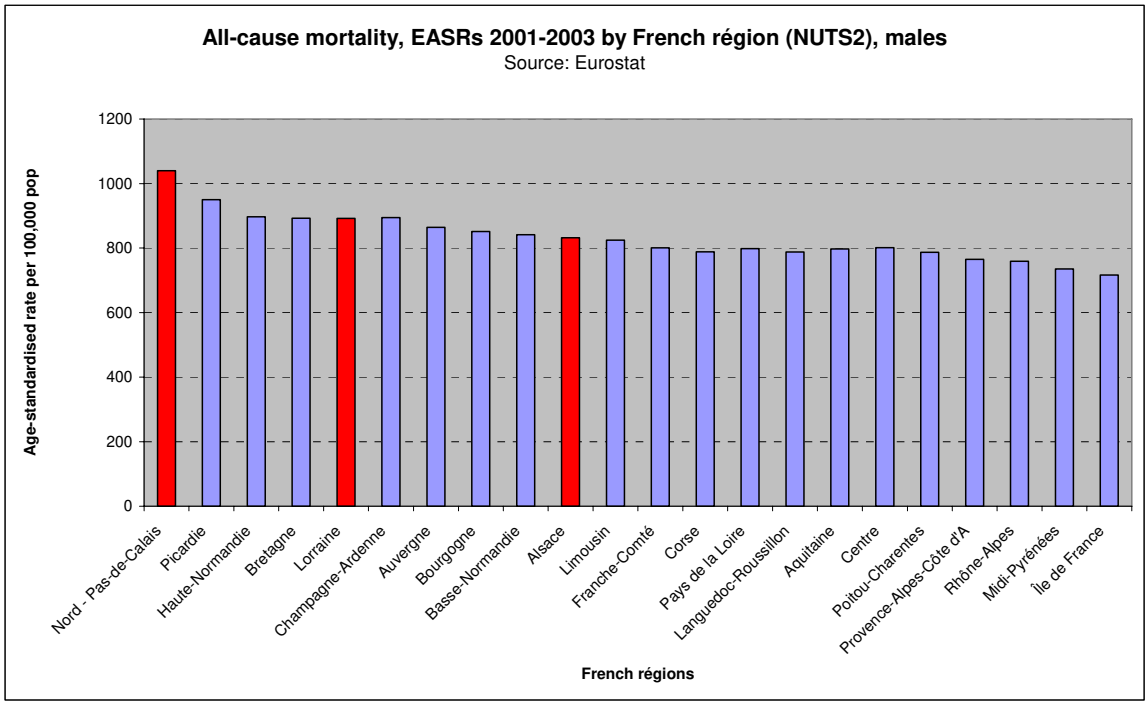
- In Germany, the Ruhr region had among the highest all-cause mortality rates in the country for both males and females. The situation is more complex in the East German regions. Mortality rates in Saxony-Anhalt (Sachsen-Anhalt) are the highest in Germany for both males (Figure 2.14) and females. However, although mortality rates among *males* in Saxony (Sachsen) are among the six highest of the 16 German federal states (Länder), for *females* they are among the four lowest.

Figure 2.14



- In Belgium (data not graphed), all cause mortality in Wallonia in 1995-1997 (the most recent data available) was approximately 10% and 20% higher than the other two Belgian provinces – Brussels and Flanders – respectively. Analysis of smaller urban areas showed that four of the five Walloon 'arrondissements' (Hainaut, Liège, Luxembourg and Namur) had the highest mortality rates of all eleven Belgian urban areas for both males and females.
- Analysis of French data revealed that Nord-Pas-de-Calais has the highest standardised mortality rates of all the French *régions* for both males (Figure 2.15) and females, while Lorraine and (especially) Alsace are closer to the national average.

Figure 2.15



- The Silesia region (in Polish: Slaskie) containing the Katowice conurbation exhibits the second highest levels of mortality for females in Poland, and is the fifth highest (out of 16 regions) for males (Figure 2.16).
- The two regions that constitute Silesia's southern neighbour, Northern Moravia in the Czech Republic, have relatively high mortality compared to the rest of Czech 'kraje', especially the core Moravskoslezky region. This is illustrated in Figure 2.17.

Figure 2.16

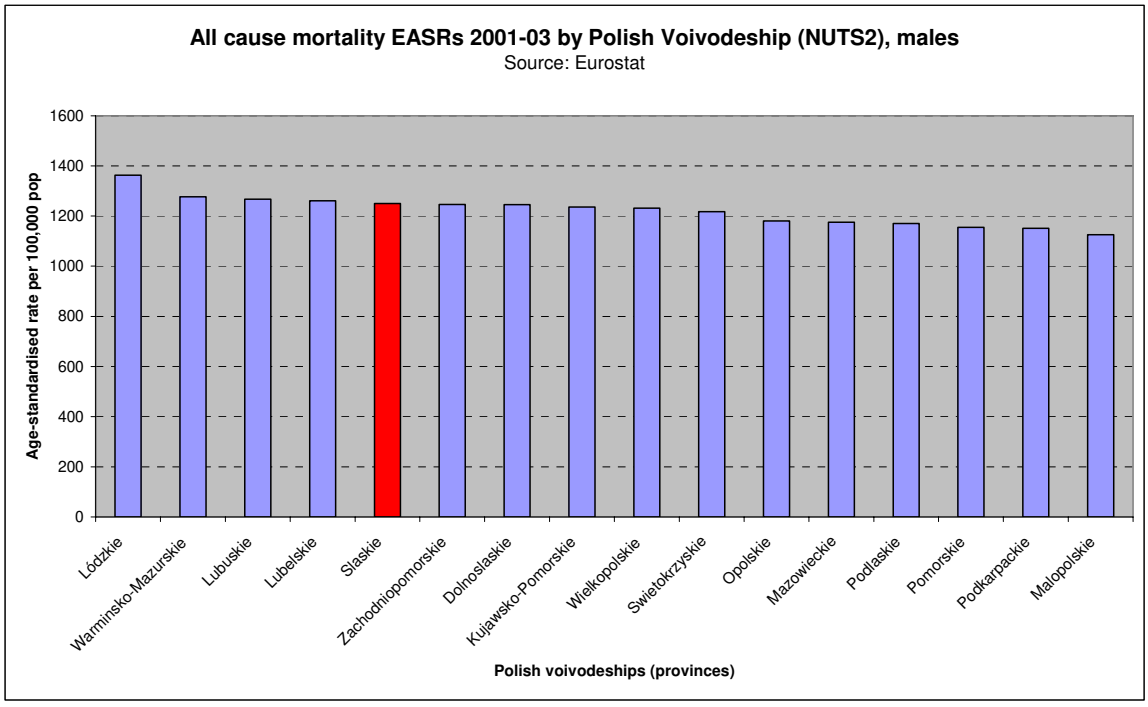
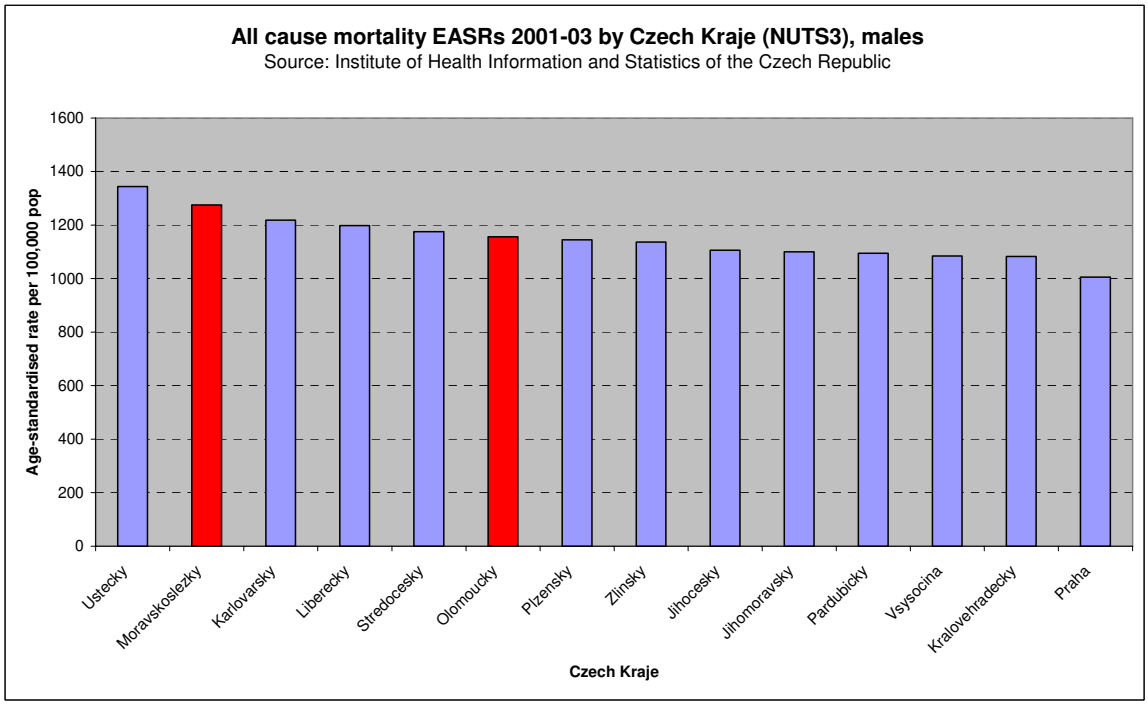
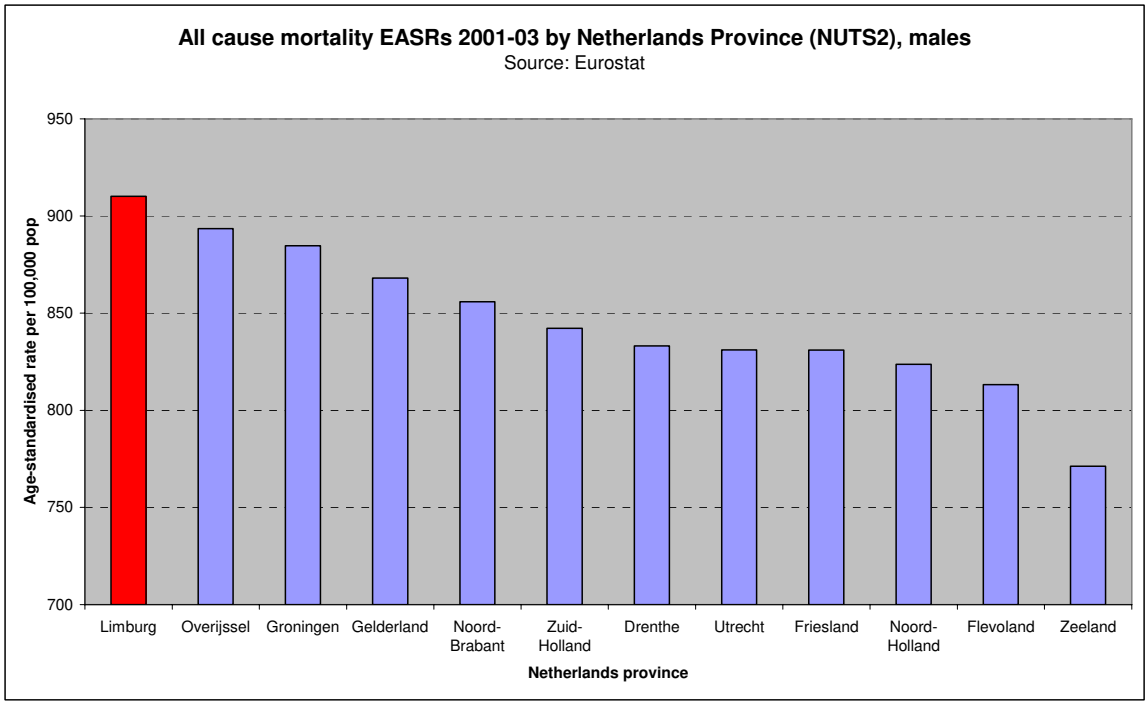


Figure 2.17



- Limburg Province had the highest mortality rates in the Netherlands for both men (Figure 2.18) and women in 2001-03.

Figure 2.18



- In England, Merseyside had the highest mortality rates in 2001-03, followed by the Greater Manchester and the NE England regions. The West Midlands had slightly lower all-age mortality rates (Figure 2.19).
- Within Wales, the highest levels of mortality are seen in the local authority areas that lie at the heart of the South Wales Coalfields (Figure 2.20). Note that unlike the other figures in this section, the data presented in Figure 2.20 are for males and females combined.

Figure 2.19

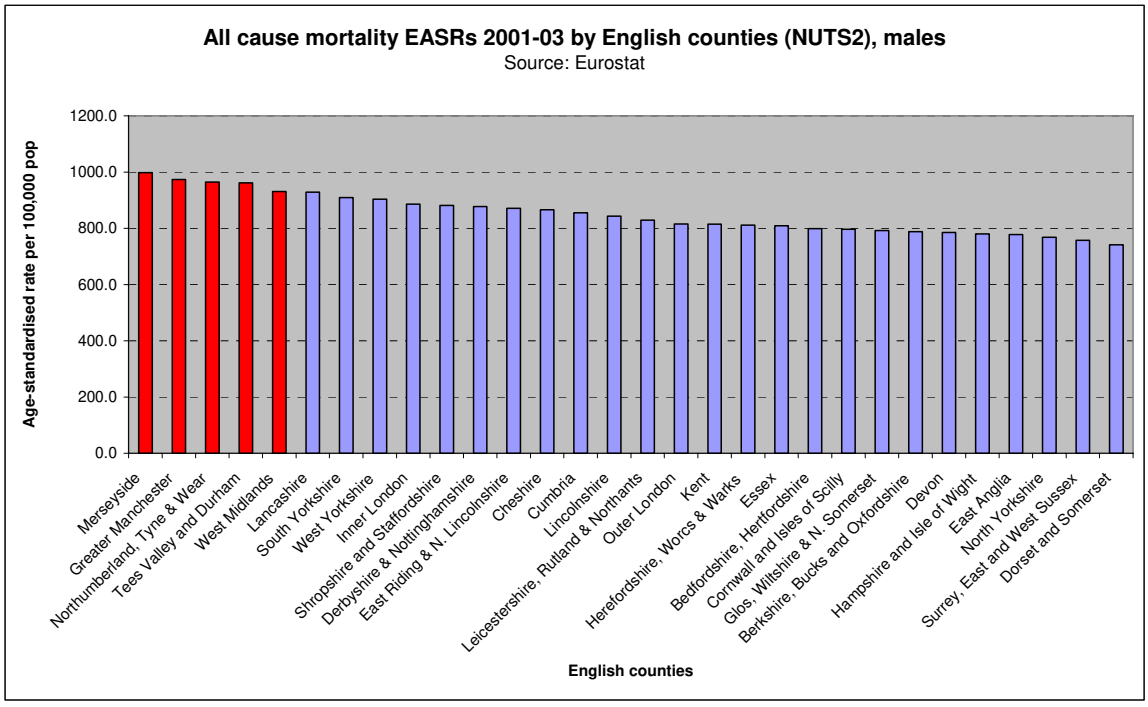
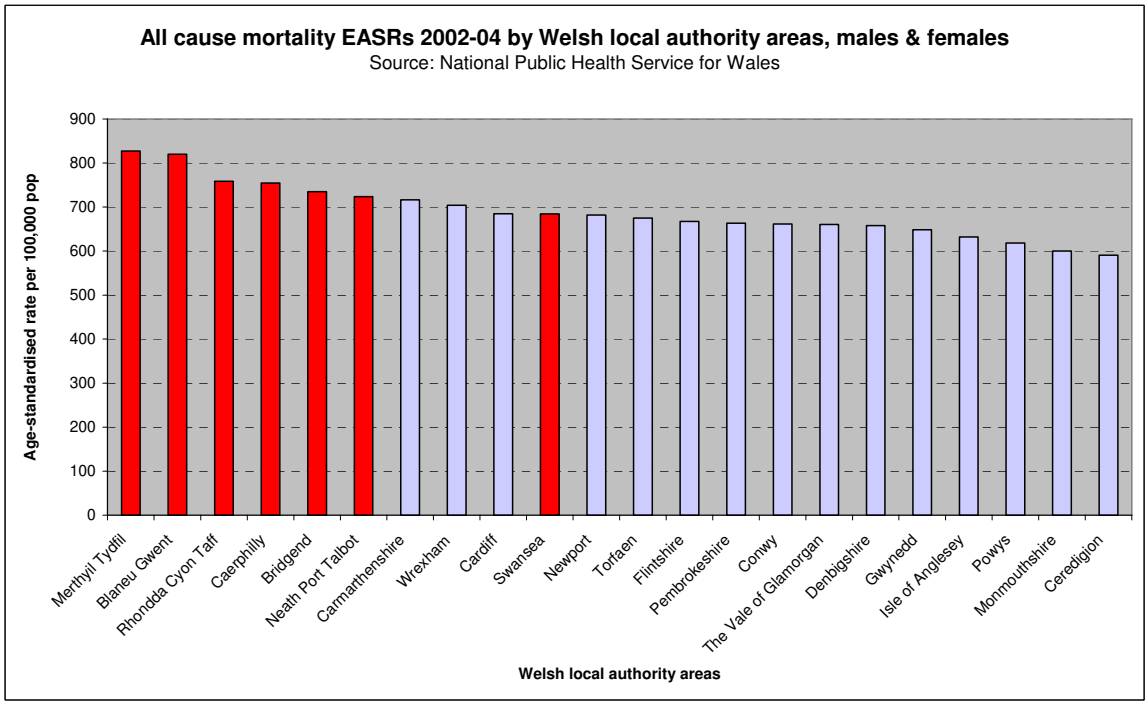


Figure 2.20



- Although not presented here, it should be remembered that – and as outlined in the introduction to the report – the West of Scotland has the poorest health (highest mortality rates) in Scotland. For the period 2003/05 all-cause mortality rates in the West of Scotland were 11% (males) and 8% (females) higher than those of the country as a whole, with the equivalent figures for the Greater Glasgow & Clyde area (the NHS board with the highest mortality rates in Scotland) being 17% and 10%[xxiii]. Furthermore, of the five local authority areas with the highest mortality rates in Scotland in 2005 (for both sexes), four fall within the West of Scotland[45].

Having established that the majority of the regions[xxiv] have poor health relative to their parent nations, the next section looks at how they compare to the West of Scotland and Scotland, beginning with trends in life expectancy.

[xxiii] Figures based on rates presented (in comparison with other regions) in Appendix 8.

[xxiv] This analysis clearly excludes N. Ireland as it is here regarded as both a region and country, and thus in this sense (unlike, for example, the English and Welsh regions) it has no 'parent country' to which mortality rates could be compared.

2.5 Overview of life expectancy in the twenty regions

Methodological note

20-25 years of mortality and population data were requested for all twenty regions from local and national statistical agencies. However, the periods for which data were available varied from region to region, and this is reflected in the figures that are included in this section of the report. A full sequence of data was obtained for: Katowice (1980-2005); Saxony and its sub-regions of Chemnitz and Leipzig (1983-2005); all four French areas (1983-2003)[xxv]; and Northern Ireland (1980-2005). Eighteen years of data (1988-2005) were obtained for the English and Welsh regions and 15 years (1991-2005) of data were obtained for both Northern Moravia and Limburg.

However, only 10 years of data (1996-2005) were available for Saxony-Anhalt, and no data after 1997 could be obtained for Wallonia. For Limburg, life expectancy rates were calculated in a slightly different manner[xxvi]. Finally, although 25 years of mortality data were obtained for the Ruhr area, only 15 years (1990-2005) could be used for the calculation of life expectancy. Further details of this, and other relevant methodological issues, are contained in Appendices 2-4.

Results

Life expectancy at birth for males and females separately are presented in Figures 2.21-2.39 below. For presentational purposes, they are grouped within three geographical categories: western mainland Europe; eastern mainland Europe; and UK regions/countries.

Western mainland Europe

Figure 2.21 shows male life expectancy for our three national, regional and sub-regional comparator areas viz. **Scotland**, **West of Scotland (WoS)** and **Greater Glasgow &**

[xxv] Note that French data was not available for every year in the period, but rather for the individual years of: 1983; 1987; 1991; 1995; 1999; 2003.

[xxvi] As mentioned in Appendix 2, life expectancy estimates for Limburg were calculated based on fewer age bands. However, comparisons of both calculation methods for similar sized regions showed very little (<1%) difference.

Clyde (GGC). What is apparent from this chart is that while life expectancy is increasing across all three areas, it is doing so more slowly in the two areas in the West: thus, a gap between Scotland and the West of Scotland and Greater Glasgow & Clyde has emerged over the 20+ year period. These trends are similar for females. As will become apparent, however, even the superior rate of improvement in life expectancy at the national level is considerably slower than the rate of improvement in almost every other post-industrial region examined in this project.

Figure 2.21

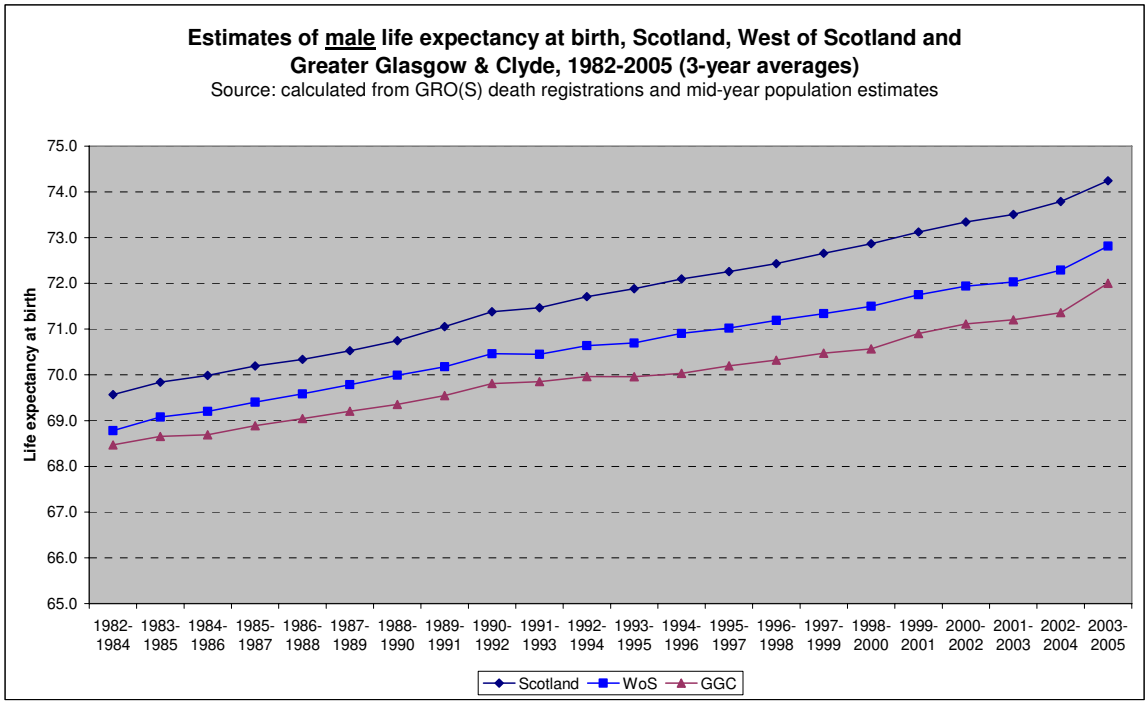


Figure 2.22 shows the same three Scottish trends alongside male life expectancy in the **Ruhr area** in Germany. As can be seen, life expectancy in the Ruhr appears to have improved faster than in Scotland, and a widening gap is evident between the Ruhr and Scotland and, especially, the Ruhr and the West of Scotland over the 15 years for which data are presented. The equivalent trends for females (Figure 2.23) show consistently higher levels of life expectancy in the Ruhr over the period.

Figure 2.22

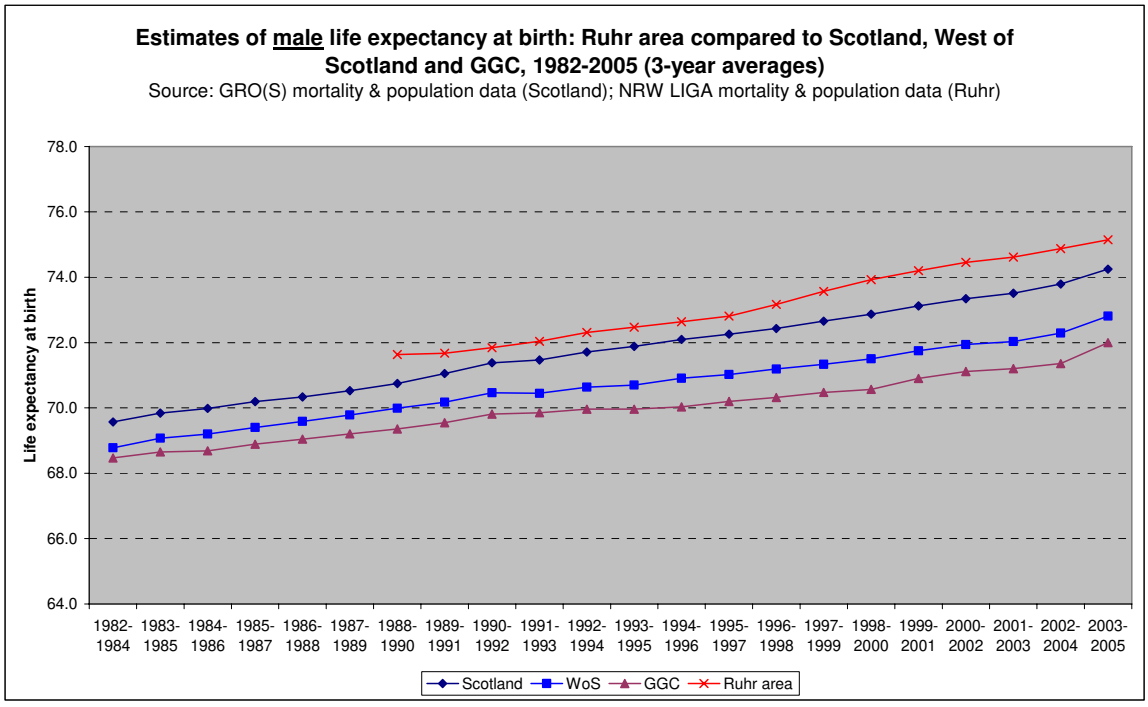
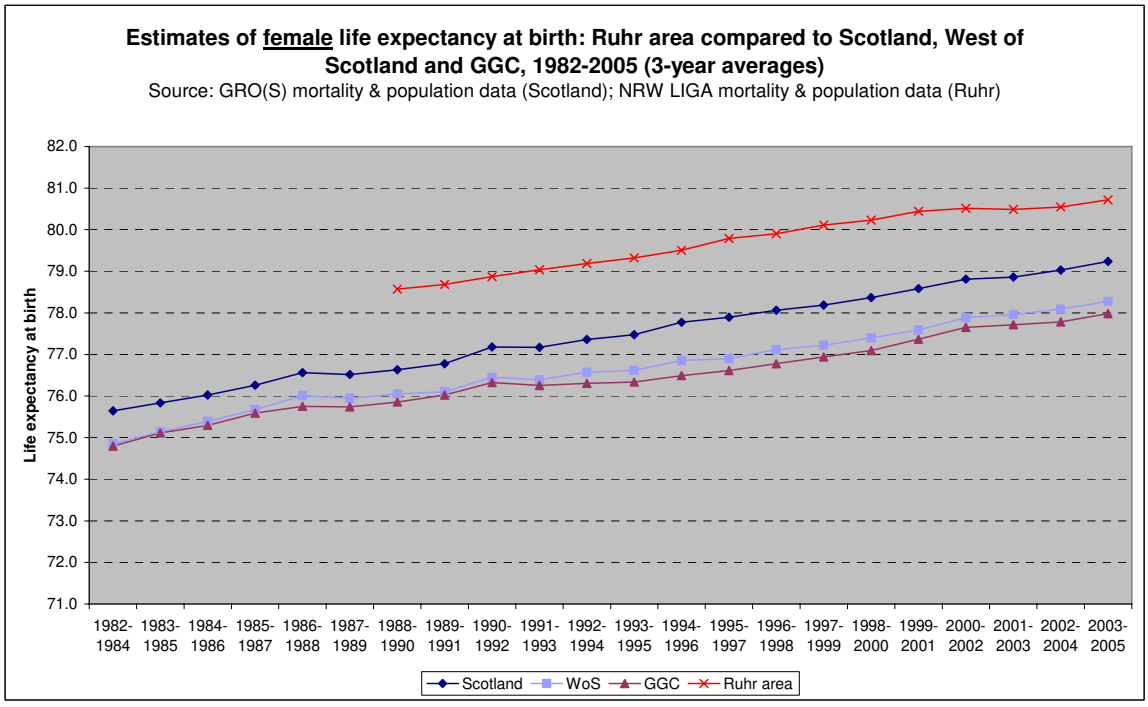
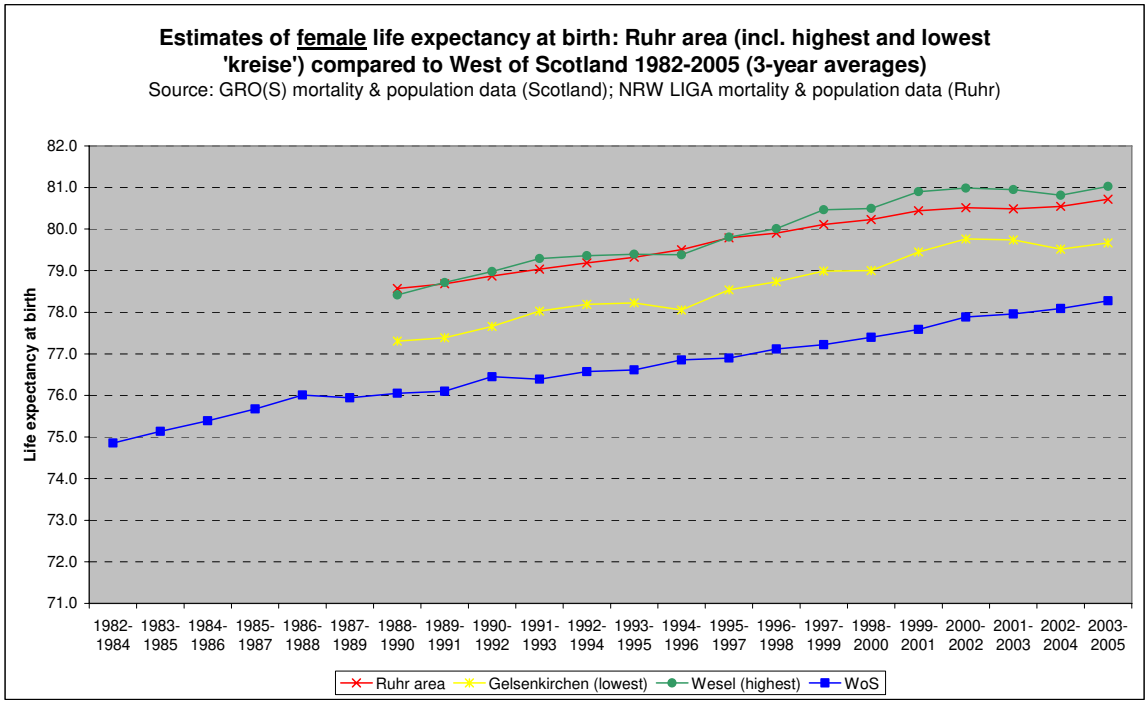


Figure 2.23



We have also been able to examine trends in life expectancy within smaller administrative regions ('kreise'[xxvii]) of the Ruhr area. Figure 2.24 shows that, for females, and compared to the West of Scotland, not only has there been a greater improvement in life expectancy in Wesel, the 'kreis' with the *highest* estimated figure in 2003/05, the same is also true of the 'kreis' with the *lowest* life expectancy at that time, Gelsenkirchen. Thus, all parts of this region appear to be improving faster than the West of Scotland.

Figure 2.24



Although not shown here, the same overall pattern is evident for males, but with a narrower gap between the 'worst' Ruhr area and the West of Scotland at the end of the period (0.8 years compared to the equivalent figure of 1.4 years for females presented above).

Figures 2.25 and 2.26 present trends over a shorter period for **Limburg** in the Netherlands. Although in both cases life expectancy is higher in Limburg than in

[xxvii] Kreise are German districts – intermediary administrative units between the German Länder (federal states) and local municipal authorities.

Scotland, there appears to be some evidence of a narrowing of the gap, especially among females. However, this appears to be the only region out of the 20 selected areas where this has occurred.

Figure 2.25

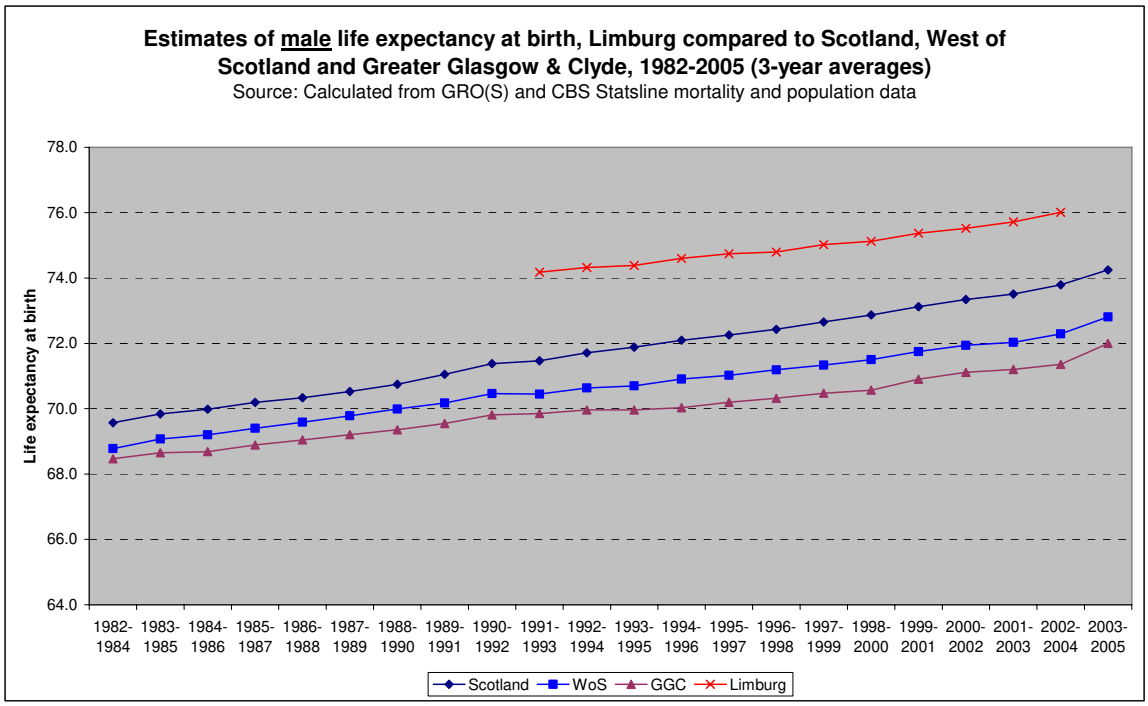
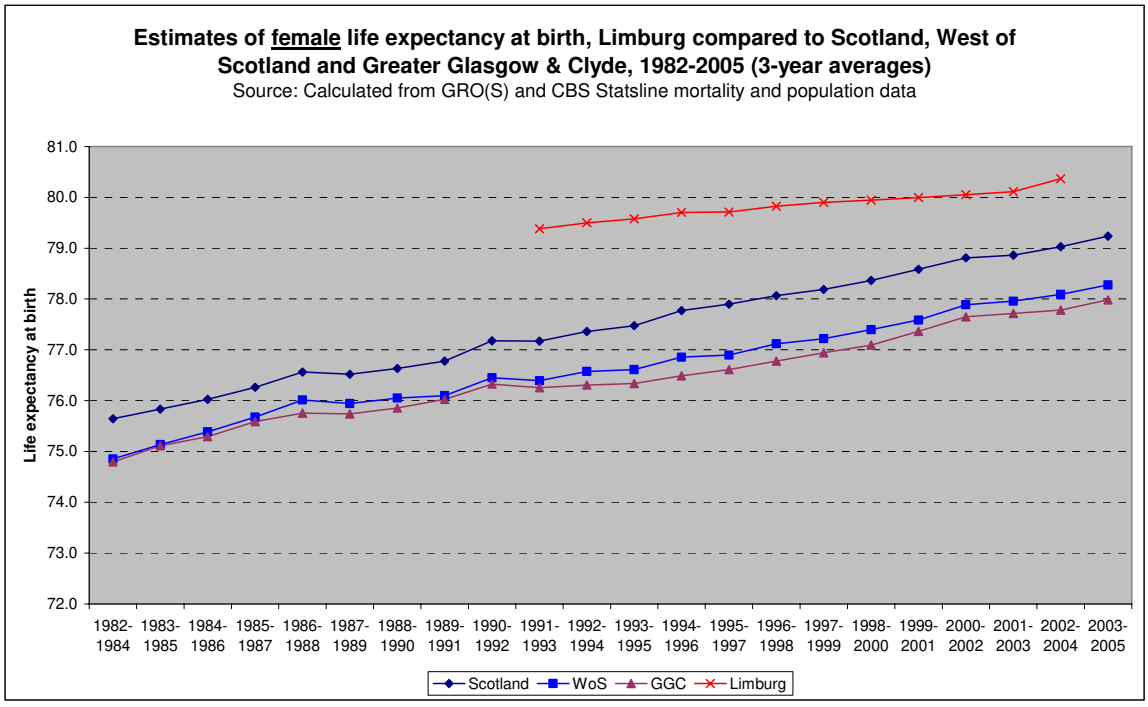


Figure 2.26



Finally in this section, Figure 2.27 shows male life expectancy in three of the four **French regions** (as estimates for Lorraine and its sub-region Moselle are more or less identical, those for the latter area have been excluded). For clarity of presentation, the figures are compared to the West of Scotland only. Faster rates of improvement in life expectancy are evident in all three French areas compared to the West of Scotland, epitomised by Nord-Pas-de-Calais where life expectancy at the start of the period was lower than the West of Scotland, but which, two decades later, had overtaken it. Equivalent figures for females are shown in Figure 2.28, with higher, and more rapidly increasing, levels of life expectancy evident in all three areas compared to the Scottish region.

Figure 2.27

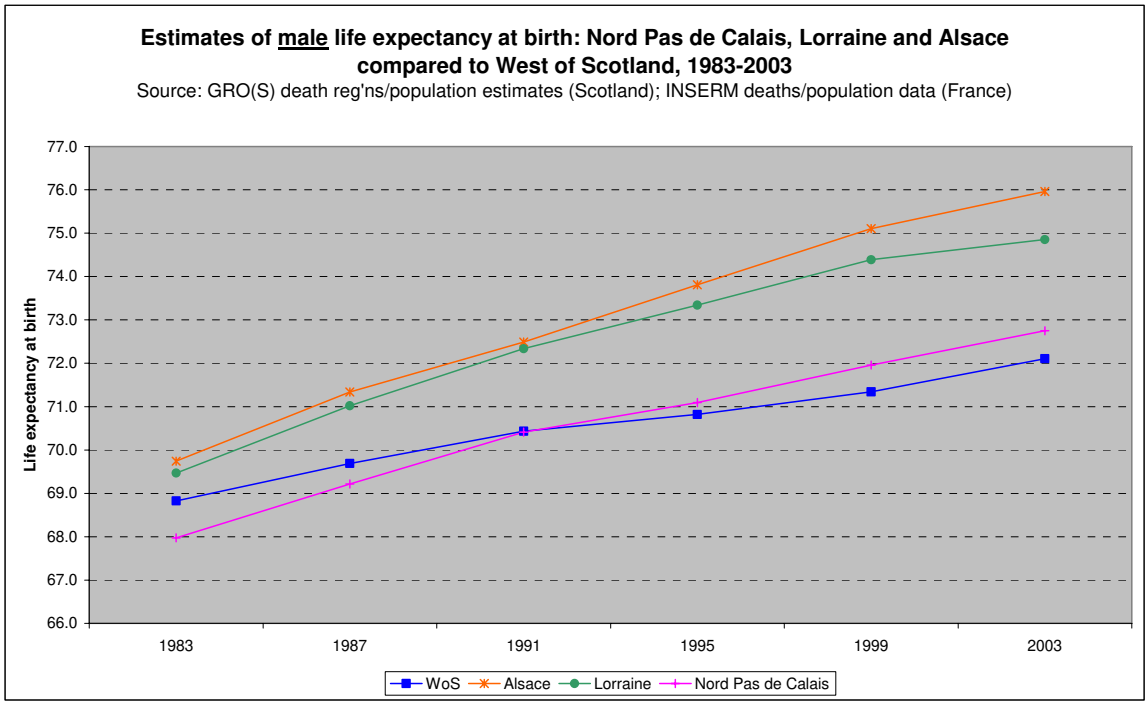
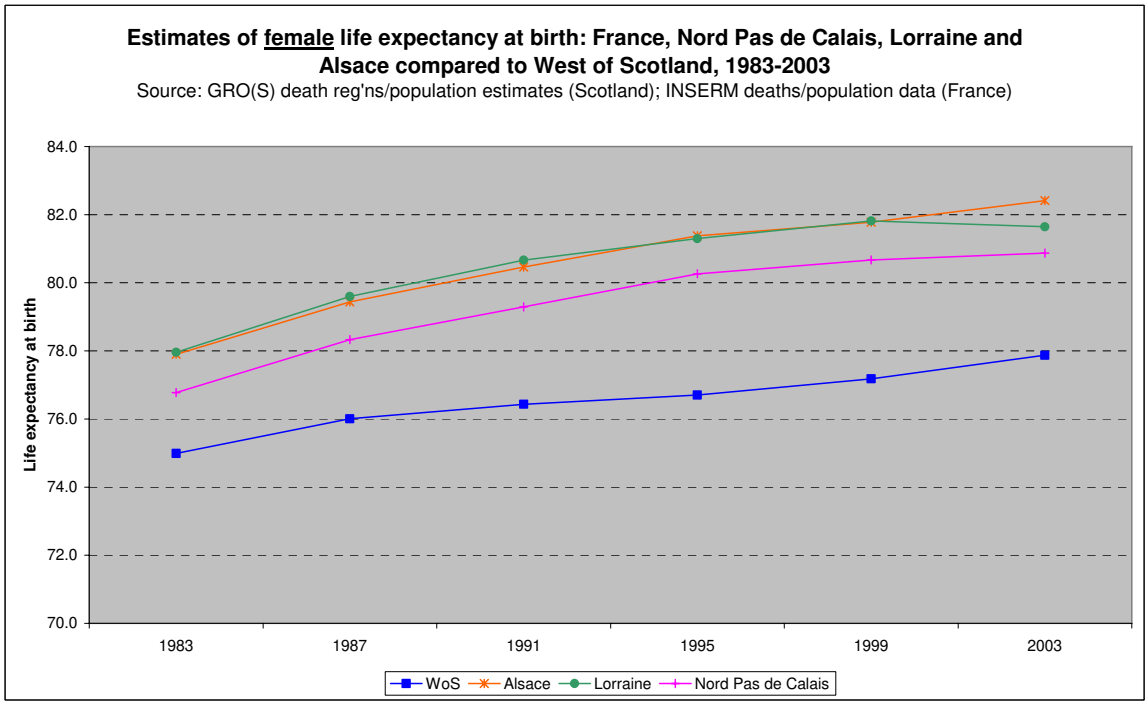


Figure 2.28



Note that trends for **Wallonia** in Belgium are not presented here as data were not available after 1997. However, for both males and females, life expectancy in Wallonia was considerably higher in that year (72.5 and 79.4 years respectively) than in the West of Scotland (71.3 and 77.1 years).

Eastern mainland Europe

As has been documented elsewhere, in Eastern Europe the end of Communism in the late 1980s coincided with initial increases in mortality, followed by – in many countries – rapid decreases[46, 47, 48, 49]. Thus, life expectancy in the former German Democratic Republic decreased at the time of the fall of the Berlin wall, but then improved in subsequent years. This can be seen in Figures 2.29 (males) and 2.30 (females) which compare life expectancy in **Saxony** with that in the Scottish areas. For example, Figure 2.29 shows that by 1990/92, male life expectancy in Saxony had fallen to around the same level as that of the West of Scotland: since then, however, it has improved rapidly and by 2003-2005 was around three years higher than in the West of Scotland. The figures for females (Figure 2.30) are even more striking: whereas in the mid-1980s there was little difference in life expectancy between Saxon females and their West of Scotland counterparts, by the end of the period the gap was almost four years. As with the Ruhr area, data were also analysed at the 'kreise' level within Saxony. Although not shown here, the same pattern is evident: that is, even the area with the lowest life expectancy in 2003-05 had improved significantly faster over the period than the West of Scotland.

Figure 2.29

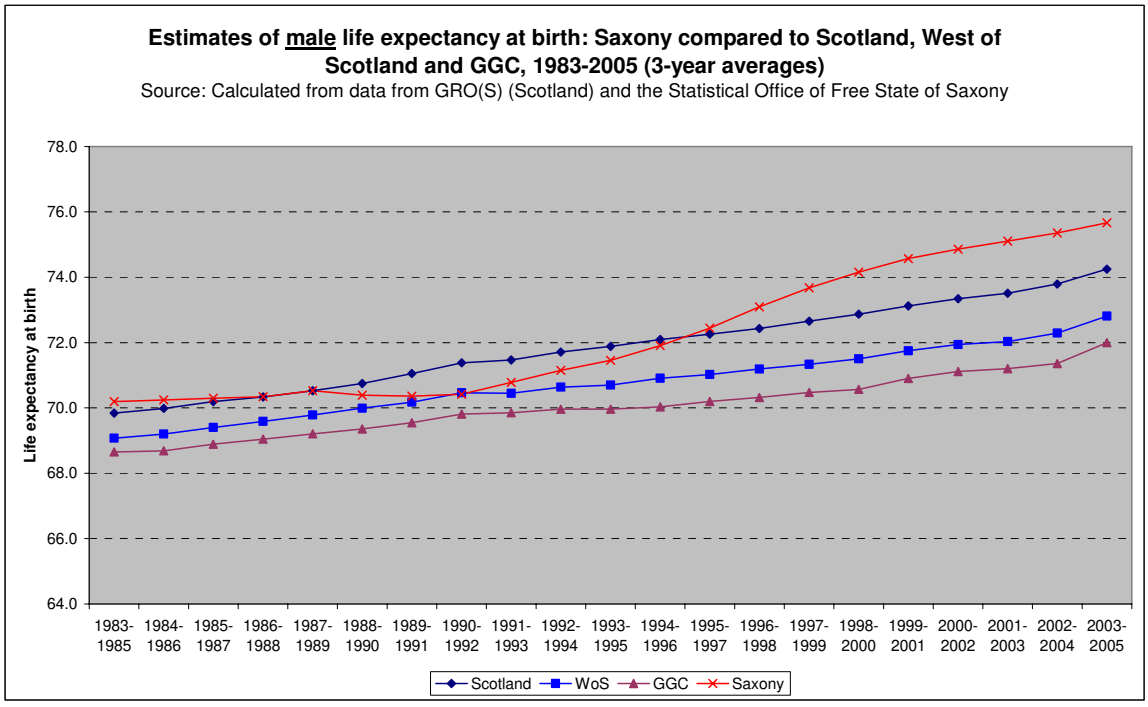
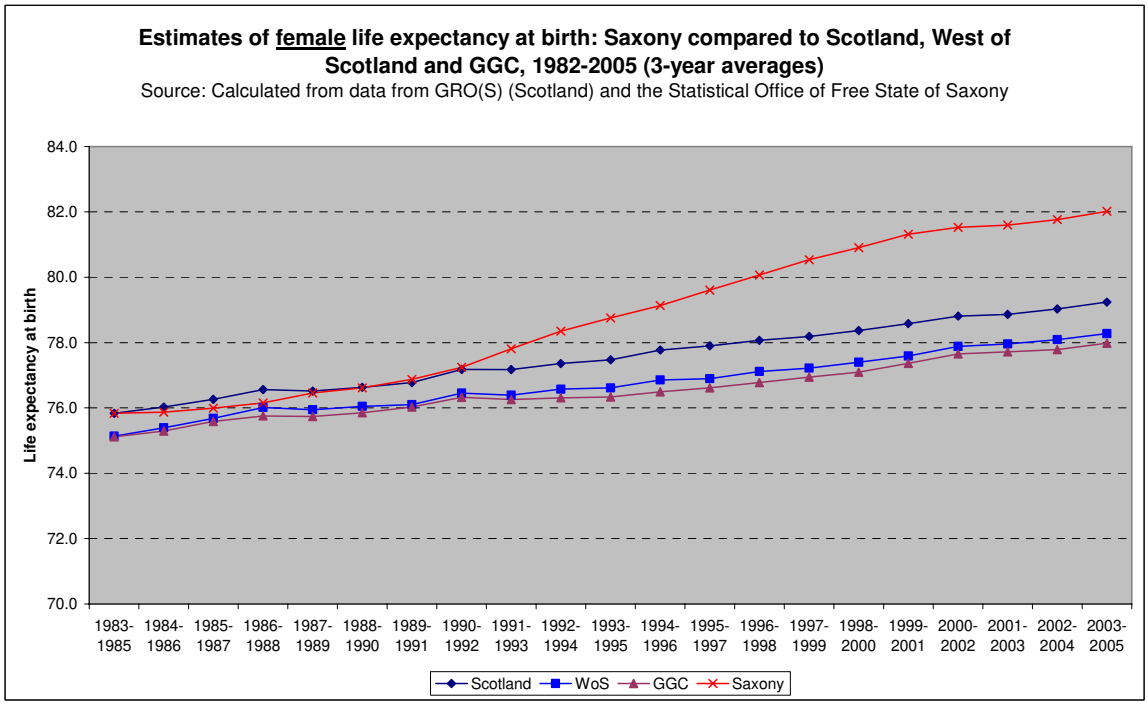


Figure 2.30



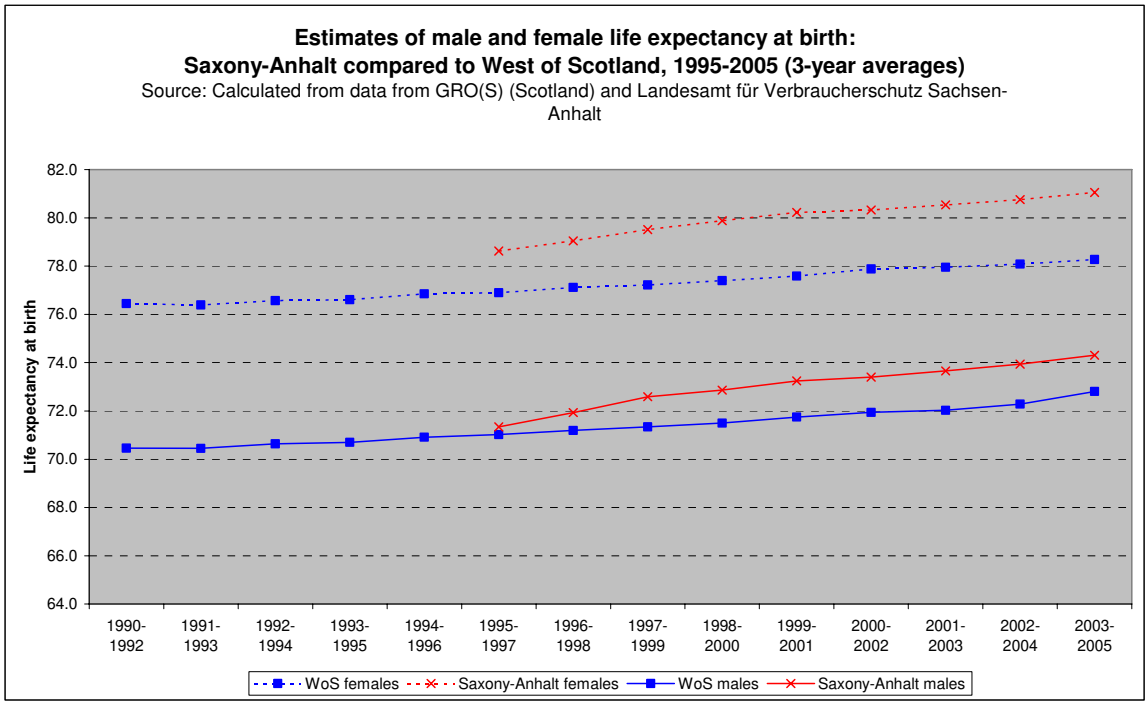
Note that the same overall pattern of male and female life expectancy exhibited in Saxony over the 20 or so years is also seen for the two sub-regions of **Leipzig** and **Chemnitz**. This is summarised (for males) in Table 2.2 below.

Table 2.2. Male life expectancy at birth, Saxony and its sub-regions of Leipzig and Chemnitz.

Region/sub-region	1983-85	1993-95	2003-05
Saxony	70.2	71.5	75.7
Leipzig	70.0	70.7	75.5
Chemnitz	69.9	71.5	75.4

Although data could only be obtained for Saxony's neighbouring 'Land', **Saxony-Anhalt**, for the period 1995-2005, it would appear that this region, despite an apparently poorer socio-economic profile than Scotland (as discussed in Section 2.3), has experienced striking improvements in life expectancy for both males and females, similar to those seen in Saxony. This is summarised in Figure 2.31.

Figure 2.31



Life expectancy in **Katowice** in Poland is currently (as at 2003/05) lower than in Scotland and the West of Scotland. However, as Figure 2.32 shows, that statement disguises the fact that life expectancy has been improving much faster in the Polish region than in Scotland. The four year gap between Katowice's and the West of Scotland's male life expectancy that was seen in the mid-1980s had been halved by 2003/05. One could surmise, therefore, that if current trends continue, male life expectancy in Katowice could overtake that of the West of Scotland in the near future. Indeed, among females this has already happened: Figure 2.33 shows that life expectancy among female residents of Katowice is now greater than those living in the West of Scotland, whereas in the 1980s it was two years lower.

Figure 2.32

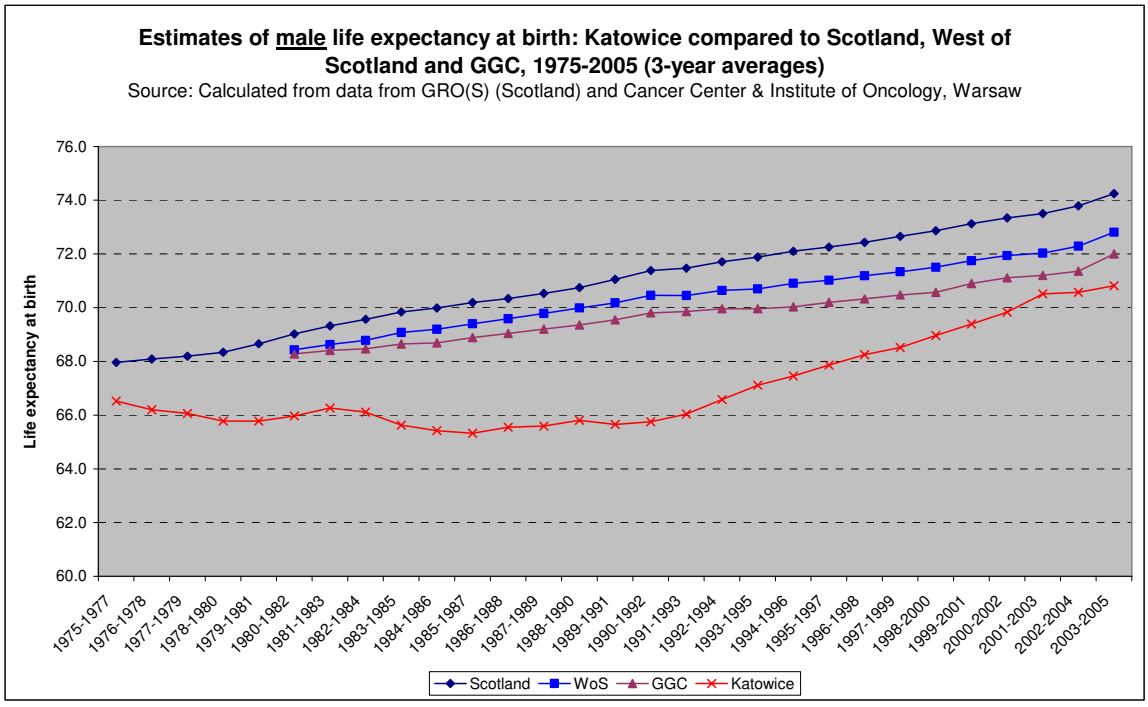
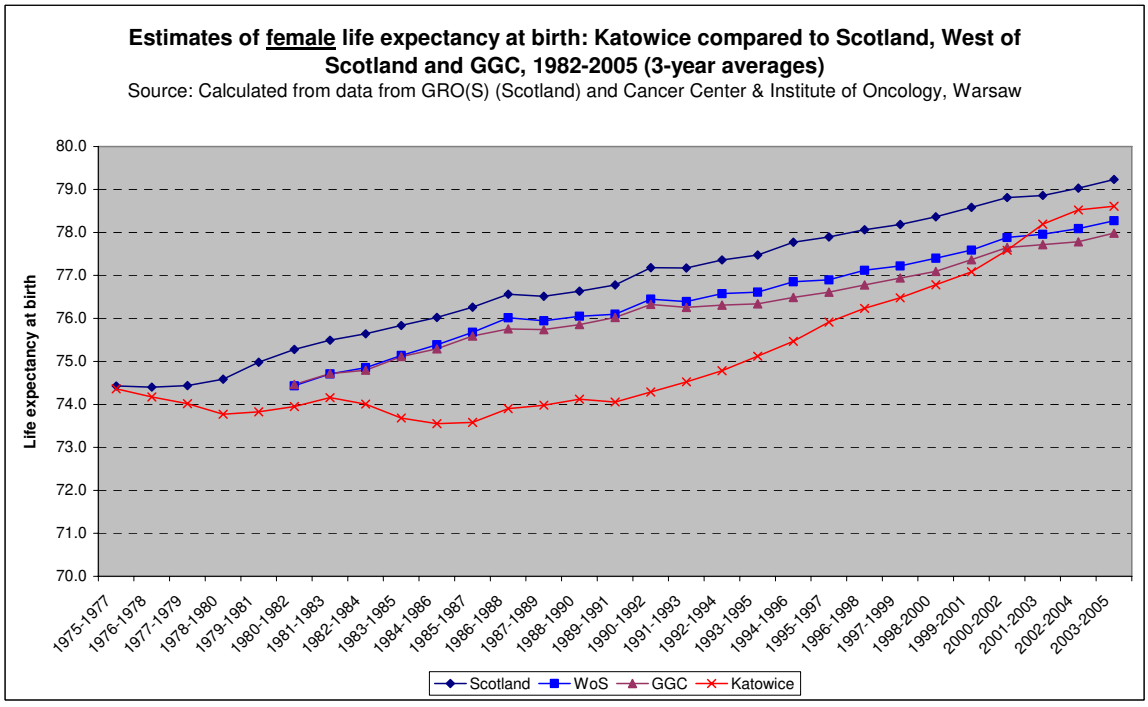


Figure 2.33



A very similar phenomenon has taken place in **Northern Moravia** in the Czech Republic. Between 1991/03 and 2003/05 the gap in male life expectancy between this region and the West of Scotland narrowed significantly, and among females, life expectancy is now higher in the Czech region than in the Scottish region (Figures 2.34 and 2.35)

Figure 2.34

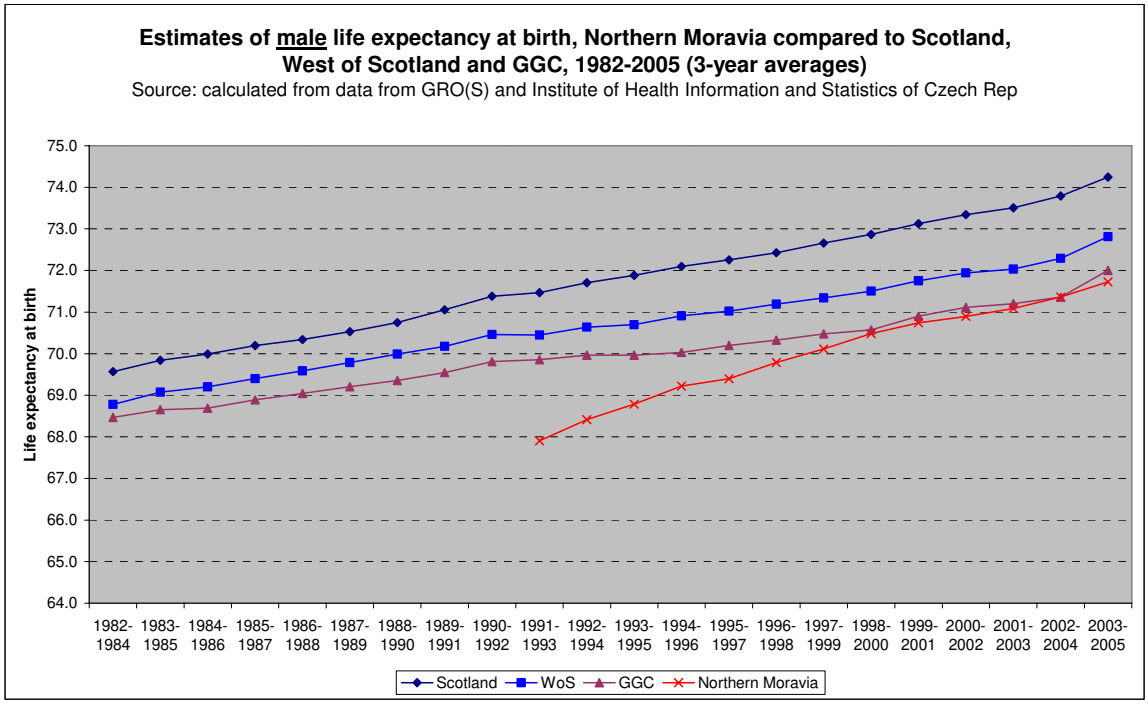
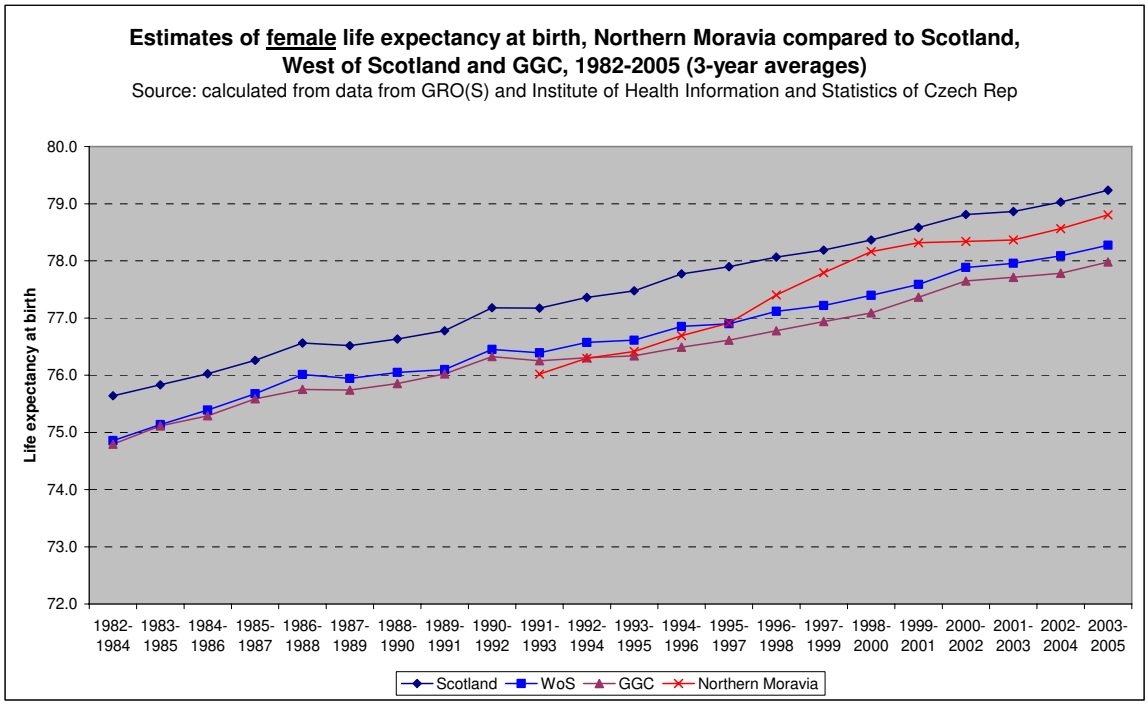
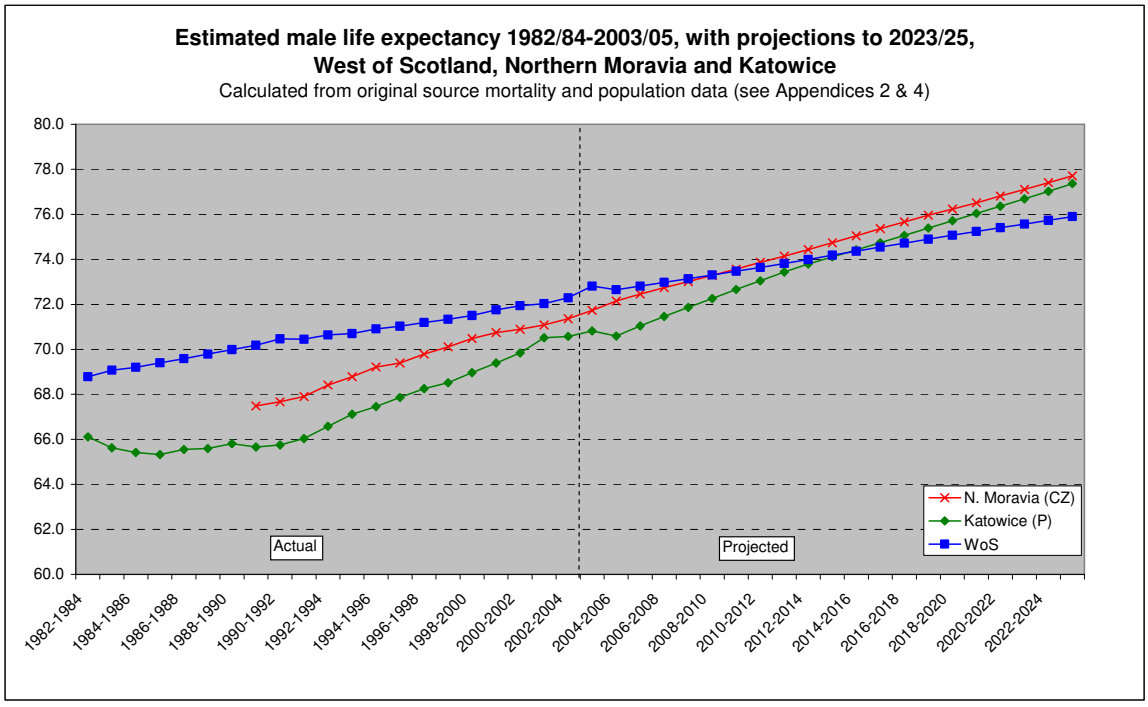


Figure 2.35



To emphasise the point regarding the faster improvement in life expectancy in these regions compared to Scotland, we can produce simple projections based on recent trends in life expectancy. These suggest that, if current trends continue, then in about 10 years' time, male life expectancy in both Katowice and Northern Moravia will have overtaken that of the West of Scotland, leaving the West of Scotland with the lowest life expectancy not only among females (which is the case already) but also among males. This is illustrated in Figure 2.36.

Figure 2.36



All of the above findings from Eastern Europe – where economic hardship has been marked – are of considerable interest.

UK regions/countries

It has been well documented that life expectancy in Scotland and the West of Scotland is the lowest within the UK[50, 51, 52]. Figures 2.37 and 2.38 summarise trends in male and female life expectancy respectively for the six **English and Welsh regions** (Greater Manchester; Tyne Tees & Durham; Northumberland & Tyne and Wear; Merseyside; West Midlands; Swansea & South Wales Coalfields) compared to the West of Scotland. In both cases, these repeat the general finding from analysis of the other areas that not only is life expectancy higher in these areas compared to the West of Scotland, it is also increasing at a faster rate. The same is also true of trends in **Northern Ireland**, shown separately in Figure 2.39.

Figure 2.37

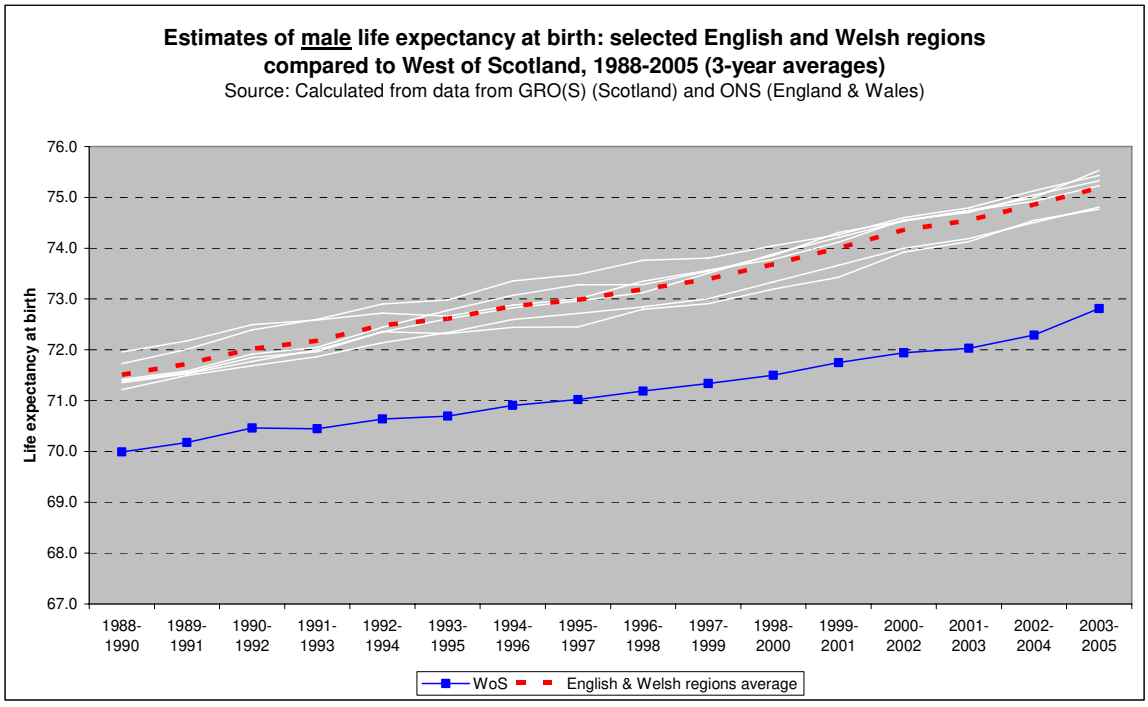


Figure 2.38

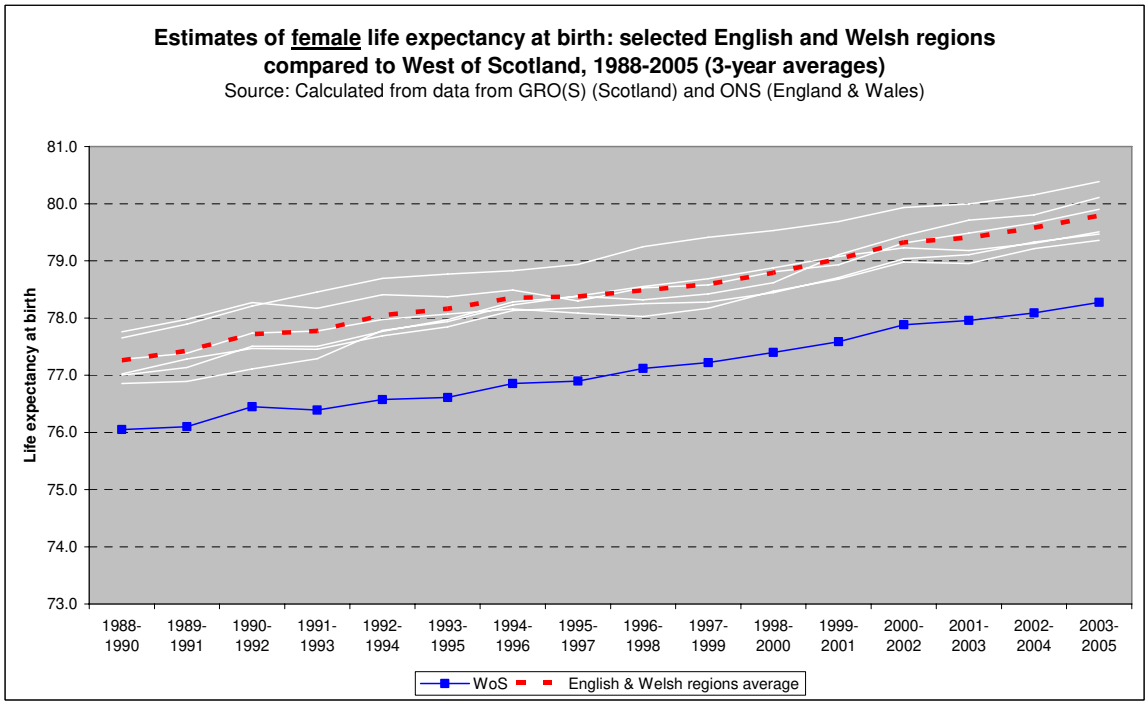
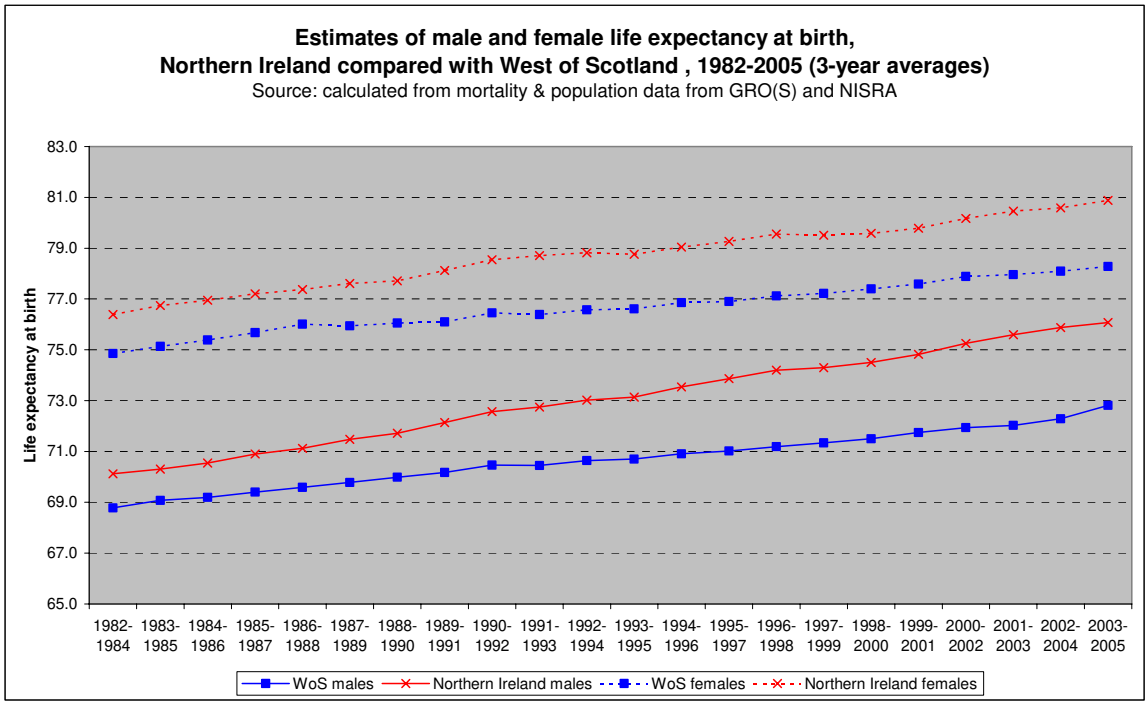


Figure 2.39



All of the above life expectancy trends are obviously driven by age, sex and cause specific deaths. These are investigated in the next part of the report for a smaller group of 10 regions.

Summary of Part Two

- A total of 20 regions in Europe were identified as being appropriate to compare to Scotland/West of Scotland in terms of their shared history of industrialisation and subsequent deindustrialisation.
- All the regions selected established their key economic industries prior to the middle of the 19th century and enjoyed strong economic growth until World War I, followed by difficulties during the inter-war period. After 1945 their pathways were more varied. Eastern European regions were corralled into specialising in heavy and light industrial manufacturing without regard for the environment or competitive advantage. Deindustrialisation occurred later than in the West.
- Comparisons of socio-economic indicators between the (South) West of Scotland and the selected areas suggest that – at a regional level – the West of Scotland compares favourably to the vast majority of the selected regions for indicators such as GDP, unemployment, educational attainment and economic activity rates.
- Examination of all-cause mortality rates shows that the selected regions tend to have the worst, or among the worst, health profiles in their parent countries.
- Life expectancy estimates were calculated for around 20-25 years for the majority of the areas. These showed that despite apparently having a superior socio-economic profile in terms of unemployment, GDP and educational attainment, Scotland/West of Scotland have life expectancy trends that are improving more slowly than in almost every other selected European region.
- West of Scotland females currently have lower life expectancy than every selected region.
- West of Scotland males currently have lower life expectancy than every region except Katowice in Poland and Northern Moravia in the Czech Republic. However, projections suggest that these regions will overtake the West of Scotland in around 10 years time if current trends continue.

PART THREE:
IN-DEPTH ANALYSIS OF TEN POST-INDUSTRIAL REGIONS IN EUROPE

3.1 Selection of a sub-set of ten regions

In the previous section we examined trends in life expectancy for all 20 selected regions. In order to make the detailed analysis process more manageable for the remainder of the project, we reduced the number of comparator regions from 20 to 10. This was done as follows:

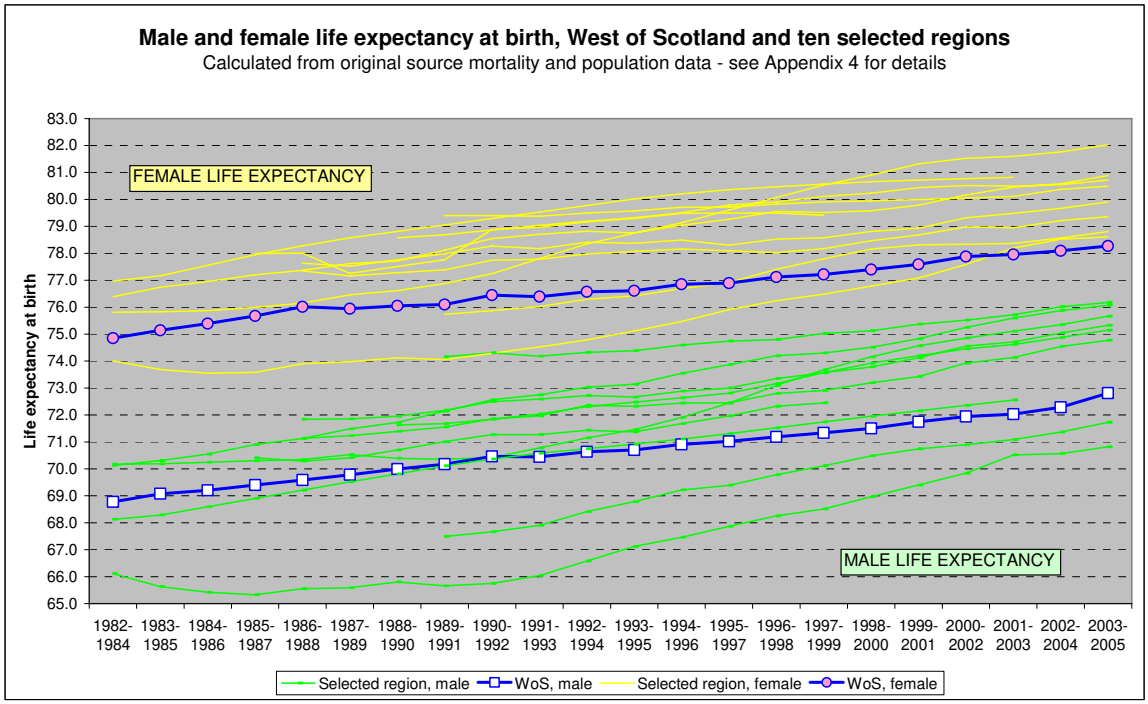
- With the exception of Germany, one region per country was selected. For each country, the post-industrial region with the poorest health was retained. This was to make comparisons with the West of Scotland more robust, given that region's health status compared to the rest of Scotland. Thus, Nord-Pas-de-Calais was chosen for France, Merseyside for England, and so on.
- The historical divergence of East and West Germany meant that two regions were retained. Note, however, that in the case of East Germany, in-depth, cause-specific mortality data could not be obtained for Saxony-Anhalt; thus, Saxony was included instead.

In the remainder of the report we will therefore concentrate on comparing the West of Scotland with the remaining 10 key post-industrial regions in Europe. These 10 areas are:

- Katowice (Poland)
- Limburg (Netherlands)
- Merseyside (England)
- Nord-Pas-de-Calais (France)
- Northern Ireland
- Northern Moravia (Czech Republic)
- Ruhr (Germany)
- Saxony (Germany)
- Swansea & South Wales Coalfields (Wales)
- Wallonia (Belgium).

As we have shown, each of these areas has the worst, or among the worst, levels of mortality in their respective country. Despite this, however – and as Figure 3.1 reminds us – all regions have higher levels of *female* life expectancy than the West of Scotland, while all bar two (Katowice and Northern Moravia) have higher *male* life expectancy. Furthermore, in virtually every region (Katowice and Northern Moravia included), life expectancy among both males and females is improving considerably faster than in the Scottish region.

Figure 3.1



This next section of the report examines the age, sex and cause specific aspects of mortality that are driving these life expectancy trends.

3.2 Trends in cause-specific mortality

Methodological note

Methodological details of the analyses presented in this section are included in Appendices 2-4. Briefly, however, mortality and population data were obtained for each region by age, sex and cause, from which a series of standardised mortality rates were calculated. Sixteen different causes of death were examined including: various cancers (lung, breast, oesophageal, stomach, colorectal, and prostate); disease of the circulatory system (including, separately, ischaemic heart disease (IHD) and stroke); chronic obstructive pulmonary disease (COPD) and related conditions; chronic liver disease and cirrhosis; and 'external' causes including motor vehicle traffic accidents and suicide (the latter including deaths of undetermined intent). Appendix 3 includes a full list of these causes and their associated ICD codes.

A detailed set of comparisons of mortality trends between Scotland/the West of Scotland (WoS) and each of the 10 regions for all the above causes is included in Appendix 8. For ease of presentation, however, in this section of the report the data are presented in summarised format, with each graph showing directly age-standardised mortality rates in the West of Scotland compared to the maximum, minimum and mean rate across the 10 other regions (plus the WoS itself). This format borrows from that presented in a 2003 report on 'Scotland's health in an international context' by Prof. David Leon and colleagues at the School of Hygiene and Tropical Medicine[53]. Note, however, that data were not always available for each region in each year: thus, the number of regions included in each year of the analysis is shown at the foot of each chart. Although this occasionally results in rather odd-shaped graphs – due to the inclusion or exclusion of a region with low or high rates in a particular year – it does, however, allow us to present a vast array of information in a more easily digestible format.

Note also that data for Limburg are not included in the children 1-14 and working age 15-44 sets of analysis[xxviii], while rates for Nord-Pas-de-Calais outwith the years provided have been imputed[xxix]. As stated, other methodological issues are discussed in Appendix 2.

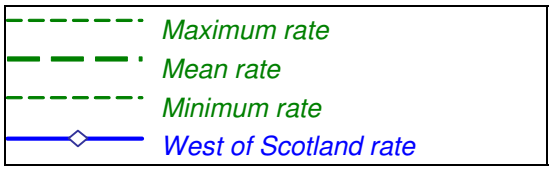
Results

Summarised data are presented here for five key age groups: infants (<1 year); children (1-14); working age 15-44; working age 45-64; and the elderly (65+).

Note: in the commentary that accompanies the graphs below, we highlight trends which are notably different from the average for these regions. However, it is worth remembering that as all the chosen regions have the worst, or among the worst levels of health in their respective countries, being "average" in this context should not necessarily be viewed as a positive outcome in international health terms.

Key to Figures 3.2 – 3.32

As outlined in the methodological note above, the Figures presented in this section summarise mortality trends for the West of Scotland compared to the maximum, minimum and mean mortality rates in each year of all the regions analysed. The key to each trend line shown is as follows:



Note also that that y-axis scale (in most cases showing the mortality rate per 100,000 population) on each chart varies considerably.

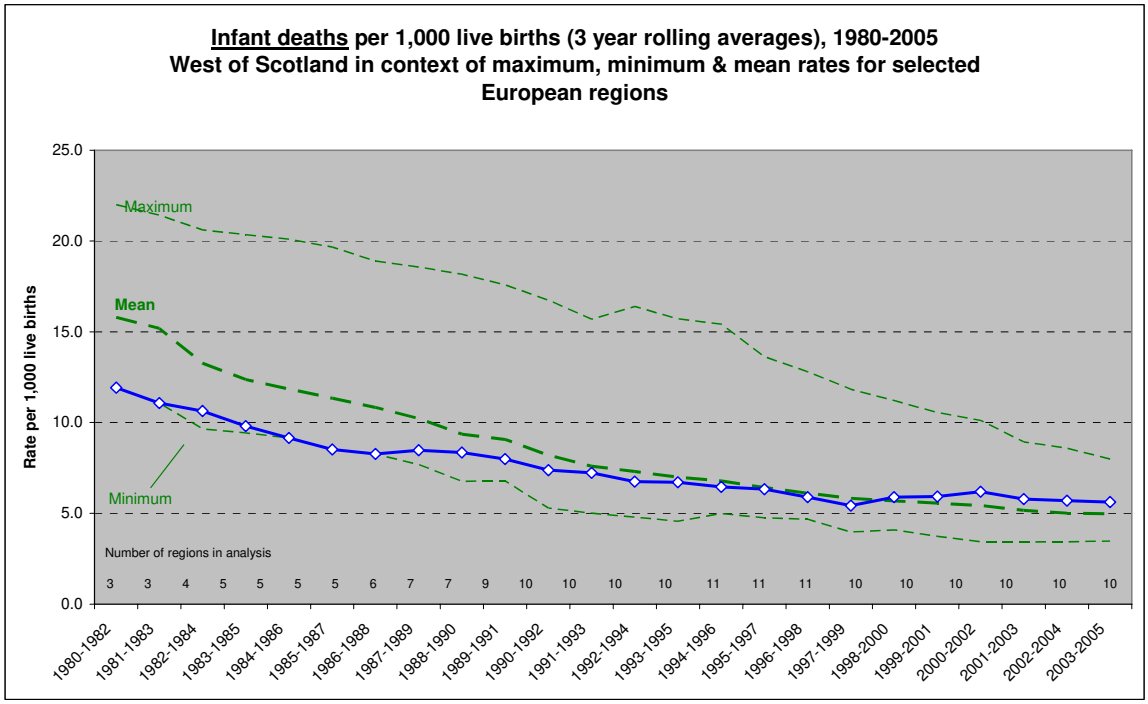
[xxviii] Standardised rates were calculated from mortality and population data for five-year age bands. However, for Limburg for age group 45-64, data could only be obtained for two 10-year age bands (i.e. 45-54 and 55-64). This will affect the comparability of rates between Limburg and other regions to an extent: however, it does not significantly effect the overall maximum, minimum and mean trends shown in any of the figures.

[xxix] Note that French data was not available for every year in the period, but rather for the individual years of: 1983; 1987; 1991; 1995; 1999; 2003; however, for clarity of presentation in this set of charts, estimates for the years in-between (1984-86, 1988-90 etc) were derived arithmetically.

Infant mortality

Figure 3.2 shows that infant mortality in the West of Scotland (in blue) compares reasonably well with rates recorded in the 10 other regions. Over the 25 year period presented, WoS rates have been at or below the average rate of all the chosen regions, although there is some suggestion that the Scottish rates have improved at a slightly slower rate than the majority of the other regions.

Figure 3.2



Children 1-14

Figures 3.3 (males) and 3.4 (females) show mortality rates for all causes among children aged 1-14. As with infant deaths, in both cases the WoS rates are fairly close to the regional average. There is clearly more fluctuation in the female rates, reflecting the smaller number of deaths experienced in this age group among girls compared to boys.

Figure 3.3

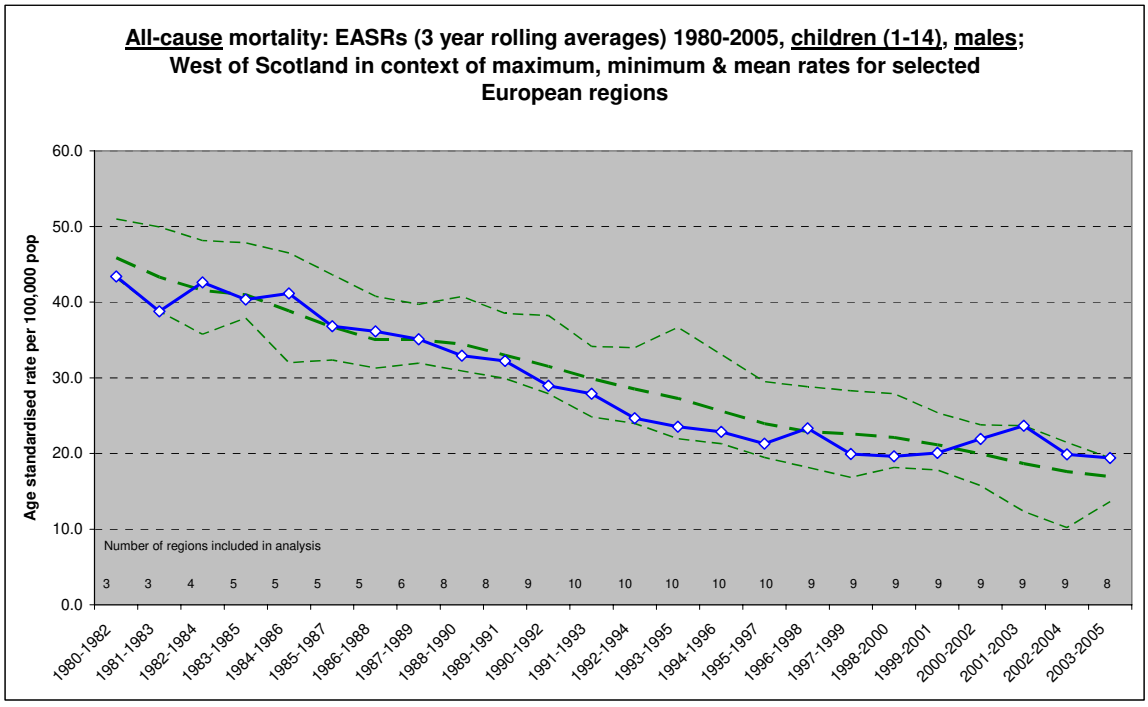
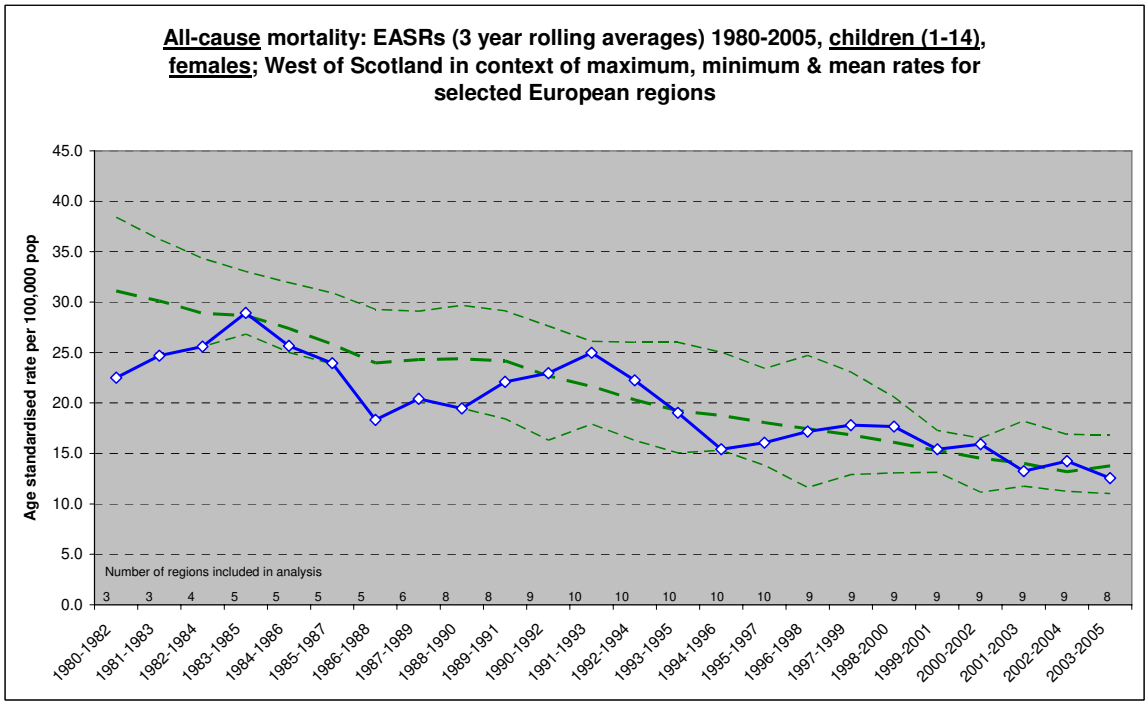


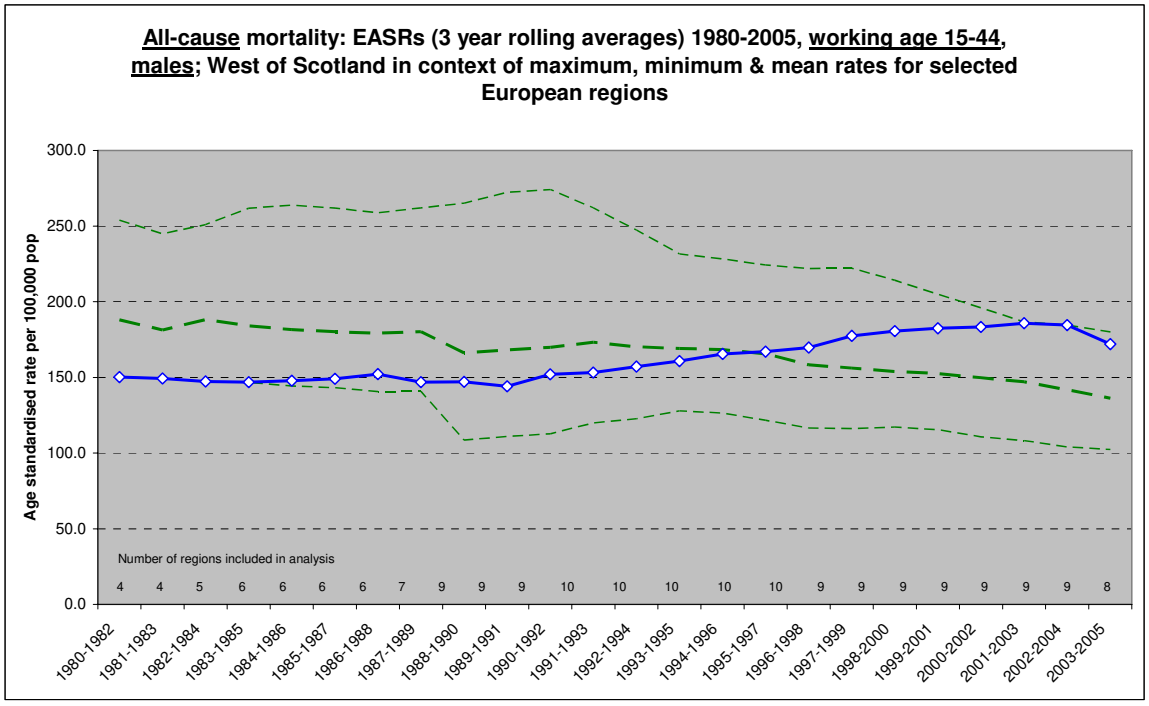
Figure 3.4



Working age 15-44

Figure 3.5 shows all-cause standardised mortality rates for West of Scotland males aged 15-44 compared to the maximum, minimum and mean rates recorded in the nine[xxx] other regions (plus the West of Scotland itself). The contrast between the rates of WoS males of this age and their counterparts in regions which have undergone similar industrial decline is clear: while rates have generally been rising in the WoS since the start of the 1990s, the opposite is true of the other regions.

Figure 3.5



This increase in mortality at this age has also been seen at the national (Scotland) level and has been highlighted by other commentators, with the rise attributed to increased numbers of Scottish deaths involving suicide, alcohol, drugs and violence[54, 55]. What is of particular interest, however, is the fact that this phenomenon is not being repeated in the majority of other, comparable, European regions: in the continental (i.e. non-UK) areas, mortality has been falling consistently since the start of the 1990s; of our three other UK regions, increases were recorded in Merseyside and Swansea & S. Wales

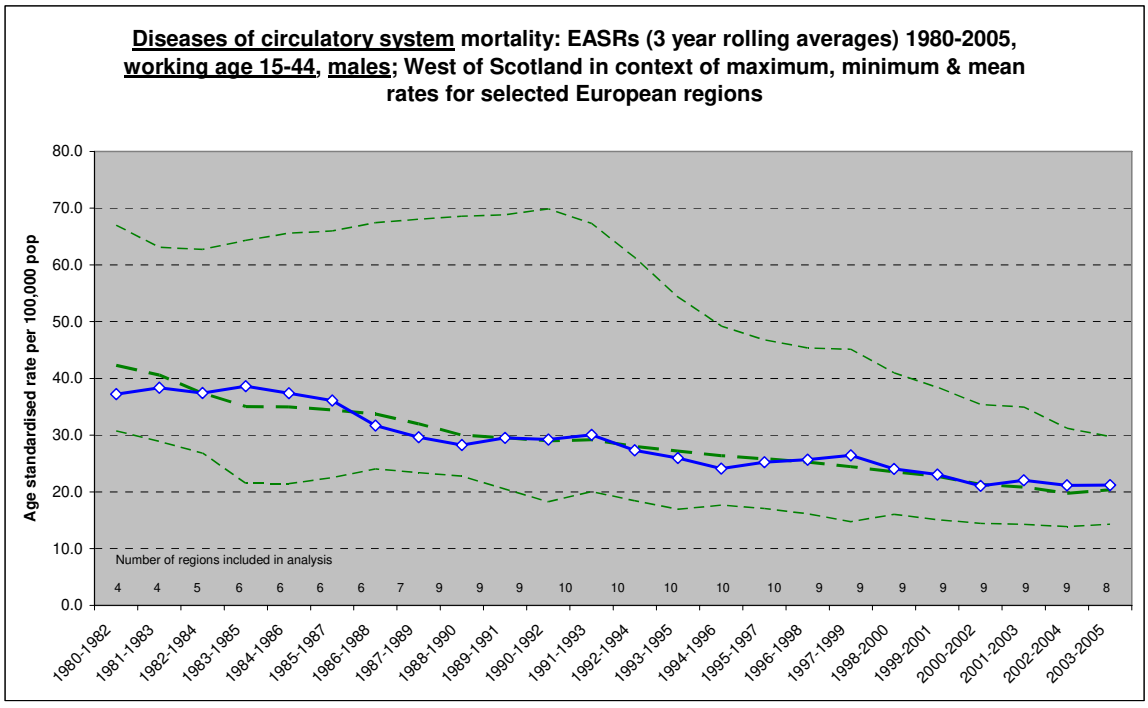
[xxx] Limburg is excluded from the 15-44 analysis

Coalfields, but not to the same extent as was seen in Scotland or the West of Scotland. In Northern Ireland rates decreased.

Although not shown here, a similar pattern is seen for females, although with a less marked increase in rates from the mid-1990s onwards.

This increase in rates in the 15-44 age group in the West of Scotland appears to be driven by a number of key factors. Rates are *not*, for example, higher in the West of Scotland for deaths from circulatory system diseases (Figure 3.6 – males) or all cancers (Figure 3.7 – females). However, contrasting trends are clearly seen for deaths from 'external causes'[xxxi]: Figure 3.8 shows the mortality trend for males for this set of causes. The overall pattern for females is similar.

Figure 3.6



[xxxi] 'External causes' is a grouping of ICD (International Classification of Diseases) codes which includes: accidents, intentional self-harm (suicide), assault, complications of medical and surgical care, and other external causes of accidental injury (e.g. drowning, exposure to fire, poisoning).

Figure 3.7

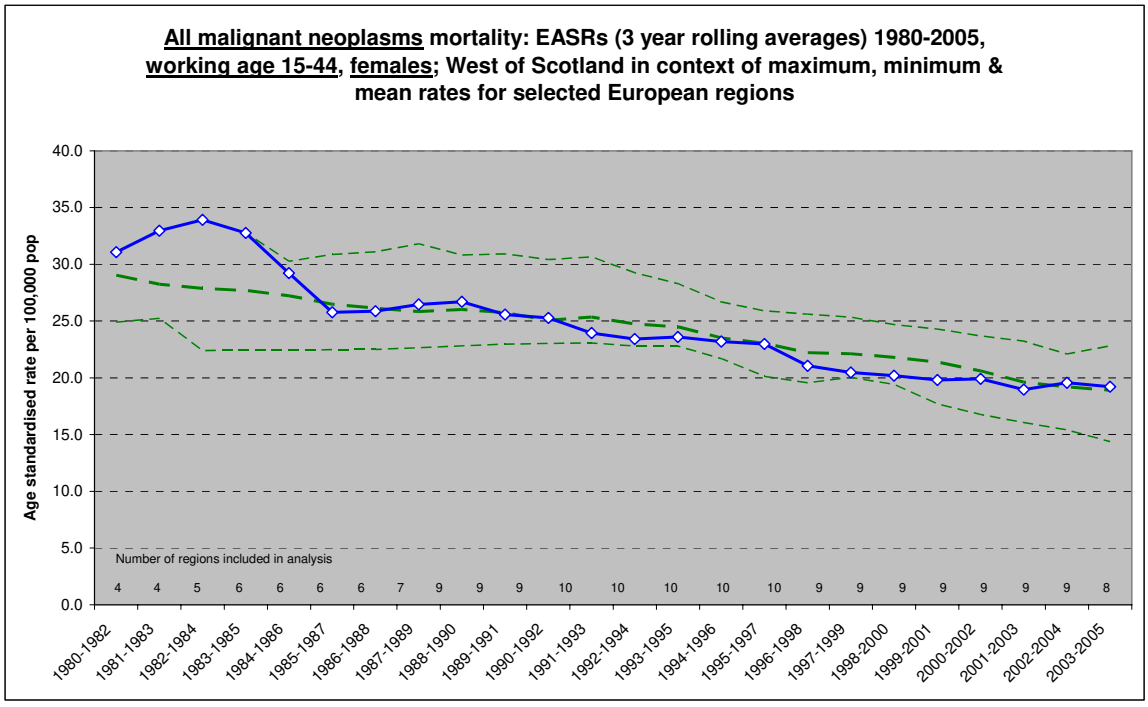
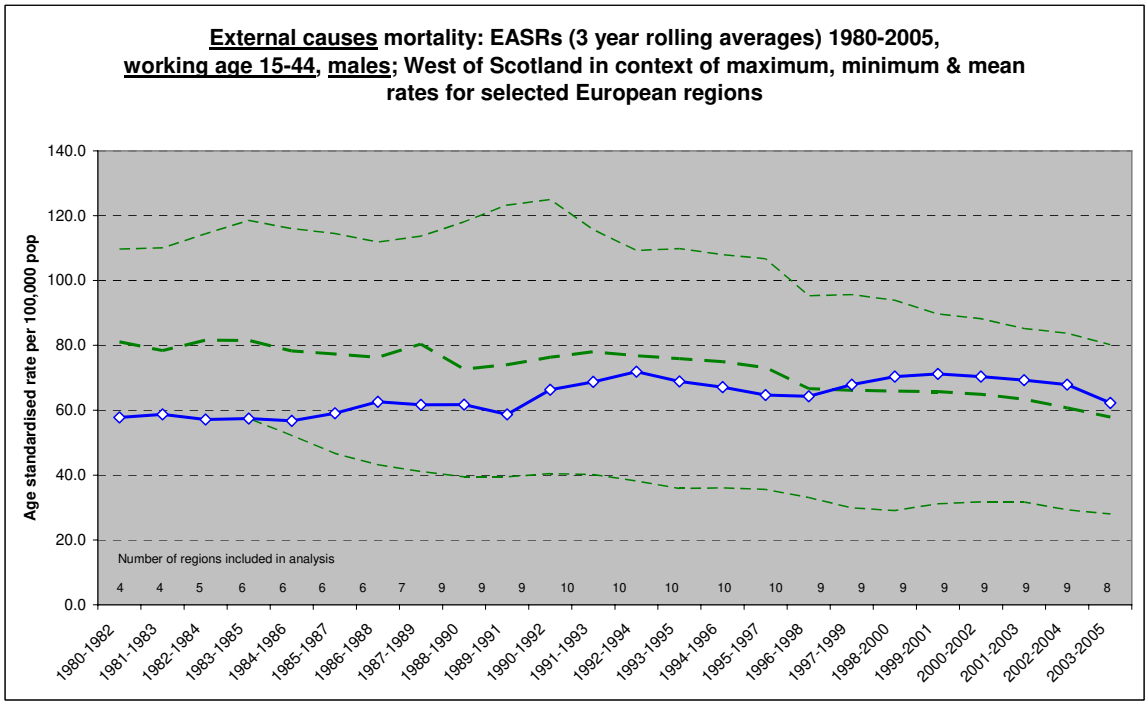


Figure 3.8



A subcategory of 'external causes' is suicide. Figure 3.9 and 3.10 show the contrasting trends in mortality from suicide (including deaths from undetermined intent) in the 15-44 age group for males (Figure 3.9) and females (Figure 3.10) in the West of Scotland compared to their European counterparts. The upward trend witnessed for both sexes in the WoS contrasts greatly with the downward trend seen in other regions. However, it is noticeable that WoS suicide rates have shown a decrease in the most recent 2-3 years' data available.

Figure 3.9

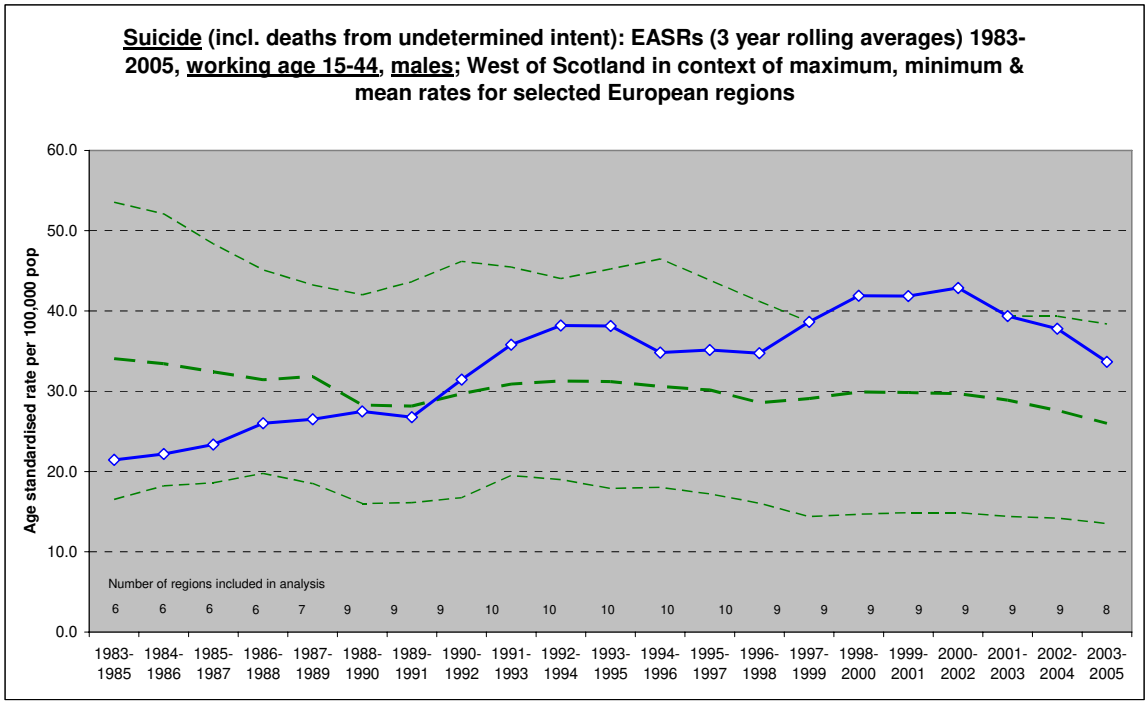
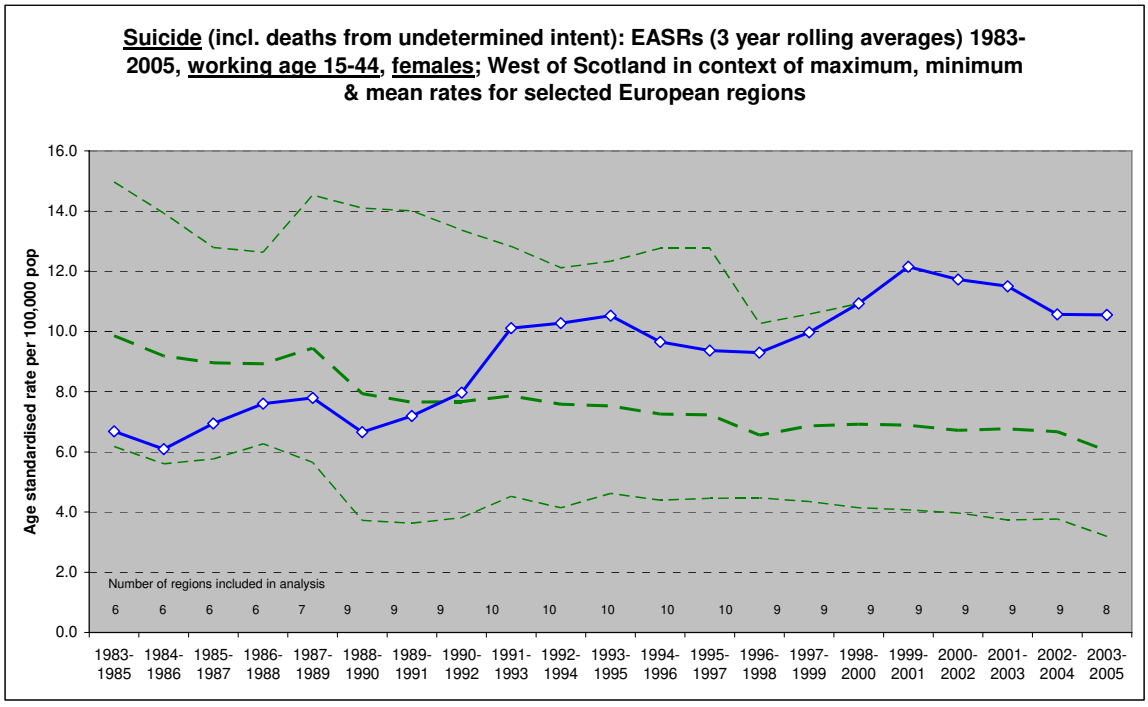


Figure 3.10



Figures 3.11 and 3.12 highlight the influence of alcohol harm. These show the striking increases in mortality from chronic liver disease and cirrhosis which have occurred over the past 25 years in the West of Scotland for both males and females respectively in this age group. In both cases, the West of Scotland's relative position has altered from being significantly below the regional average in the earlier years of the analysis, to being the highest of all the post-industrial regions analysed. The issue of chronic liver disease and cirrhosis, and alcohol harm more broadly, is discussed in more detail later in this part of the report.

Figure 3.11

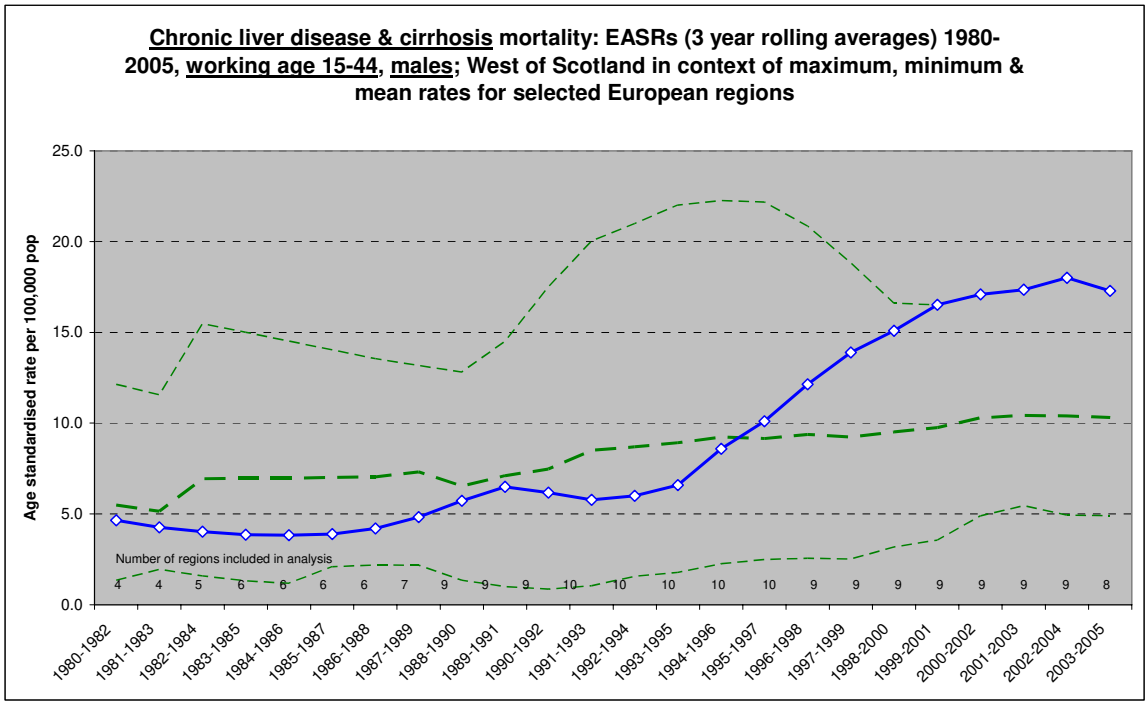
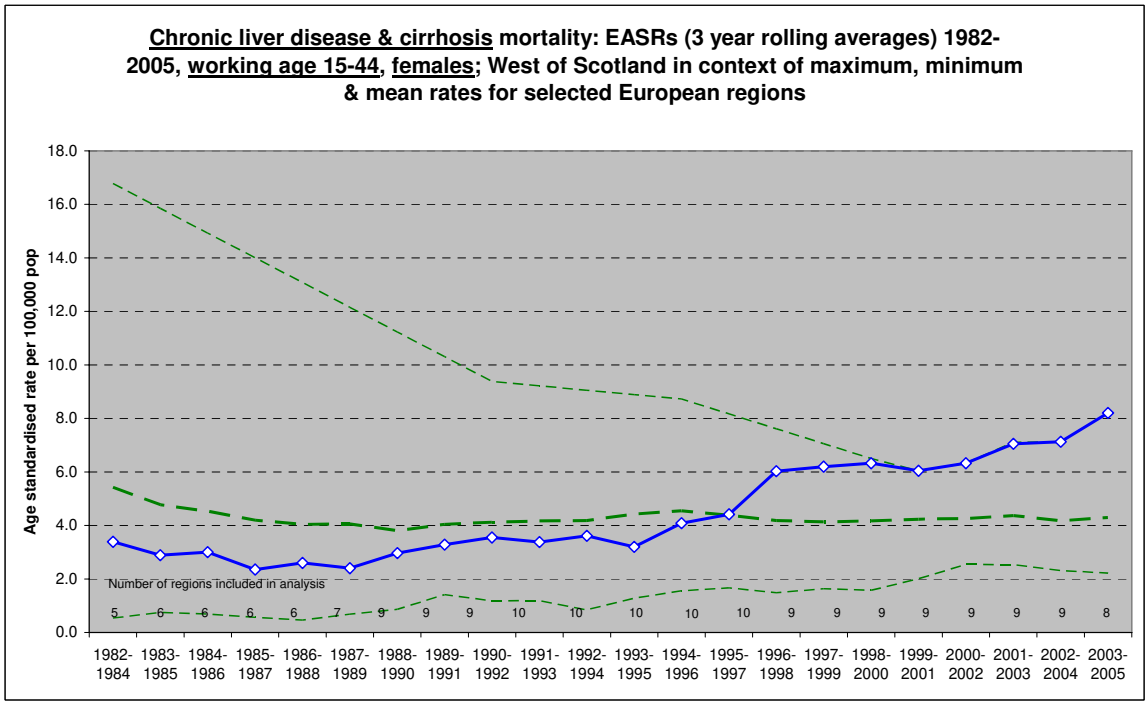


Figure 3.12

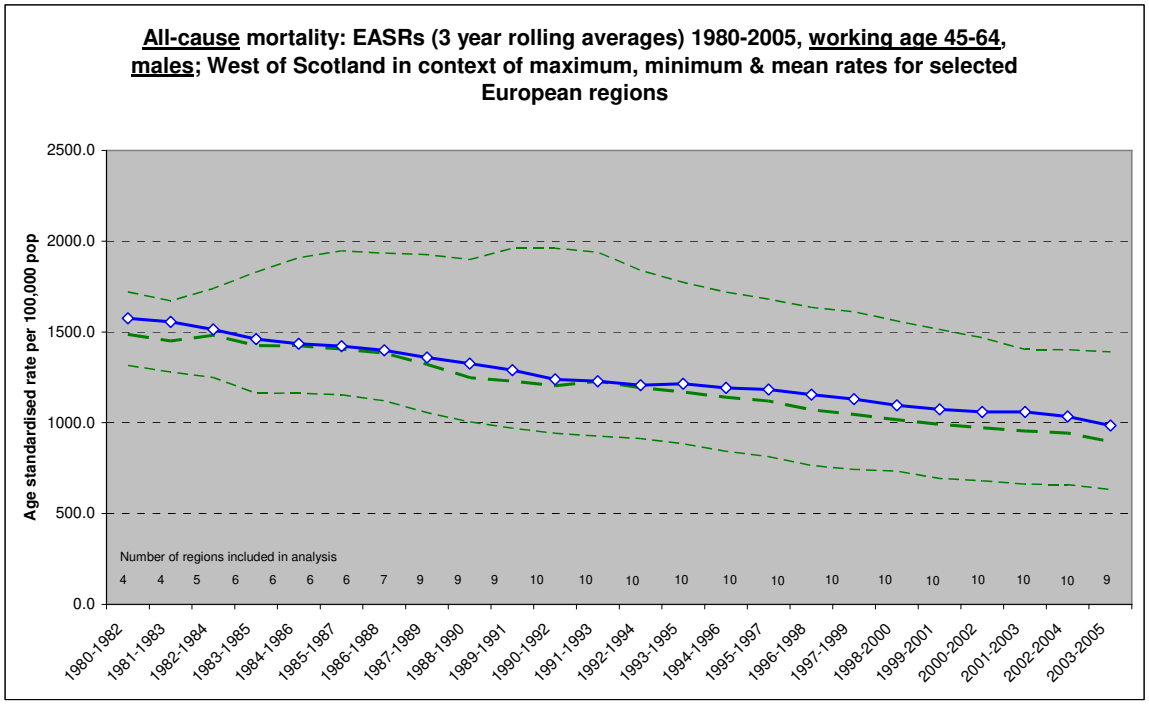


Similar summarised charts for other causes of death in this age group are included in Appendix 7a.

Working age 45-64

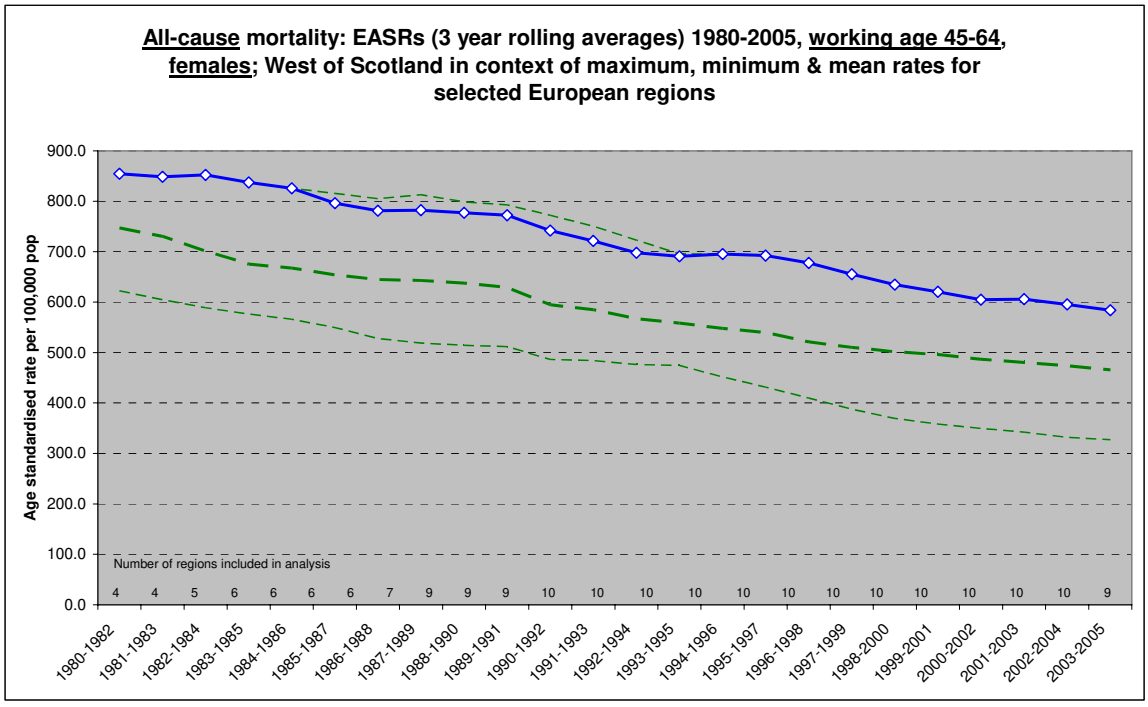
Figure 3.13 shows all-cause standardised mortality rates in the 45-64 age band for WoS males compared to other regions. As can be seen, the WoS rates lie consistently around the regional average.

Figure 3.13



The above contrasts notably with the picture for females in this age group. As Figure 3.14 shows, WoS females have the highest mortality rates of all the regions analysed, and this has been the case for most of the 25 years for which we have comparable data.

Figure 3.14



When we look at individual causes, we see that this overall higher level of mortality in WoS middle-aged females is driven principally by a small number of causes: cancer (especially lung cancer, breast cancer, oesophageal cancer); IHD and stroke; COPD; and alcohol (deaths chronic liver disease and cirrhosis). This is illustrated in Figures 3.15 to 3.22 below.

Figure 3.15

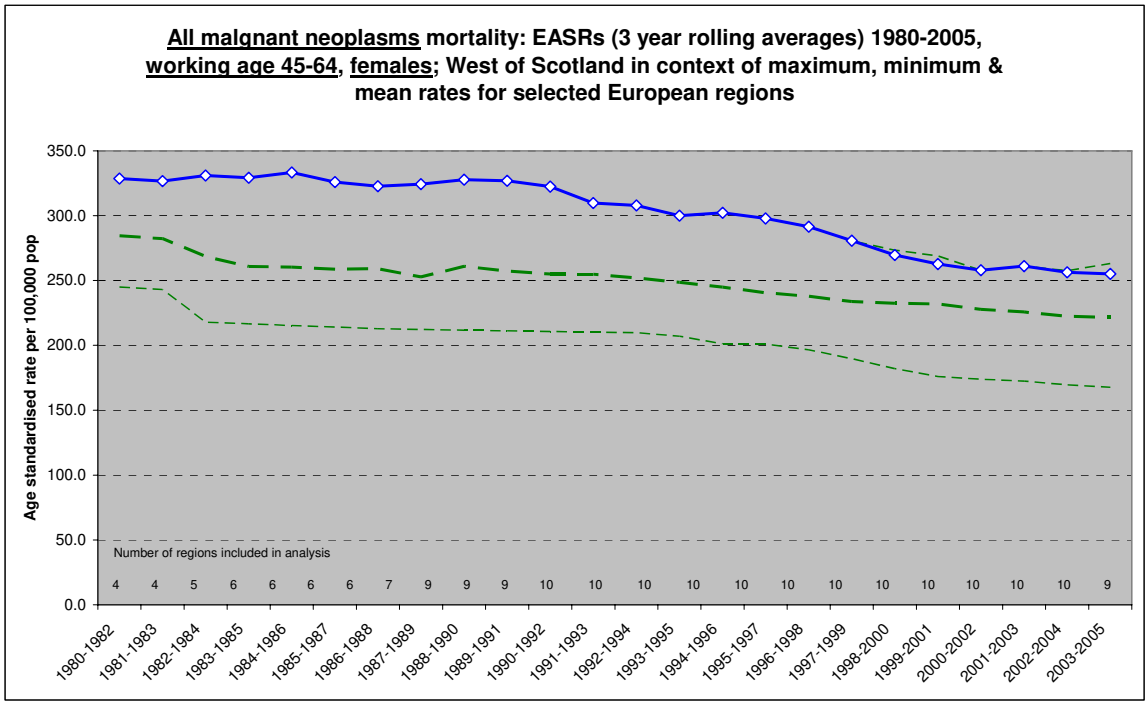


Figure 3.16

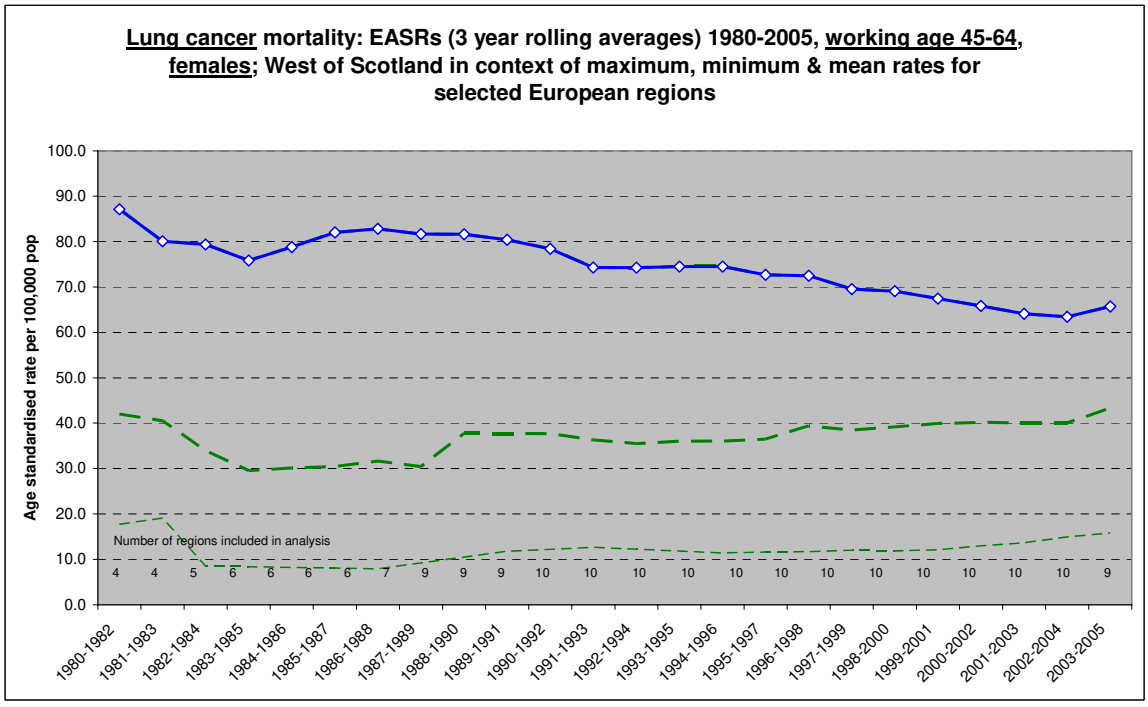


Figure 3.17

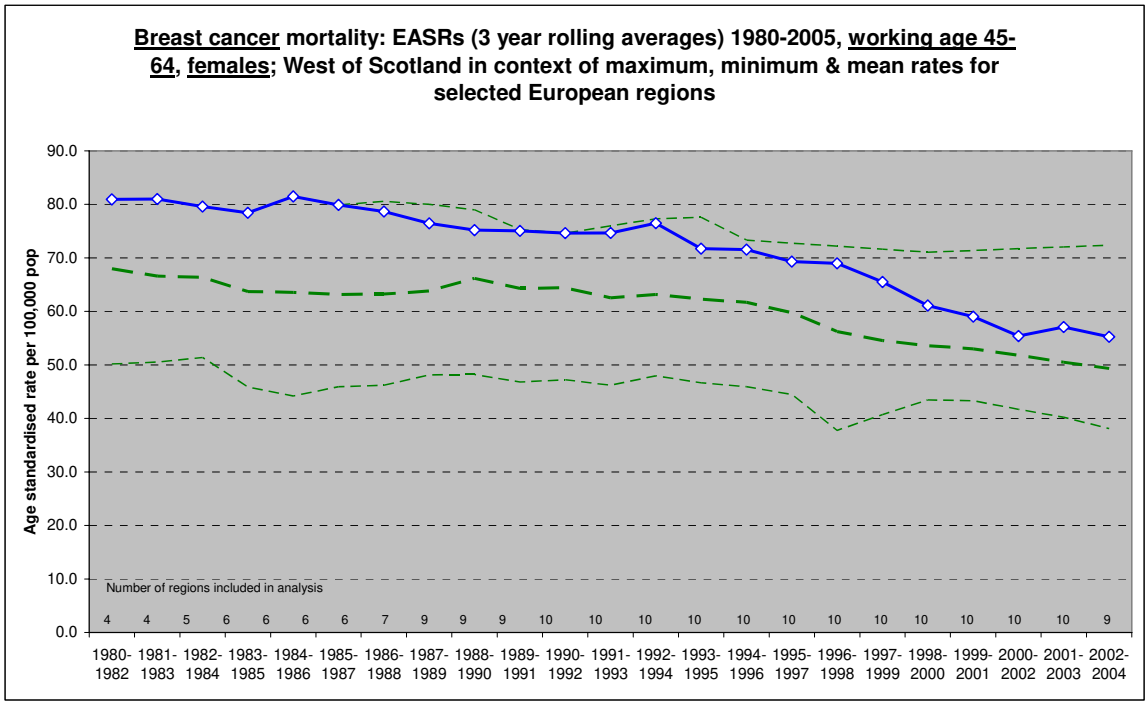


Figure 3.18

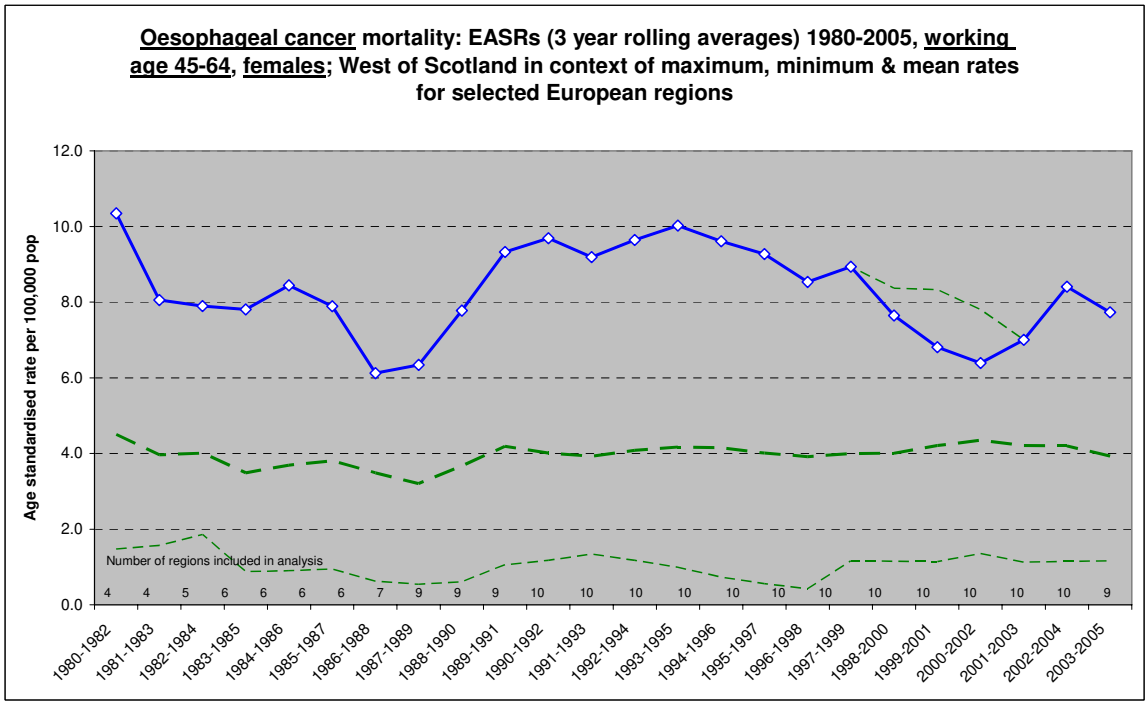


Figure 3.19

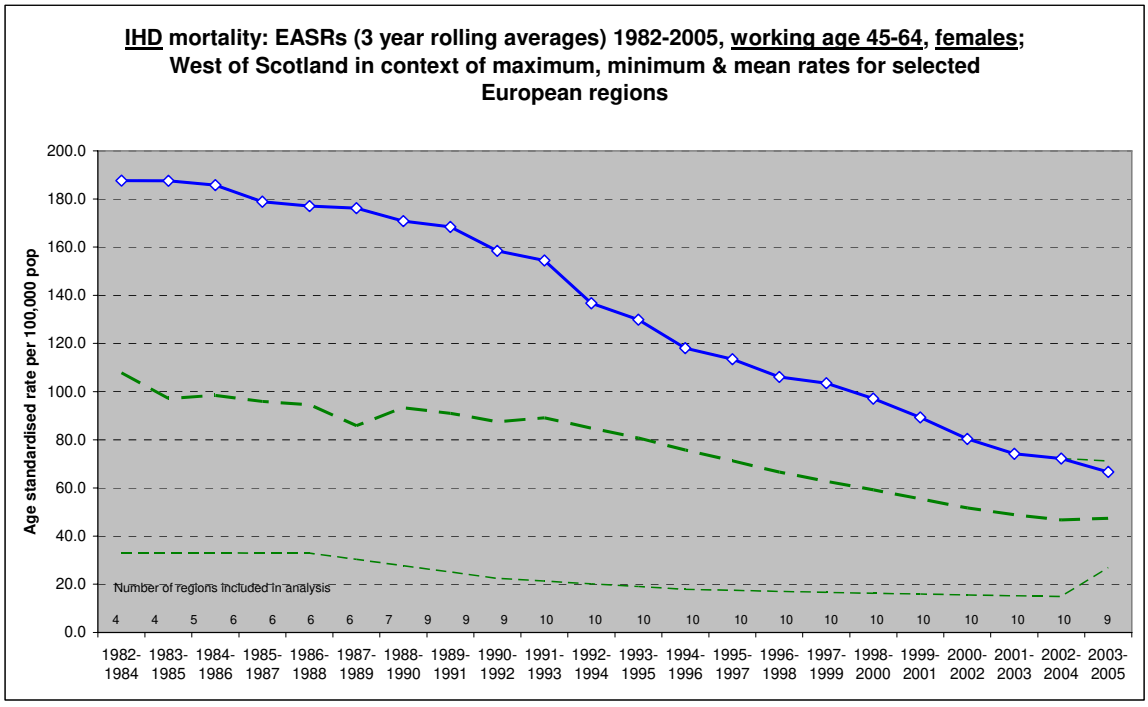


Figure 3.20

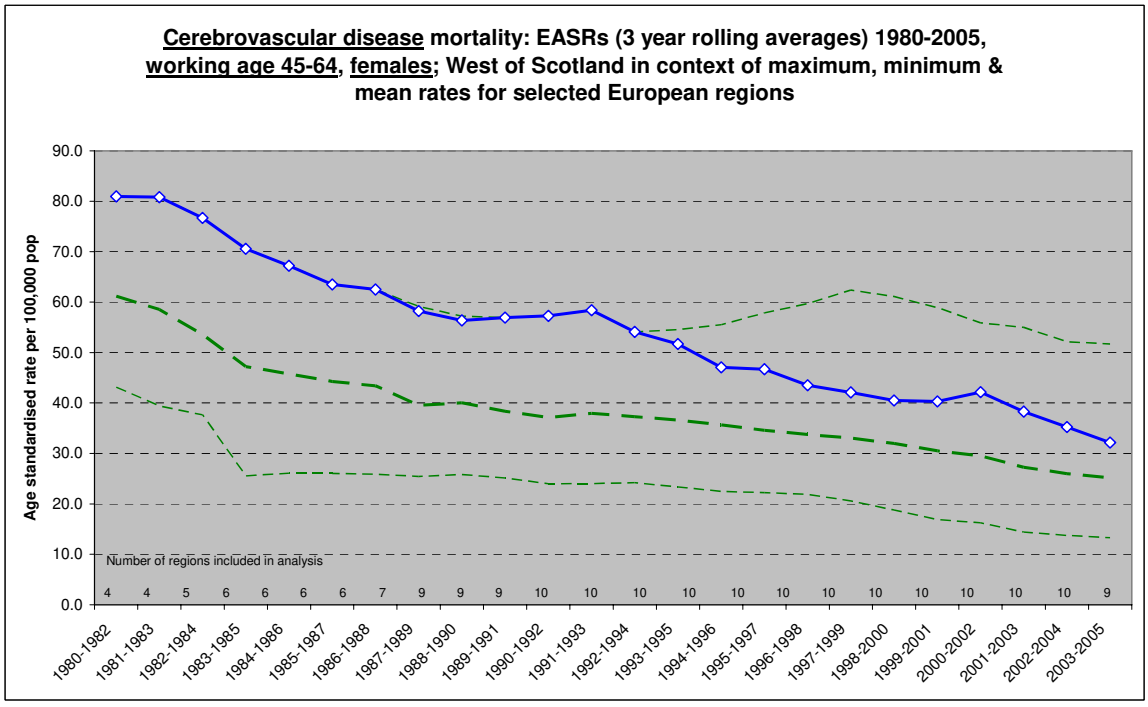


Figure 3.21

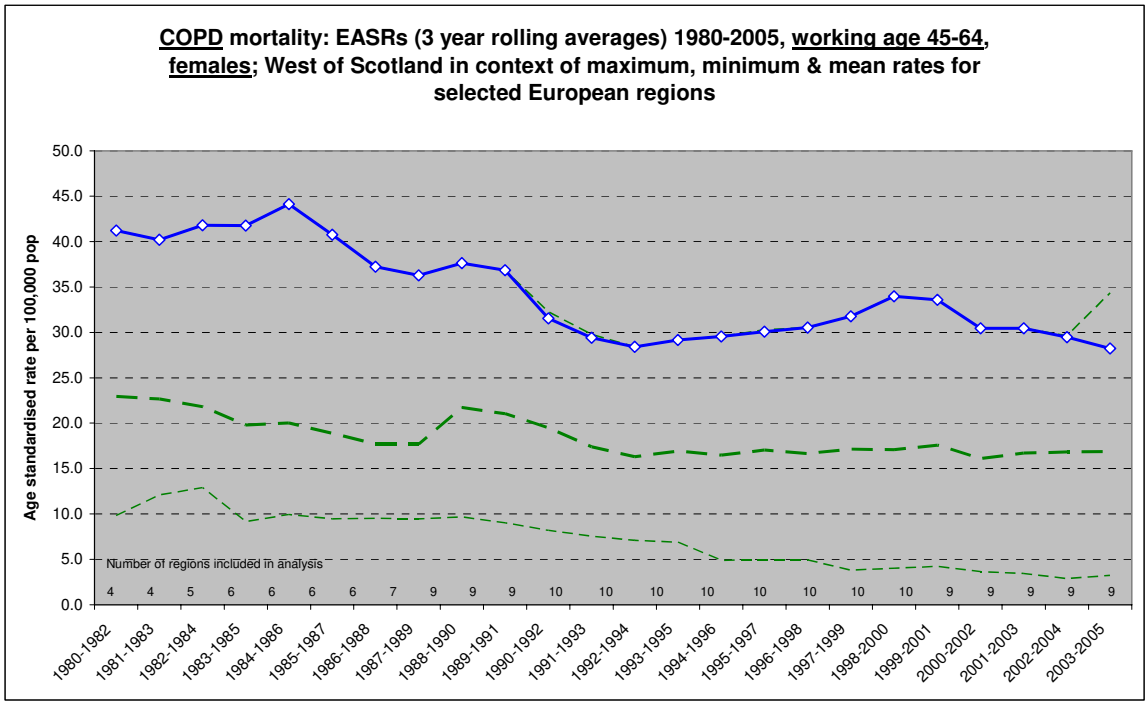
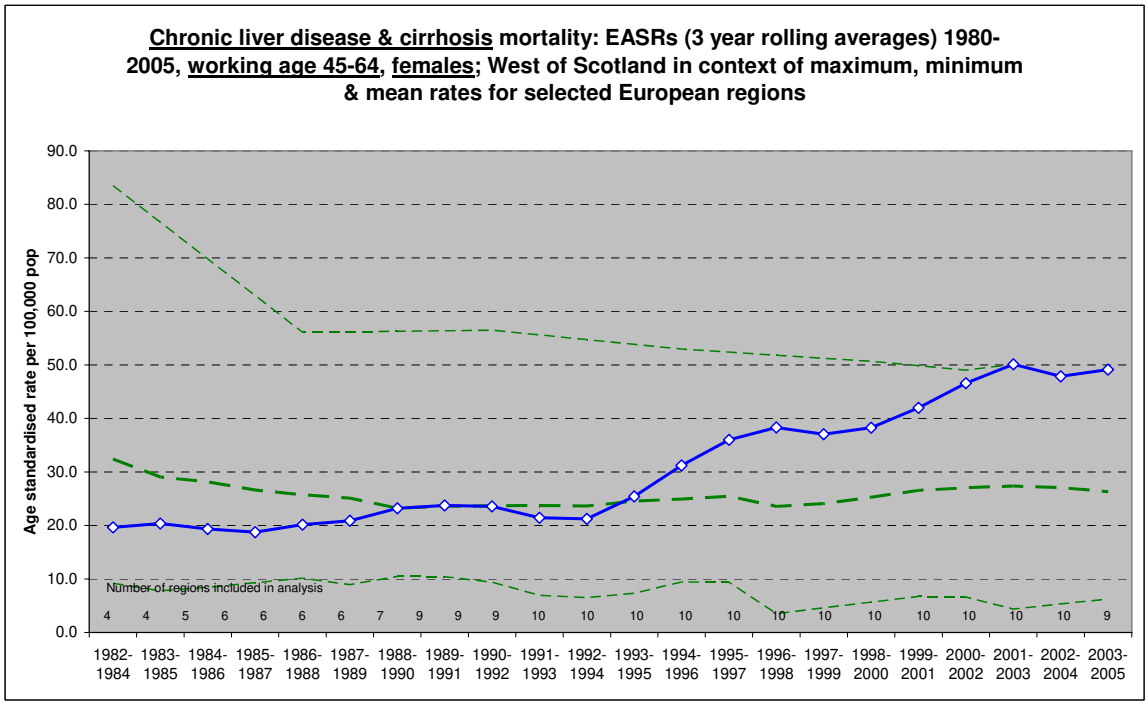


Figure 3.22



On a more optimistic note, these data do, however, highlight the fact that with the exception of chronic liver disease and cirrhosis, oesophageal cancer and COPD, the gap between these female WoS rates and the regional average has been narrowing in recent years.

Returning briefly to male death rates within this age group, although – as mentioned above – the WoS all-cause mortality rate has remained close to the European regional average over the course of the period analysed, there are, however, are a number of individual causes for which rates differ significantly. These include:

- IHD (higher in the WoS, but falling and becoming closer to the average)
- COPD (higher but falling)
- Suicide (consistently lower than the average – see Figure 3.23 below)
- chronic liver disease and cirrhosis (higher and rising – see Figure 3.24 below)

Figure 3.23

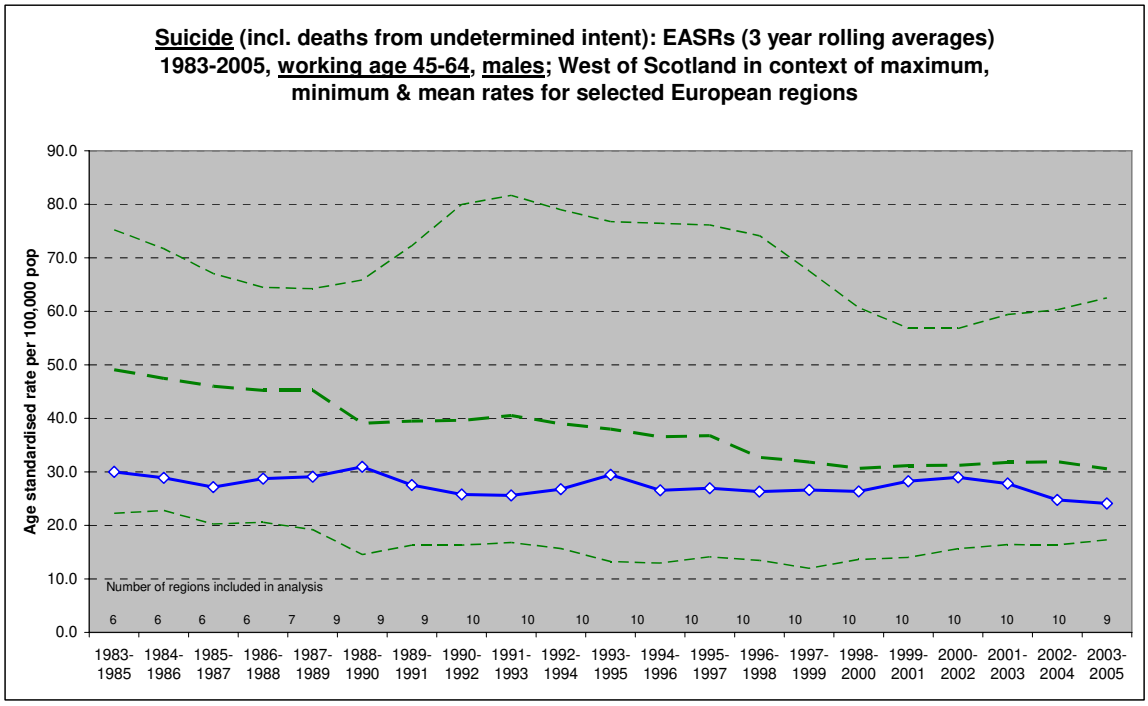
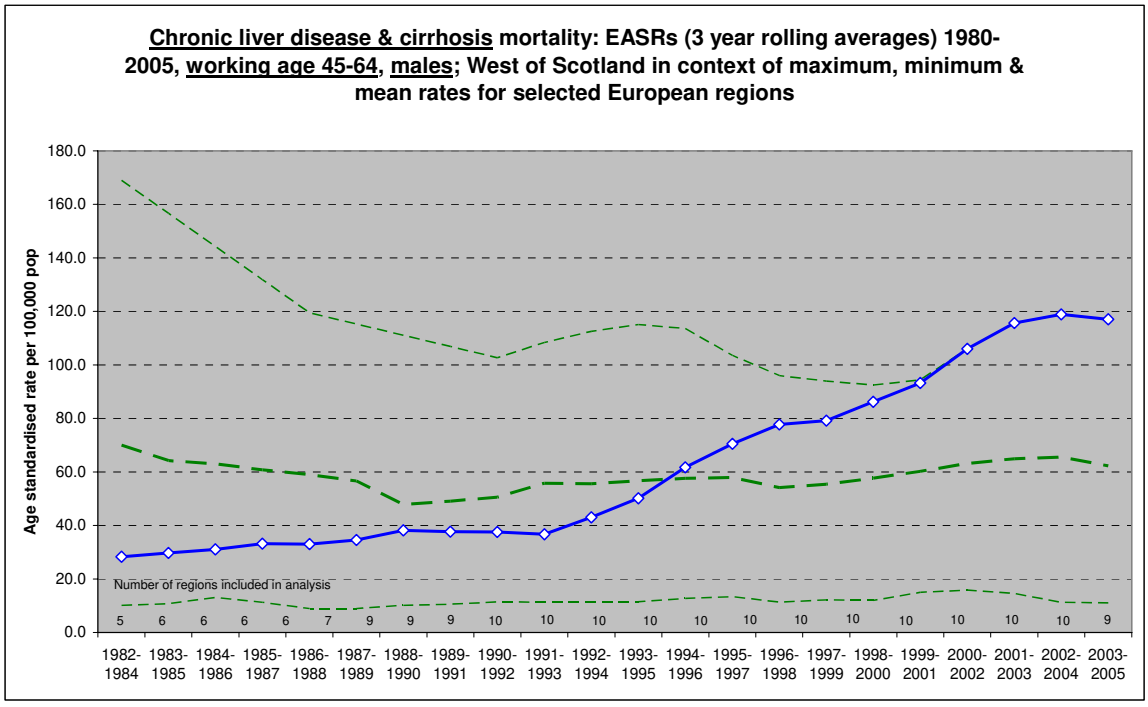


Figure 3.24



Elderly (65+)

All-cause deaths among the elderly WoS population are higher, but only slightly higher, than the European regional average. This is shown in Figure 3.25 (males) and Figure 3.26 (females).

Figure 3.25

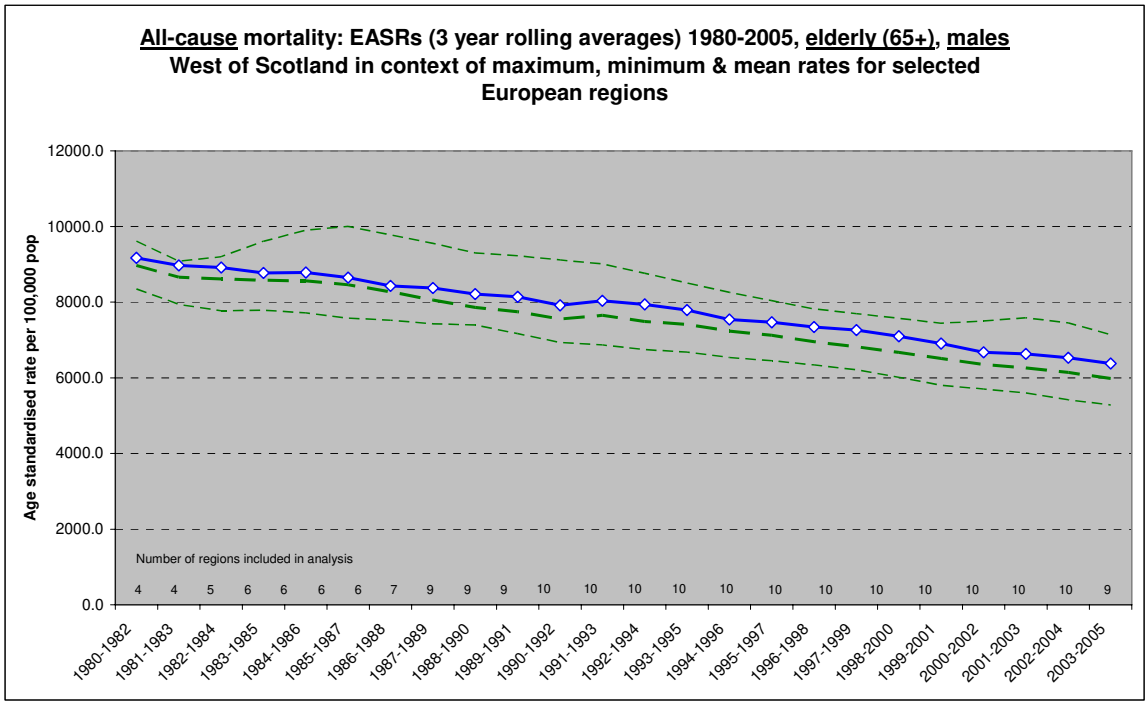
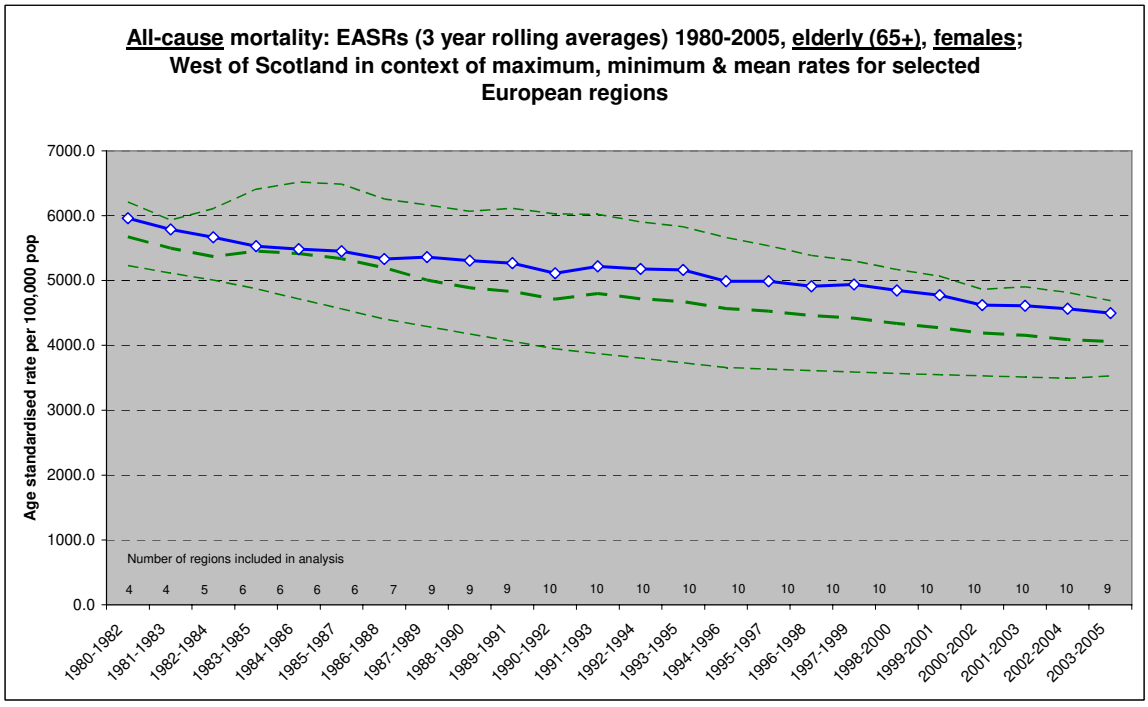


Figure 3.26



There are, however, a number of specific causes where markedly different trends can be observed. For example: cancers, IHD, COPD, chronic liver disease and cirrhosis (all much higher); and suicide (lower). And while the gap between the WoS rates and the regional average is narrowing for causes such as IHD and stroke, as well as for male lung cancer deaths, for others it is widening e.g. oesophageal cancer (males and females), most cancers among females, and COPD among both sexes.

Some examples of these trends are presented below. Figures 3.27 and 3.28, showing the contrasting trends for rates of lung cancer among WoS males and females respectively, are included to highlight the smoking 'cohort effect' commented on by Leon and others: these differing trends reflect the different points in time at which men (earlier) and women (later) took up smoking in Scotland. Unsurprisingly, similar patterns are seen in the trends from death from COPD.

Figure 3.27

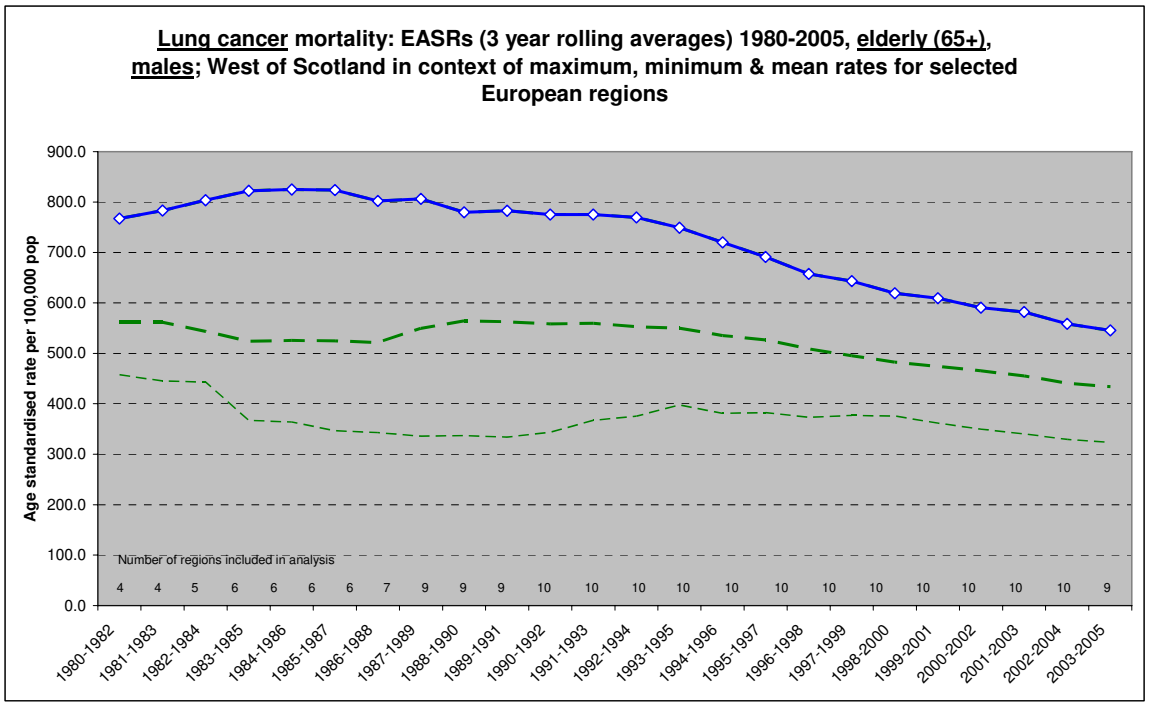
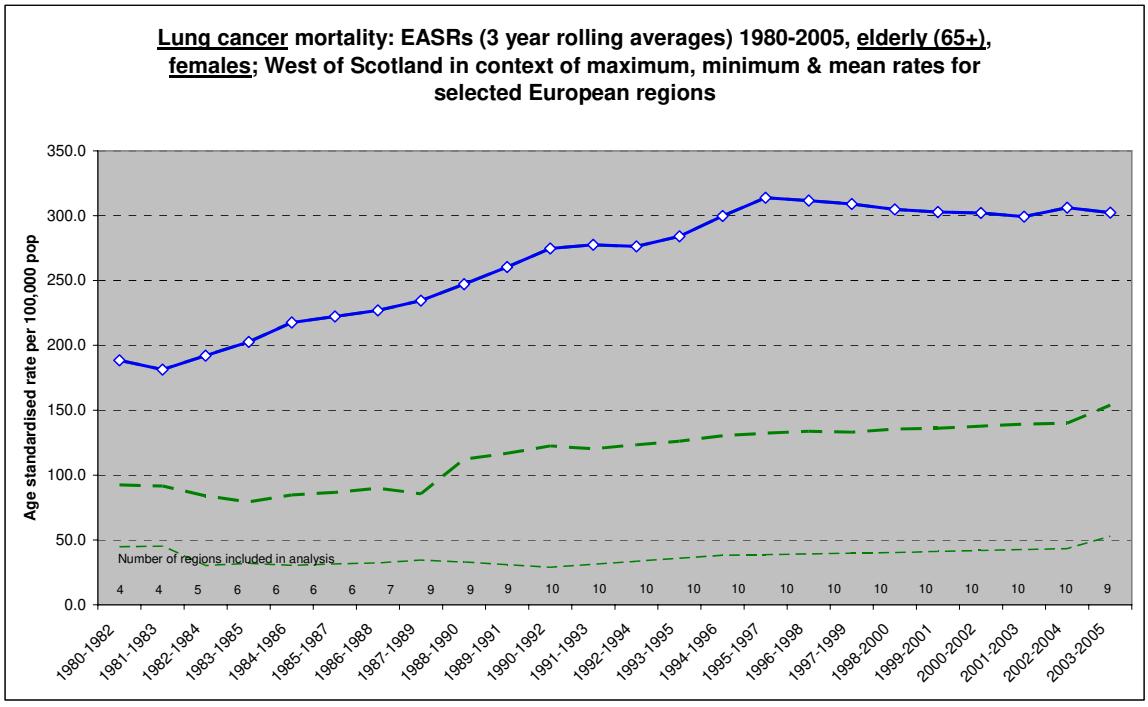


Figure 3.28



The striking differences between the WoS and the other European regional rates at this age for deaths from oesophageal cancer and chronic liver disease and cirrhosis (both causes linked to alcohol consumption) are also worth highlighting. These are shown in figures 3.29-3.32.

Figure 3.29

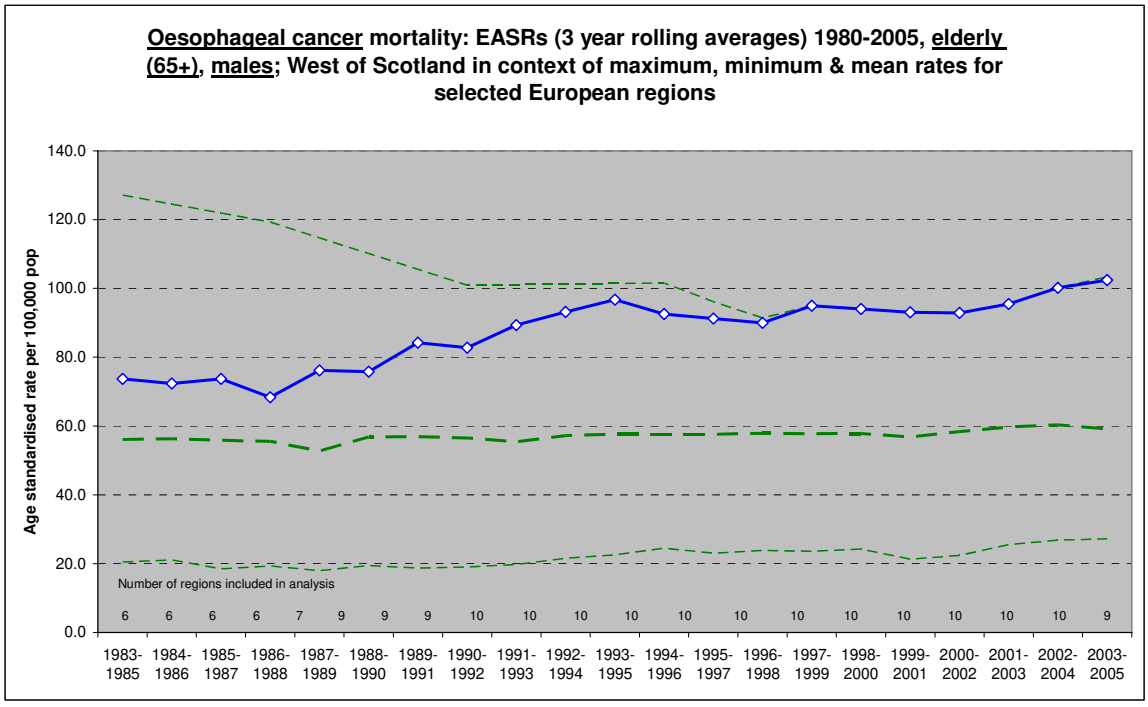


Figure 3.30

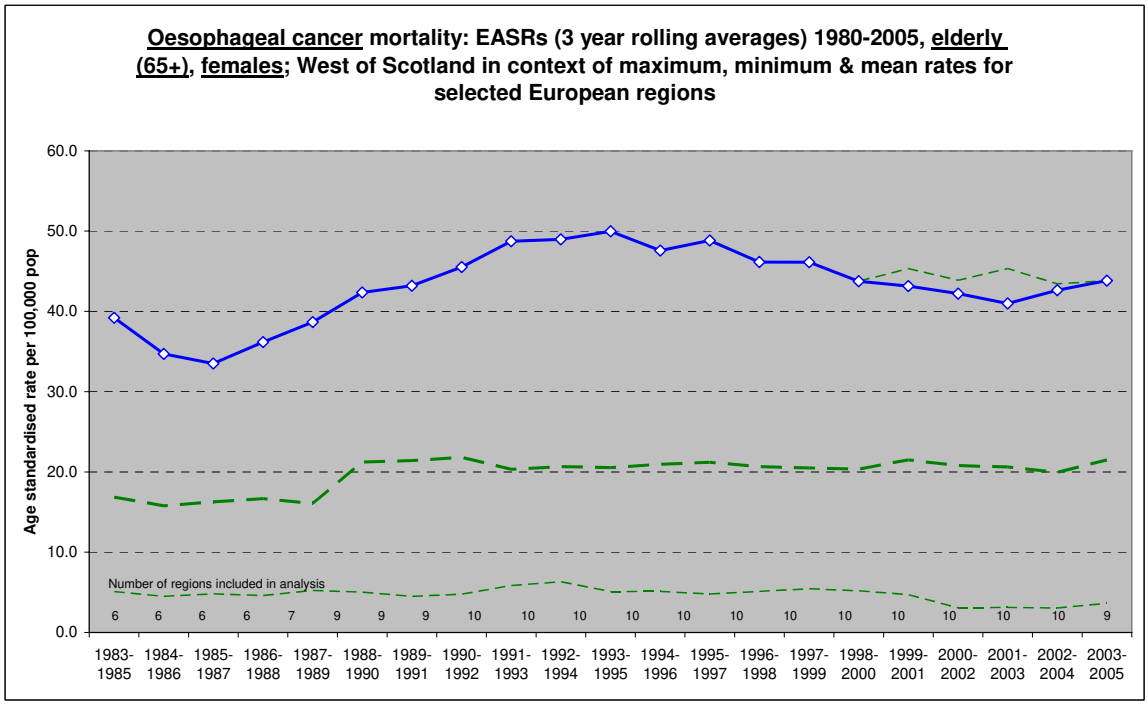


Figure 3.31

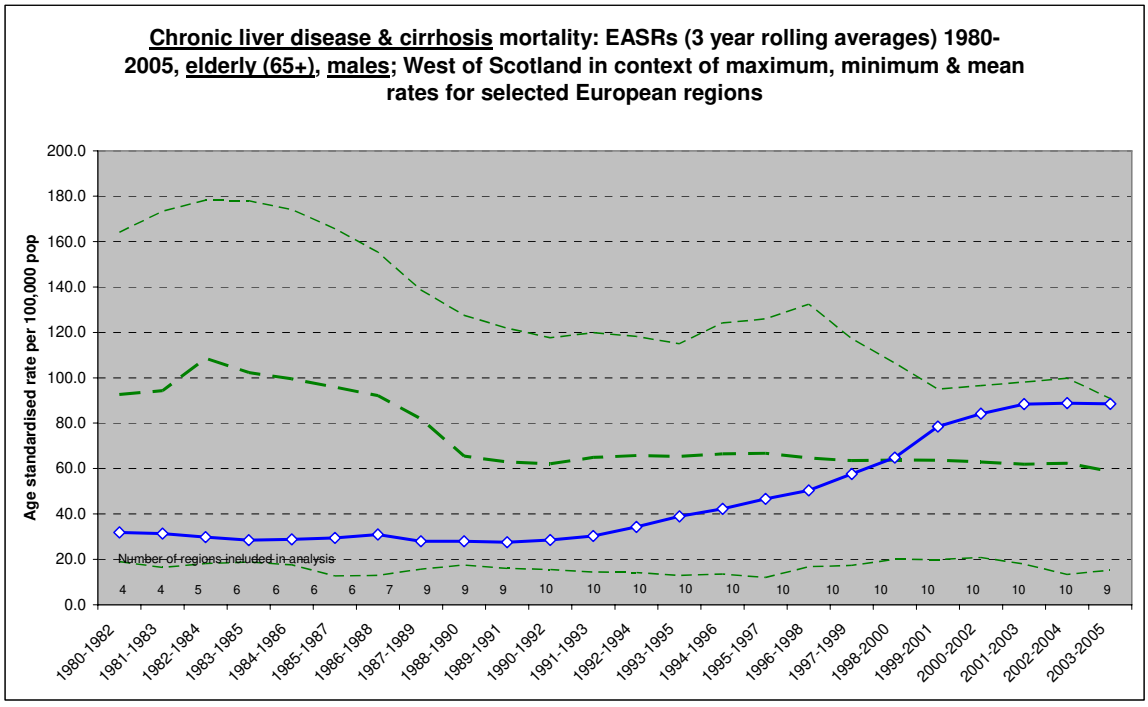
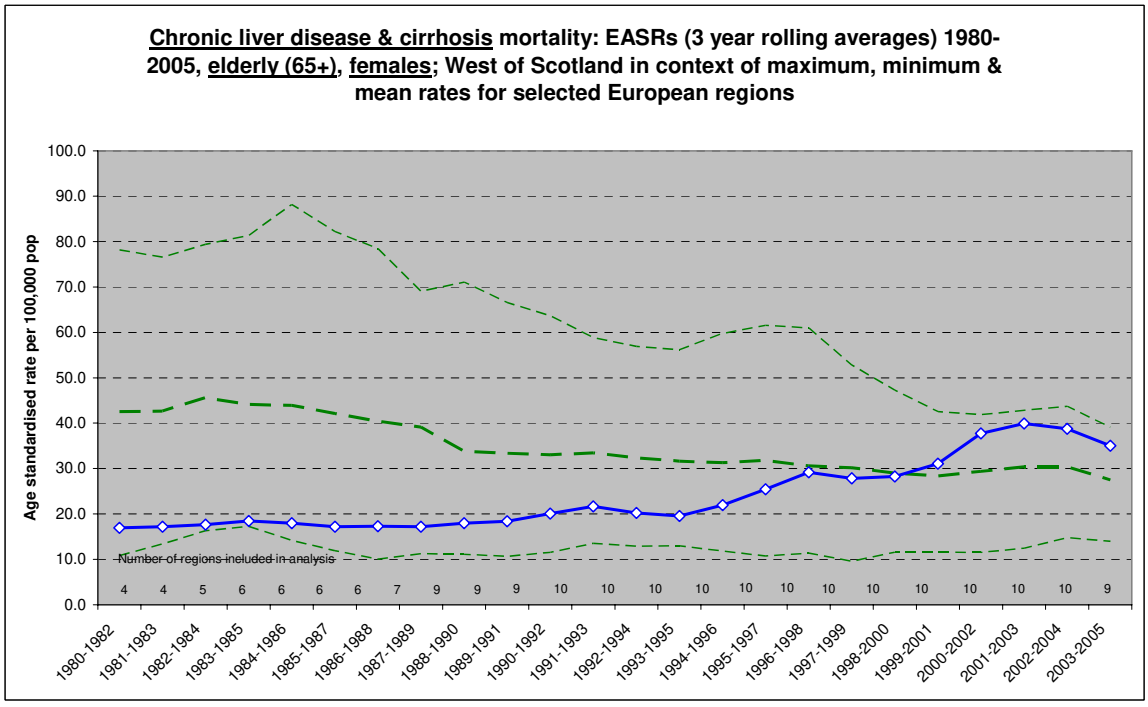


Figure 3.32



Chronic liver disease and cirrhosis

The dramatic upward trend in mortality in the WoS from chronic liver disease and cirrhosis, as highlighted above in all three of the adult age groups, is worthy of further comment. The increase in alcohol related deaths generally in Scotland has been the focus of a great deal of attention in recent times[56, 57, 58, 59, 60]. However, what is of particular interest here is the contrast with other regions. Broadening the analysis to *all ages* over the whole 20-25 year period, mortality rates from this cause have either fallen, or remained unchanged, in virtually every continental (i.e. non-UK) region for which we have comparable data. The exception is Saxony where, having risen prior to 1989, rates have fallen consistently since the start of the 1990s. This is in sharp contrast to the UK, where an increase in rates has been seen in Northern Ireland and in the English and Welsh regions – and to the greatest extent in the West of Scotland.

This general picture also holds true for the three individual adult age groups presented above with two exceptions: in Katowice in Poland mortality rates from this cause have increased among both males and females in the 15-44 age group, and there has been a slight rise among 45-64 females. There have also been slight increases among 45-64 year-old males and females in Northern Moravia in the Czech Republic. In both cases, however, both the rates and levels of increase are dwarfed by the comparable rates and increases seen in the West of Scotland. Appendix 8 presents region-specific analyses for all ages (region *and age* specific rates are available on request).

It should also be borne in mind that this particular cause of death does not represent the full extent of alcohol related harm. This is discussed in more detail in the next section when we examine the contribution of the various causes of death to the overall excess mortality experienced in the West of Scotland.

3.3 Assessing the contribution of individual causes of death

This section attempts to *quantify* the contributions of individual causes of death to the higher overall levels of mortality experienced by West of Scotland males and females in relation to other regions. Specifically we ask the question: what change to levels of *cause-specific* mortality would be required for the West of Scotland to achieve the same level of *total* mortality as the best performing post-industrial regions? The answers to this question are quantified in terms of two very simple measures: absolute numbers of deaths and standardised mortality ratios (SMRs).

Based on the most recent mortality data available, Northern Ireland and Saxony have the highest female life expectancy of the 10 regions, and the highest male life expectancy with the exception of Limburg. Thus, these two areas were chosen as the two 'best performing' comparator areas for the analysis[xxxii]. Note, however, that for the sake of clarity results are presented here for Northern Ireland alone. Results from identical analyses for Saxony are available in Appendices 5 and 6.

Methodological note

By applying the age and sex specific mortality rates of Northern Ireland to the West of Scotland population, we can obtain the numbers of deaths we would expect to see if the West of Scotland experienced the same proportional levels of mortality for these causes as is seen in Northern Ireland. We can then compare these 'expected' figures with the actual numbers of deaths both in absolute terms for each cause, and also – by dividing the total 'observed' deaths for all ages by the equivalent 'expected' figures – expressed as standardised mortality ratios (SMRs).

[xxxii] Note that, in addition, data for a lesser number of years were available for Limburg, strengthening the selection of Saxony and N. Ireland. Note also that an alternative way of measuring the excess mortality experienced in the West of Scotland would be to compare the Scottish region's rates with the average rates presented in the previous section. However, it was felt that this would be a more abstract comparison than using actual data from two relevant regions. Furthermore, these two areas offer useful east/west and UK/non-UK levels of comparison.

These calculations were carried out for the West of Scotland in relation to Northern Ireland for three separate periods: 1983-1985, 1993-1995 and 2003-2005. SMRs were also calculated for four different age groupings: all ages, 0-64 (shown here), 15-44 and 45-64.

Absolute numbers of deaths

Table 3.1 shows the difference between the actual numbers of deaths which took place in the West of Scotland between 2003 and 2005 and the 'expected' numbers that would have occurred if the West of Scotland had experienced the same age, sex and cause specific levels of mortality as Northern Ireland over the three year period. Note that the numbers are shown as annual averages. Green represents a decrease, and red an increase.

Table 3.1

Comparison of mortality between N. Ireland and West of Scotland, 2003-2005
Difference between actual and 'expected' deaths ('expected' from application of N. Ireland age-specific rates to WoS population)
Numbers of average annual deaths (green = decrease; red = increase)

	Age group	ALL CAUSE	All Malignant neoplasms	Diseases of circulatory system	COPD & related conditions	All external causes	Suicide (including undetermined intent)	Motor vehicle traffic accidents	External excl. MVTAs & suicide	Chronic liver disease & cirrhosis	ALL OTHER
MALE	0-4	-2	0	0	0	1	0	2	0	0	-3
	5-9	3	-1	0	0	1	0	0	1	0	3
	10-14	1	-1	-1	0	2	1	1	1	0	1
	15-19	2	0	0	0	6	2	9	-5	0	-4
	20-24	-7	1	0	0	8	-7	18	-3	-1	-16
	25-29	-20	-1	-3	0	5	-5	8	2	-2	-20
	30-34	-66	-4	-5	-1	-9	-15	6	0	-7	-40
	35-39	-76	-3	-8	0	-16	-19	3	1	-16	-32
	40-44	-95	-1	-15	-1	-15	-8	-1	-7	-28	-35
	45-49	-110	-8	-31	-2	3	-1	4	-1	-48	-23
	50-54	-152	-26	-48	-7	1	-2	1	2	-48	-23
	55-59	-216	-31	-84	-7	-2	-6	4	0	-54	-38
	60-64	-343	-101	-100	-20	-9	-2	3	-10	-54	-59
	65-69	-446	-163	-157	-23	-11	-3	0	-9	-38	-53
	70-74	-360	-105	-146	-5	-7	-5	3	-5	-28	-69
	75-79	-342	-111	-102	-42	-5	-4	2	-4	-14	-69
	80-84	-234	-87	-91	-11	-12	-1	0	-10	-7	-27
	85+	-112	-40	-57	-11	1	-1	1	1	2	-6
	TOTAL	-2573	-683	-848	-129	-59	-77	63	-45	-340	-513
FEMALE	0-4	-7	-2	-1	0	1	0	0	0	0	-5
	5-9	4	1	0	1	2	0	1	1	0	0
	10-14	0	-1	0	0	1	0	1	1	0	0
	15-19	-8	0	-1	0	-4	-4	1	-2	0	-3
	20-24	-2	-2	1	0	2	-3	5	0	0	-4
	25-29	-7	0	1	0	-1	-2	2	-1	-2	-5
	30-34	-23	-6	-2	0	0	-2	3	-1	-5	-9
	35-39	-32	1	-2	1	-6	-7	1	0	-6	-19
	40-44	-21	-2	-6	0	-2	-5	1	1	-12	1
	45-49	-55	-7	-13	1	-3	-5	-1	2	-21	-10
	50-54	-85	-21	-16	-4	-5	-6	1	0	-24	-15
	55-59	-143	-56	-19	-11	-3	-2	0	-1	-20	-33
	60-64	-227	-65	-73	-24	1	-2	1	2	-27	-38
	65-69	-282	-81	-110	-38	2	-2	1	2	-11	-44
	70-74	-328	-88	-118	-56	-6	-1	1	-6	-9	-50
	75-79	-427	-119	-129	-75	-6	0	-3	-4	-5	-93
	80-84	-388	-116	-147	-52	-9	-2	2	-9	-1	-64
	85+	-246	-18	-161	-24	-10	-1	-1	-8	-1	-33
	TOTAL	-2276	-583	-796	-282	-48	-45	17	-21	-142	-424

What this Table shows is that if the WoS had experienced Northern Ireland's level of mortality between 2003 and 2005, in total it would have resulted in an average of almost 5,000 fewer deaths per year over the three year period. In terms of the individual causes of death, we note that:

- All cancers account for around a quarter of the total difference – 1,266 deaths in all (683 males and 583 females).
- Diseases of the circulatory system account for an even greater share – around one third (more than 1,600 deaths out of the near 5,000 total).
- Chronic liver disease and cirrhosis account for a total difference of almost 500 deaths; however, among the under 65s, this category proportionally accounts for more than one in five of the total number (372 out of a total of 1,683 for this age group), and the Table also clearly shows which age groups experience the greatest differences i.e. 35-74 for men, and 40-69 for women.
- Another 'age cluster' is clearly evident for male suicides, with around 70% of the total difference seen in ages 20-44.
- Despite the country's overall lower mortality rates between 2003 and 2005, in fact Northern Ireland's death rates from motor vehicle traffic accidents were actually higher than those of the West of Scotland – thus, applying the rates for that particular cause of death results in an increased number of deaths among both males and females.

Importantly, we also note that almost a fifth of the total difference (937 deaths) is accounted for by 'other' causes. An analysis, using West of Scotland mortality data, of what constitutes these 'other' causes is informative. Although among *all ages* the majority of 'other' causes relate to a range of illnesses frequently associated with the elderly (e.g. pneumonia, other respiratory conditions, dementia and related conditions), when we restrict the age grouping to *under 65*, a different picture emerges. The most common 'other' cause of death recorded in the period 2003-2005 for those aged 0-64 was 'mental and behavioural disorders due to the use of alcohol' (>350 deaths, 10% of the total). This highlights the fact that the contribution of chronic liver disease and cirrhosis

to the overall excess mortality experienced by the West of Scotland compared to Northern Ireland (and probably elsewhere) considerably underestimates the contribution of alcohol related harm as a whole.

It should also be noted that among the 'other causes' recorded for West of Scotland deaths under 65, the second most common cause of death in this age group is 'mental and behavioural disorders due to use of opioids' (>320 deaths, 9% of total). This is also clearly relevant to the earlier discussion of what lies behind the increased mortality rates among young men in Scotland.

Comparison with Saxony

Comparison with Saxony's mortality rates in the same period results in a similar overall result i.e. a difference of around 5,000 fewer deaths on average. However, there are some differences in individual causes and age bands which obviously reflect the slightly different mortality pattern seen in Saxony compared to both the West of Scotland and Northern Ireland. The Table summarising these data is presented in Appendix 5.

Standardised mortality ratios (SMRs)

Table 3.2 presents SMRs for West of Scotland males and females aged 0-64 in relation to Northern Ireland for the periods 1983-85, 1993-95 and 2003-2005. This highlights the following:

- Among males, the excess all-cause mortality experienced by the WoS in comparison to Northern Ireland has increased over the three periods from 13% in 1983-85, to 32% in 1993-95 and to 47% in 2003-05. This reflects the widening gap seen in both life expectancy estimates (see Figure 2.39 in Part Two) and all-cause mortality trends (see Appendix 8e) between Northern Ireland and the West of Scotland.
- The equivalent figures for females are: 24%, 25% and 42%.
- By far the biggest differences are seen in the SMRs for chronic liver disease and cirrhosis: in 2003-05 the SMR for the West of Scotland compared to Northern Ireland was 312 for males and 301 for females. In other words mortality rates for

this cause were more than three times higher in the West of Scotland than Northern Ireland.

- However, as mortality rates for the above cause fell slightly in the most recent 2-3 years, SMRs in 2003-05 are slightly lower than the equivalent figures in 1993-95.
- SMRs for suicide among both males and females are also striking. Among males suicide deaths were 43% higher in the WoS compared to Northern Ireland in 2003-05, and for females the equivalent figure was 86%.
- The widening levels of excess mortality for 'all other causes' are also notable, rising – for males – from 11% in the first period to 62% in the third. The equivalent figures for females are 20% and 45%. These findings reinforce the points made in the earlier discussion in this section, concerning the likely impact of additional alcohol and drugs related mortality in the younger age groups.

Table 3.2

Standardised mortality ratios (SMRs), age 0-64, for West of Scotland relative to Northern Ireland, 1983-85, 1993-95, 2003-05

		1983-1985	1993-1995	2003-2005
		SMR (95% confidence intervals)	SMR (95% confidence intervals)	SMR (95% confidence intervals)
MALES	All-cause	**113.2** (111.3 - 115.1)	**132.1** (129.6 - 134.5)	**146.8** (144 - 149.7)
	All malignant neoplasms	**124.3** (120.2 - 128.4)	**131.8** (127.2 - 136.5)	**126.9** (121.9 - 131.9)
	Diseases of circulatory system	**112.9** (110.1 - 115.7)	**129.6** (125.7 - 133.5)	**148.4** (142.8 - 154)
	COPD & related conditions	**125.0** (114.3 - 135.8)	**106.6** (93.8 - 119.3)	**177.3** (155.8 - 198.9)
	All external causes	**87.1** (82.8 - 91.5)	**99.7** (94.6 - 104.7)	**106.1** (100.3 - 111.9)
	Suicide & undetermined intent	**131.5** (120.4 - 142.7)	**184.3** (171.1 - 197.5)	**142.6** (131.4 - 153.8)
	Motor vehicle traffic accidents	**83.5** (75.7 - 91.3)	**74.3** (64.8 - 83.9)	**52.0** (44.5 - 59.5)
	External excl. MVTAs & suicide	**68.6** (63.1 - 74.1)	**65.8** (60.1 - 71.5)	**113.6** (103.3 - 123.8)
	Chronic liver disease & cirrhosis	**279.2** (245.9 - 312.5)	**416.9** (378.1 - 455.7)	**311.7** (293.5 - 329.9)
	All other causes	**110.8** (105.9 - 115.7)	**158.1** (151.2 - 165)	**162.2** (155.5 - 168.9)
FEMALES	All-cause	**124.3** (121.7 - 126.9)	**125.5** (122.5 - 128.4)	**141.9** (138.3 - 145.4)
	All malignant neoplasms	**122.4** (118.2 - 126.6)	**113.6** (109.4 - 117.9)	**125.0** (120 - 130)
	Diseases of circulatory system	**124.8** (120.3 - 129.3)	**136.9** (130.9 - 143)	**151.3** (142.6 - 160)
	COPD & related conditions	**154.5** (139.4 - 169.7)	**119.8** (105.3 - 134.4)	**186.1** (162.6 - 209.6)
	All external causes	**107.7** (99 - 116.4)	**112.5** (102.4 - 122.6)	**114.4** (103.8 - 125.1)
	Suicide & undetermined intent	**108.9** (94.4 - 123.4)	**179.9** (156.9 - 202.8)	**185.7** (163 - 208.4)
	Motor vehicle traffic accidents	**81.7** (67.8 - 95.6)	**73.7** (57.9 - 89.6)	**52.8** (39.2 - 66.4)
	External excl. MVTAs & suicide	**128.9** (112.6 - 145.1)	**88.1** (74.5 - 101.8)	**92.5** (76.6 - 108.4)
	Chronic liver disease & cirrhosis	**267.7** (231.5 - 303.9)	**326.4** (285.4 - 367.5)	**301.3** (275.5 - 327.2)
	All other causes	**119.6** (113.7 - 125.5)	**129.3** (122.4 - 136.2)	**144.6** (137 - 152.3)

Appendix 6 presents the parallel data for Saxony.

In the final part of this report we examine the implications of some of the above findings, and discuss possible explanations for the poorer, and relatively worsening, health profile of the West of Scotland in relation to these other comparable European regions.

Summary of Part Three

A detailed examination of sex, age and cause specific mortality trends between the West of Scotland and the 10 other post-industrial regions highlighted a number of important issues:

- The higher levels of mortality experienced in the West of Scotland compared to elsewhere appear to be driven especially by rising levels of mortality in the 15-44 age group (especially among men) and significantly higher rates among middle-aged (45-64) females.

- The pattern of rising male and, to a lesser extent, female mortality rates in the 15-44 age group is in sharp contrast to the experience of the other regions. In the majority of regions rates in this age band have, as with all other age groups, fallen consistently over time.

- The increases in WoS mortality rates in the 15-44 age band are driven especially by 'external causes' (in particular, suicide) and chronic liver disease and cirrhosis.

- The striking contrasts in trends in mortality from chronic liver disease and cirrhosis between the WoS and other post-industrial regions are seen in both sexes and across all adult age bands: 15-44, 45-64 and 65+. In contrast, the higher levels of suicide in the WoS are seen only in the 15-44 age group.

- With regard to liver disease and cirrhosis, there is a clear UK: non-UK split in the pattern of mortality trends, with rates rising in the UK (and most strikingly in the West of Scotland), but falling or remaining constant in the regions on the continent.

- The higher level of mortality among 45-64 year-old women in the WoS seems to be particularly attributable to: cancer (especially lung cancer, breast cancer and oesophageal cancer); IHD and stroke; COPD; and, yet again, chronic liver disease and cirrhosis.

- More detailed comparison of mortality rates between the West of Scotland and the two 'best' regions included in the analysis – Northern Ireland and Saxony – showed that, on average, the West of Scotland would have around 5,000 fewer deaths per year if it experienced the same mortality profile as these two other post-industrial European areas.

- When restricting the above comparison with Northern Ireland to ages 0-64, it is estimated that 1,684 fewer deaths per year would be experienced in the West of Scotland, and more than one in five (372) of those would be attributable to the difference in mortality from chronic liver disease and cirrhosis. This particular cause, however, does not fully reflect all alcohol related mortality.

PART FOUR:
WHY IS THE WEST OF SCOTLAND'S HEALTH LAGGING BEHIND SIMILAR POST-INDUSTRIAL EUROPEAN REGIONS?

Introduction

This report shows that the health of comparable, post-industrial regions elsewhere in Europe is improving at a faster rate than that of Scotland and, especially, the West of Scotland. These regions are effectively leaving, or beginning to leave, Scotland and the West of Scotland behind. What follows in this section is the presentation and initial testing of a range of hypotheses to explain this key finding. Clearly these hypotheses are not mutually exclusive, but they are presented independently for the sake of greater clarity.

1. The trends are influenced by data selection or by the quality of data available

A number of data selection and data quality issues have to be borne in mind when interpreting these results: Scotland's poor performance may not be real, but an artefact of how we have selected data, or of its quality.

First, the geographical definitions used in the report are clearly influential. Mortality rates – and other health outcome data – will vary depending on the choice of geography: large region, smaller region, urban areas, local districts. This is as true for the West of Scotland as it will be for the other regions. We must be aware, therefore, that different pictures can emerge depending on the definitions of regions that are used.

That said, we can still be confident that the conclusions about Scotland's performance are robust because they apply consistently (albeit to a different degree) across a wide range of geographies (Scotland, West of Scotland, Greater Glasgow), and comparisons are being made with a large number of conventionally defined regions widely dispersed throughout the rest of Europe.

One might also ask whether life expectancy is the most appropriate measure to employ. Of course, health is about more than life expectancy: other factors are important and we intend to explore these in future research. However, the purpose of this initial analysis was to carry out comparisons of trends in *mortality* across the regions, and in that sense, life expectancy – calculated from mortality and population data in each region – is a valid

measure to use. Note also that the general trends in life expectancy presented in Part Two are, as would be expected, mirrored by the all-cause age-standardised mortality rates included in Appendix 8.

Clearly, however, the accuracy of the mortality analyses presented in this report can only be as good as the accuracy and quality of the available data. We assume compatibility in the data gathered from different parts of Europe, but an in-depth analysis into the veracity of that assumption is outwith the limits of this project. That said, the data obtained by this project have been published in a variety of WHO and EU reports, either at a regional level or as part of national comparisons. Furthermore, the majority of our selected regions lie within countries included in a EU 2001 survey of the "Comparability and quality improvement of European causes of death statistics"[61] which generally found coding practices in the different countries to be of a sufficiently acceptable and robust nature: two-thirds of experts thought their mortality data were reliable, and there was broad agreement about completeness, although some countries (Belgium, Netherlands, France) raised issues about data quality. The report did, however, urge caution in interpreting suicide data, although a more recent assessment of suicide information claimed that "despite limitations, the total epidemiological picture seems to be reliable, and international suicide rates can be compared over time" [62].

Moreover, a 2005 report into the quality of cause of death recording practices around the globe[63] grouped 106 WHO member states into 'high', 'medium' and 'low' quality of recorded cause of death information, based on a combination of overall coverage/completeness, and "use of coding categories for unknown and ill-defined causes". The majority of the countries included in this report were grouped in the 'medium' category, with the exceptions being the UK (high) and Poland (low). Poland is categorised as such not on the basis of completeness or coverage (achieving 100% in both cases), but because it exceeds the cut-off point for the proportion of deaths coded as unknown/ill-defined. It is possible, therefore, that this might affect some of the trends presented to an extent, and is possibly particularly relevant to the inclusion of "undetermined intent" alongside suicide in our analyses. However, additional analysis of

rates of suicide alone (excluding undetermined intent) between the West of Scotland and Katowice generally showed the same overall pattern as was seen for suicide *and* undetermined intent. It is also notable than an analysis of Polish mortality trends over the latter half of the 20th century pointed to consistently high levels of both completeness and quality of cause of death recording over the period.

In summary, while recording practices in different countries and regions are an important issue, and one that should be borne in mind in interpreting trends, overall it seems unlikely that this would detract from, or help to explain, the general conclusions presented in this report.

2. The trends are influenced by a 'cohort' effect

A brief analysis was undertaken to investigate whether any of the overall mortality trends for the WoS relative to the other regions seemed to be driven by a particular 'age cohort'.

Methodological note

Here we do not define 'cohort' in the normal sense of one group of individuals followed over time, but rather as *deaths by age* followed over time. In other words deaths at age *x* at the start of the 1980s are analysed in combination with deaths at age *x* +10 at the start of the 1990s, and age *x* +20 at the start of 2000.

The time period was split into five separate five-year groups: 1981-1985; 1986-1990; 1991-1995; 1996-2000; 2001-2005. Age was grouped into corresponding five-year bands, and defined as 'age at 1981-1985'. Thus, in charts that follow (Figures 4.1 and 4.2) the label 'age 15-19' means age 15-19 at 1981-85, which is also age 20-24 at 1986-90, 25-29 at 1991-2995 etc. This is illustrated in Table 4.1 below.

Table 4.1. All-cause crude mortality rates by 'age cohort', West of Scotland

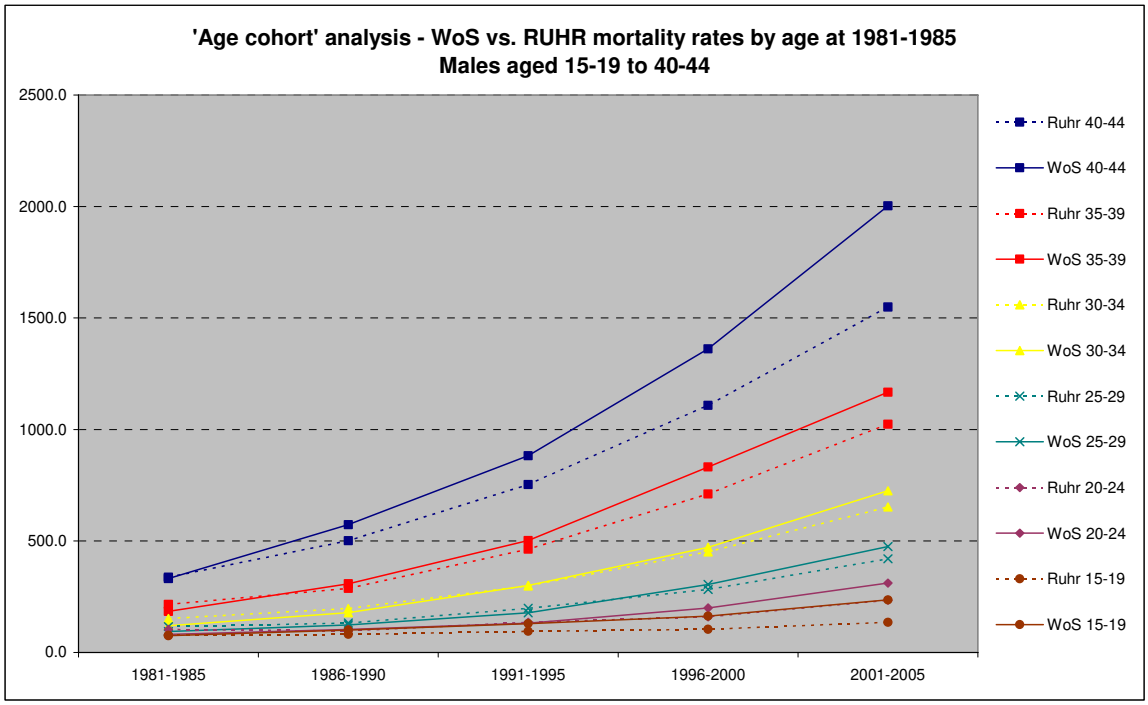
Age (as at 1981-1985)	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005
15-19	75.5	75.4	84.6	87.7	65.5
20-24	81.3	100.3	124.9	138.1	119.2
25-29	93.6	102.7	129.7	154.3	140.0
30-34	119.8	123.1	131.3	163.1	197.1
35-39	184.1	178.5	177.9	199.6	235.5
40-44	331.7	307.4	300.6	304.9	311.4
45-49	612.5	572.9	502.2	471.8	474.7
50-54	1054.1	962.6	882.2	831.5	724.8
55-59	1837.1	1649.6	1438.0	1361.2	1167.1
60-64	2912.3	2695.8	2410.2	2169.6	2003.2
65-69	4443.0	4251.1	3979.0	3464.9	3013.5
70-74	6824.7	6369.5	5912.2	5460.9	4656.8
75-79	10395.3	9577.2	8925.4	8221.4	7259.5
80-84	15158.9	14183.3	13365.3	12488.3	10915.3

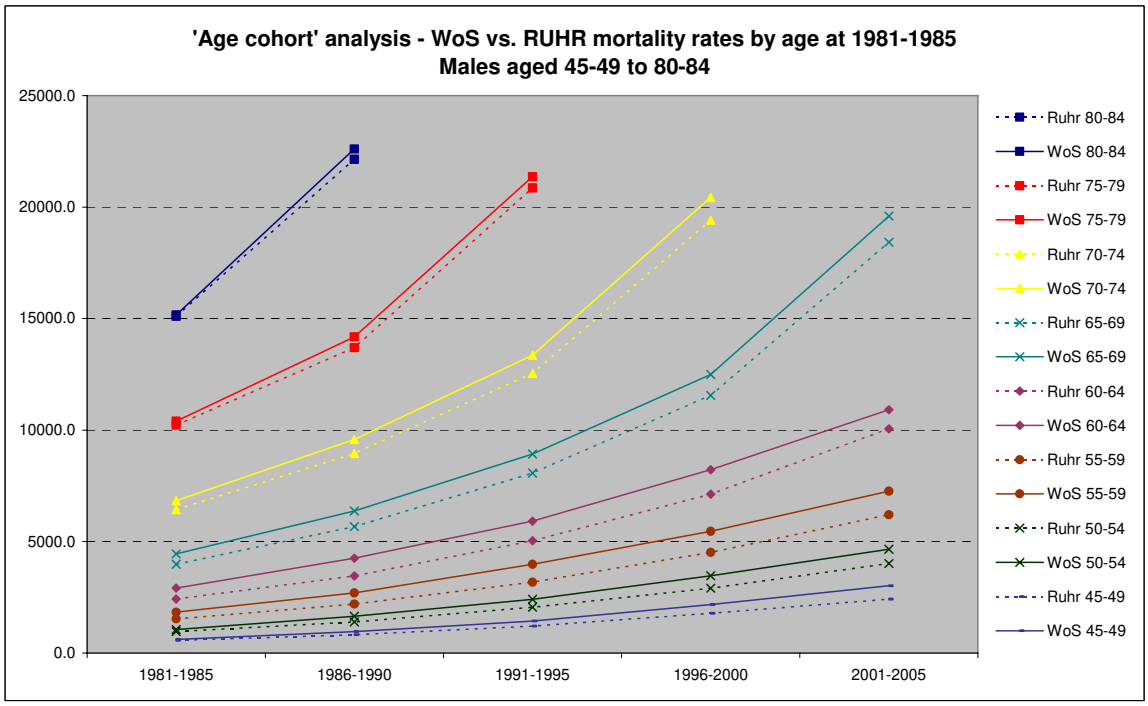
Rates for these 'age cohorts' for the WoS were then compared with those of the equivalent cohorts in a number of regions including Northern Ireland and Saxony (as the two 'best performing' regions – as discussed in Part Three), as well as the Ruhr. This was carried out separately for males and females.

Results

Figures 4.1 and 4.2 summarise the results of the WoS-Ruhr comparisons. For clarity, the results are split over two graphs with a much smaller axis scale on Figure 4.2. Generally, we see that rates in each age cohort are higher in the West of Scotland – as we would expect. However, the difference in rates between the WoS and the Ruhr appear to be fairly consistent across all the 'cohorts'. No particular WoS age cohorts have noticeably higher rates compared to the Ruhr than any other cohorts. The one possible exception is the 40-44 group, where the gap between rates appears to be wider. However the data in Figure 4.2 are presented on a much smaller scale – thus, the differences are magnified presentationally.

Figures 4.1 and 4.2





Results were similar for females, and indeed for the other regions analysed. Taken together, these results suggest that there is no particular 'cohort effect' influencing the mortality trends presented in this report.

3. The trends are influenced by migration

Figures 4.3 and 4.4 show the total population numbers for each of our 10 regions, plus Scotland, the West of Scotland and Greater Glasgow & Clyde (GGC), for males and females respectively.

Figure 4.3

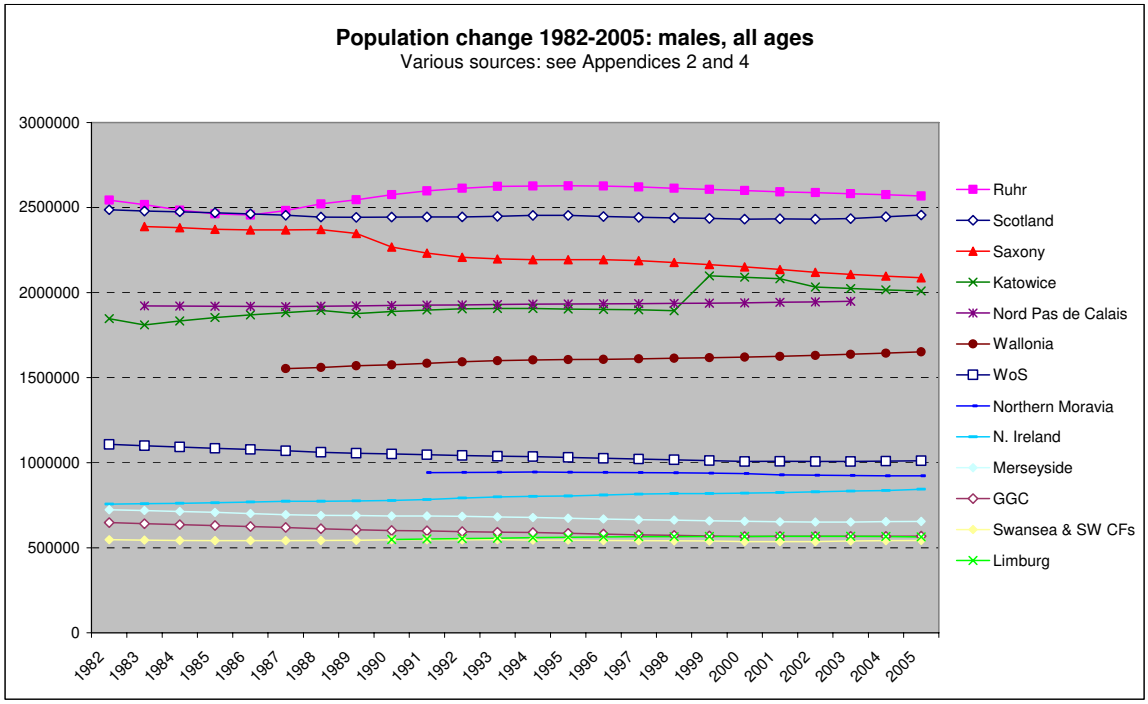
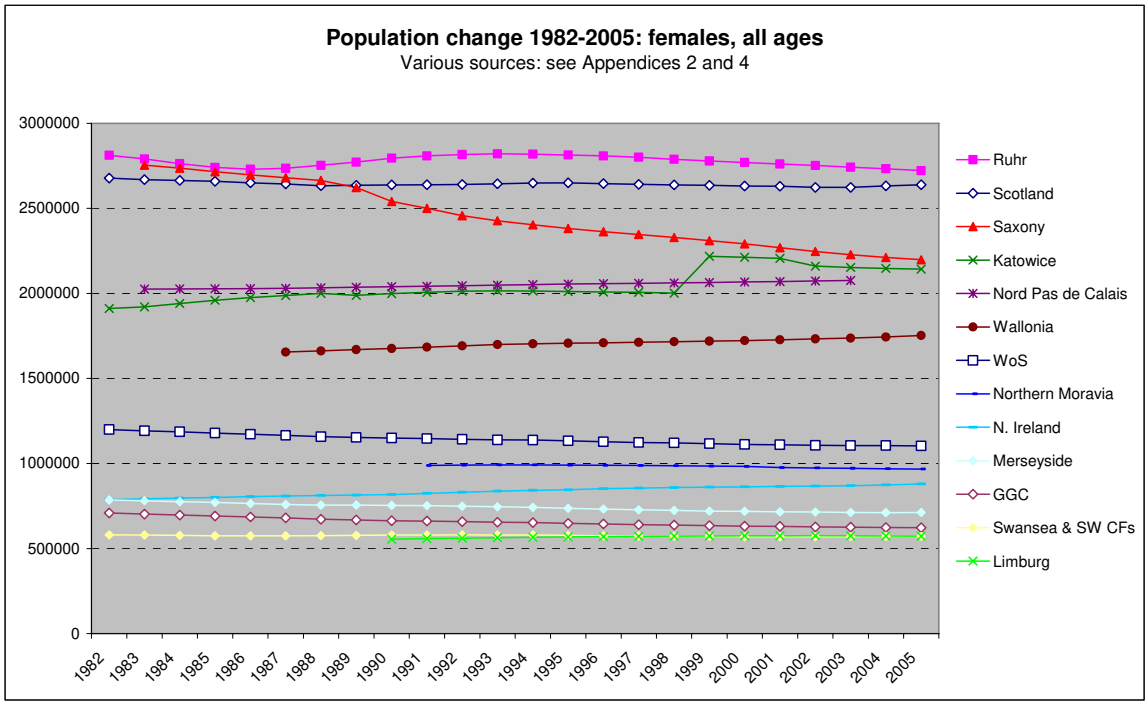


Figure 4.4



A number of important points are worth noting:

- Trends are generally flat across most areas, including all Scotland where the population change between 1982 and 2005 was only around -1%. However, a different story is true of the West of Scotland and Greater Glasgow & Clyde, where the respective figures were approximately -8% and -12% for both males and females.
- A sudden increase (11% in total) in the population of Katowice in Poland occurred between 1998 and 1999. This is an artefact due to a change in administrative boundaries, and does not affect the mortality analysis as deaths increased by a similar proportion at the same time.
- Most notably, decreases in the population of Saxony are visible following the end of communist rule in 1989. The male population fell by around 11% but the female population fell by 17% between 1989 and 2005. Although not shown here, a much larger decrease in the number of children resident in Saxony also occurred over the period – a drop of around 50%.

- The fall in the population of Saxony coincided with a slight increase in the population of the Ruhr area in the west of Germany, although population levels began to fall again around 1994-1996.

It could be argued that the comparatively higher fall in the population of the West of Scotland (and within that, Greater Glasgow & Clyde) might be significant in relation to the mortality trends presented in this report, given recent evidence of the so-called 'healthy migrant' effect [64, 65, 66]. Some support for this position is found in Northern Ireland, where a marked increase in population (approximately 11% for both males and females) took place over the same period as the improvements in population health discussed earlier. However, it is obviously difficult to quantify the potential impact of this phenomenon in either Scotland or Northern Ireland and detailed further research would be required to do so. Furthermore, recently published studies suggest that the effects of selective migration are more likely to be observed at a small area rather than large regional, level[67, 68].

The last two bullet points presented above are also very significant. Despite the caveat regarding regional vs. small area selective migration, a different case could perhaps be made for the former DDR, given the mass migration which has occurred there since the fall of Communism. It could be argued that the Ruhr area may have benefited from a 'healthy migrant' effect, with better educated Germans moving from the East in search of employment. However, the subsequent fall in population from the mid 1990s in the Ruhr suggests this may have been a short-lived effect and a 2006 report on demographic change in Germany[69] suggests that it has been the "economically strong" areas in the West (Bavaria and Baden-Wurttemberg in particular) which are likely to have benefited from any such 'healthy migration' – and specifically not areas such as the Ruhr. This same report points out that 1.5 million people have left East Germany since unification, the majority of which (63%) were women – this is partly attributed to the fact that women in the former DDR were better educated than their male counterparts. This is important because if we accept evidence of 'healthy migration' from East to West Germany, the

improvement in life expectancy in Saxony and Saxony-Anhalt compared to Scotland, as was illustrated in Part Two of this report, is even more surprising.

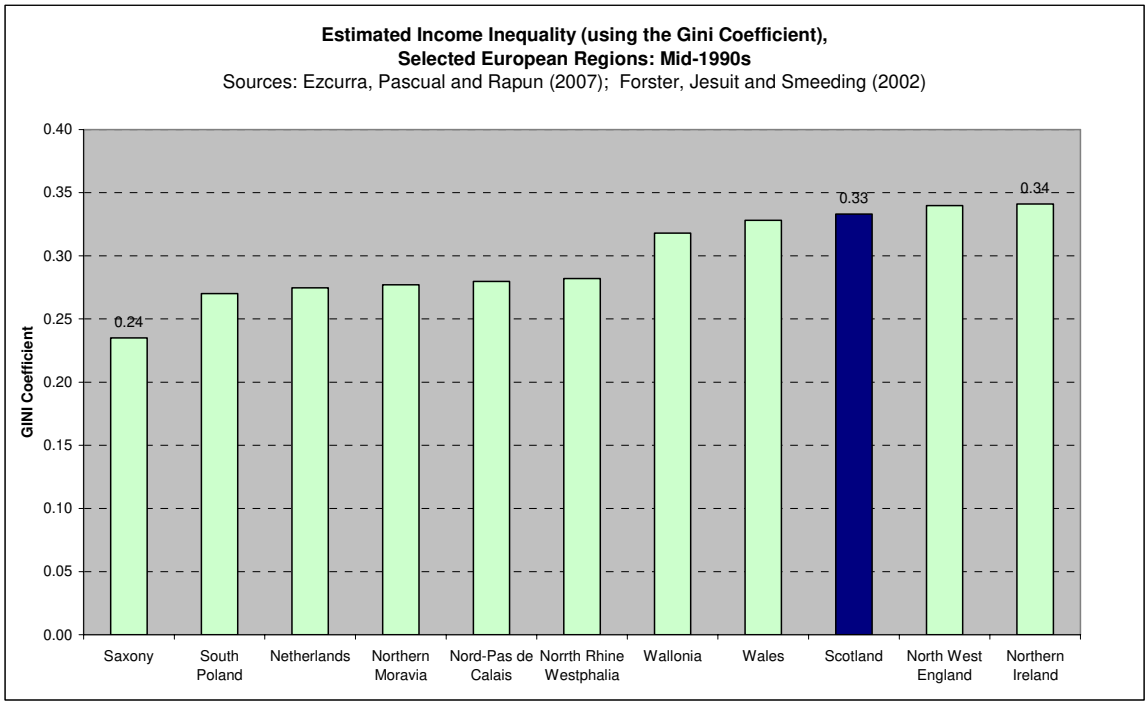
4. The West of Scotland has greater income inequalities than the other regions

There is a great deal of evidence to suggest that countries with higher levels of income inequality experience correspondingly poorer health outcomes at equivalent levels of average wealth[70, 71, 72]. In short, socio-economic inequalities have an independent impact on mortality levels within populations. This observation holds true for States within the USA but there is less certainty about whether the same is true at a regional or more local level. In the context of this report, the lack of certainty about the impact of inequalities within regions on mortality is a handicap. Furthermore, our understanding is restricted by the lack of available data on income inequalities for the European regions used in this analysis. Nonetheless, here we present two relevant measures in an attempt to cast some, if limited, light on the issue. These measures are: the Gini Coefficient, the indicator generally used in analyses of income inequalities at the national level, but which is available only for a few of our regions of interest; and Theil's T statistic which, in contrast, can be calculated for the majority of our regions, but which is here applied to *pay* inequality – a far narrower measure than income inequality.

Figure 4.5 shows Gini Coefficient data from two published sources[73, 74] for 11 relevant European areas in the mid-1990s[xxxiii]. Note that only five regions (Saxony, Northern Moravia, Nord-Pas-de-Calais, Wallonia, Northern Ireland) match the geographical boundaries of our post-industrial regions. The others are a range of national, or larger regional, areas. Despite these limitations, it is useful to obtain a sense of how Scotland compares. On this basis, Scotland appears to have a more unequal income distribution than the French, German, Dutch or Eastern European areas, but one that is similar to Wallonia and other regions of the UK.

[xxxiii] Full details of time periods covered are included in Appendix 2. Note, however, that data for the Eastern European areas all post-date the end of Communist rule in those countries.

Figure 4.5

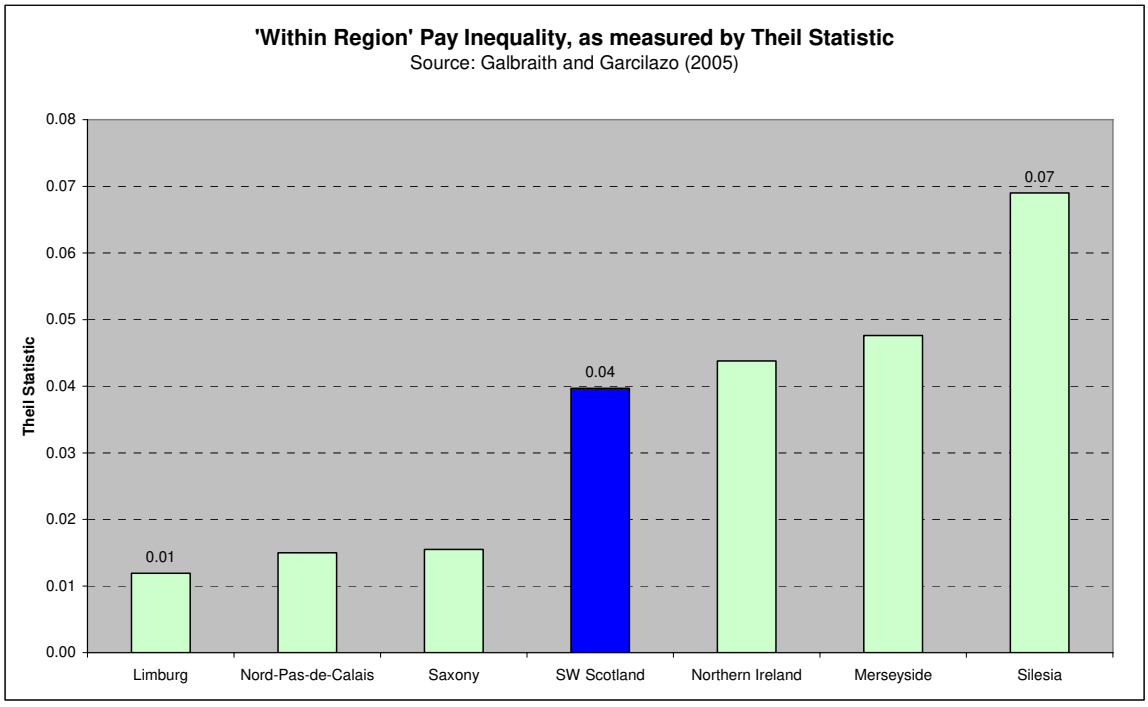


Note also that an attempt was made to check for possible associations between income inequality and mortality at the regional level, but with inconclusive results – again confirming that income inequality has an unclear relationship with mortality rates at a regional level[xxxiv].

A second measure of income related inequality calculated at a European regional (NUTS 2) level is Theil's T statistic. Here it is applied to pay inequality data, as calculated by Galbraith and Garcilazo (2005)[75]. A Theil T-statistic closer to zero indicates greater equality (in this case, pay equality). Figure 4.6 shows the results for regions where data were available, suggesting South Western Scotland is mid-ranked in terms of pay inequality.

[xxxiv] 56 European areas (including Scotland) where industrial employment was >40% in 1968-71 and Gini coefficient data were available were selected for analysis. The association (based on simple linear regression) between income inequalities in the mid 1990s and the standardised mortality rate was significant ($t=3.41$; $p<0.05$), but explained only a small proportion (R square=0.177) of variation in all age mortality.

Figure 4.6



Of course, as stated, pay inequality is a far narrower measure than income inequality. It is unclear what impact pay inequalities will have on people outside the labour market (children and young people, the elderly, the unemployed and those incapacitated by sickness/disability). Nonetheless, as with regional Gini estimates, an attempt was made to check for an association found between levels of pay inequality and health outcomes (as measured by mortality) at a NUTS 2 level. The results were again inconclusive.[xxxv]

In summary, relevant data are limited, but what are available suggests that Scotland's level of income inequality is in the middle to upper range of post-industrial areas. However, clearly better data and more detailed analysis would be required for this to be confirmed. A recommendation for further research, therefore, would be to create a more tightly defined regional version of the Gini coefficient to allow more meaningful

[xxxv] 146 European regions where mortality data and Theil pay inequality data was available for the period 2000/02 were selected for analysis. The association (based on simple linear regression) between pay income inequality and the standardised mortality rate was significant ($t=6.1$; $p<0.05$), but explained only a small proportion (R square=0.206) of variation in all age mortality.

comparisons of income inequality between Scotland, the West of Scotland and other European regions.

5. Health behaviours are worse in the West of Scotland

This is a difficult hypothesis to prove or disprove for two reasons: first, because comparable measurements of heath related behaviours are not available for all regions and, second, because we cannot properly interpret health behaviours in isolation from their social and physical context. For example, high rates of smoking are found in areas of deprivation and it is difficult to be sure which health effects are due directly to smoking and which arise from other aspects of deprivation.

That said, two measures have been examined across our regions and their parent countries: **smoking prevalence** and **alcohol consumption**. Data on adult smoking rates were obtained for 10 regions (including Greater Glasgow but not the West of Scotland), together with national figures for Scotland and the Czech Republic. However, Polish and German data were obtained for regions which include, but are much larger than, our selected post-industrial regions: Southern Poland (which includes Katowice), and North Rhein-Westphalia (which includes the Ruhr) respectively.

The data suggest that among males, smoking prevalence in Greater Glasgow is relatively high, second only to Nord-Pas-de-Calais (Figure 4.7). However, only four percentage points separate eight of the 12 areas. Among females, smoking prevalence in Greater Glasgow and Scotland was higher than in any of the other areas analysed (Figure 4.8). Note, however, that interpretation of both these sets of smoking prevalence data should be undertaken cautiously, given not only the geographical limitations of the data, but also the different sampling and other methodologies (including different age groupings) used in the various surveys.[xxxvi]

[xxxvi] Full details of differences in age definitions etc. are included in Appendix 2

Figure 4.7

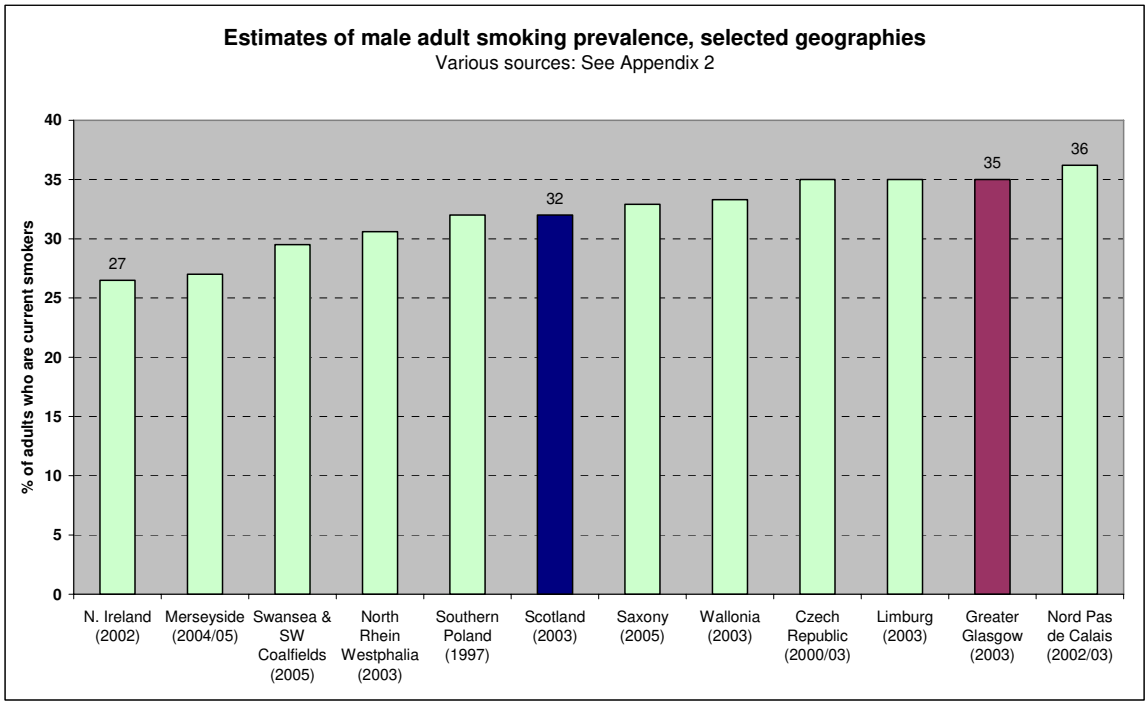
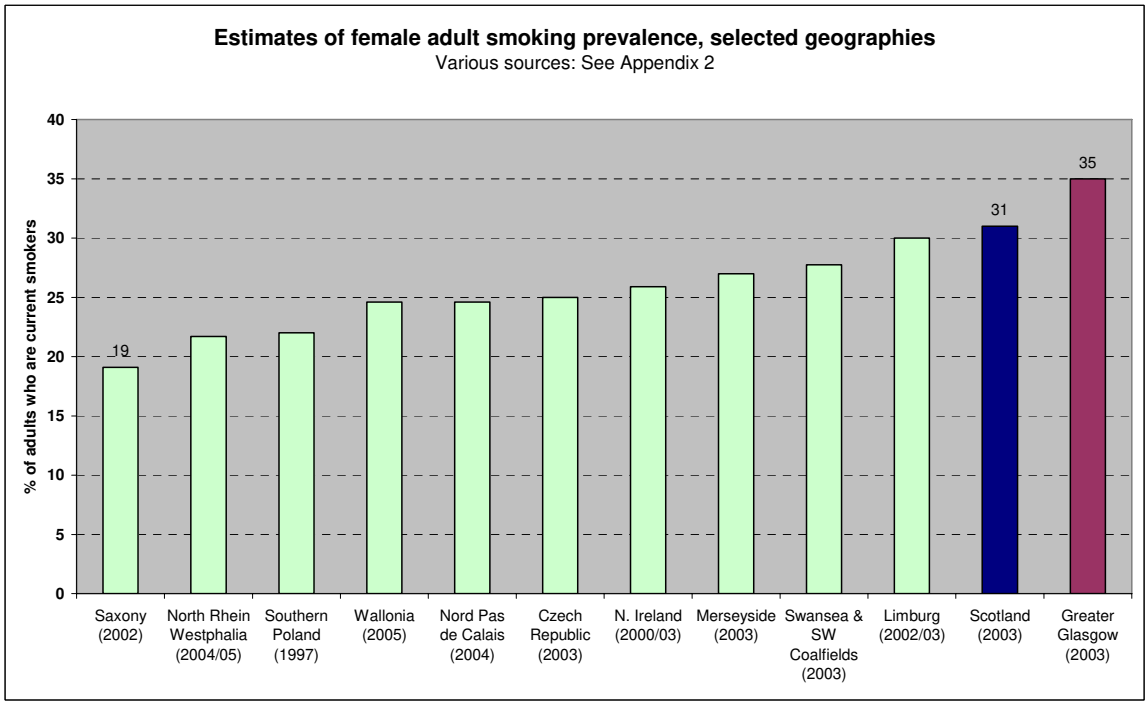


Figure 4.8



Turning to alcohol consumption, comparable sub-regional data on alcohol-related behaviours are difficult to obtain. This is for a number of reasons:

- The Western European regions have published data on alcohol consumption but the measures and thresholds (e.g. for excessive or problem drinking) vary considerably.
- Central and Eastern European health behaviours data are patchy and, where they exist, are mostly only availably nationally.

The best that could be done in these circumstances was to examine national data from the *Special Eurobarometer: Attitudes towards Alcohol*[76] (published March 2007), supplemented by the 2003 Scottish Health Survey. In this way, data were assembled for eight countries (including Scotland, but excluding Northern Ireland).

Figure 4.9 suggests that, of the countries shown, Scotland has the second lowest proportion of 'abstainers', while Figure 4.10 shows that it has a higher proportion of daily drinkers than the UK, Germany and the two Eastern European countries, but less than Belgium, France and the Netherlands. Note, however, that the Scottish figure is based on a much shorter time period than that of the other countries – consumption over a week compared to consumption over a month – and this clearly could impact on the figures to a degree.

Figure 4.9

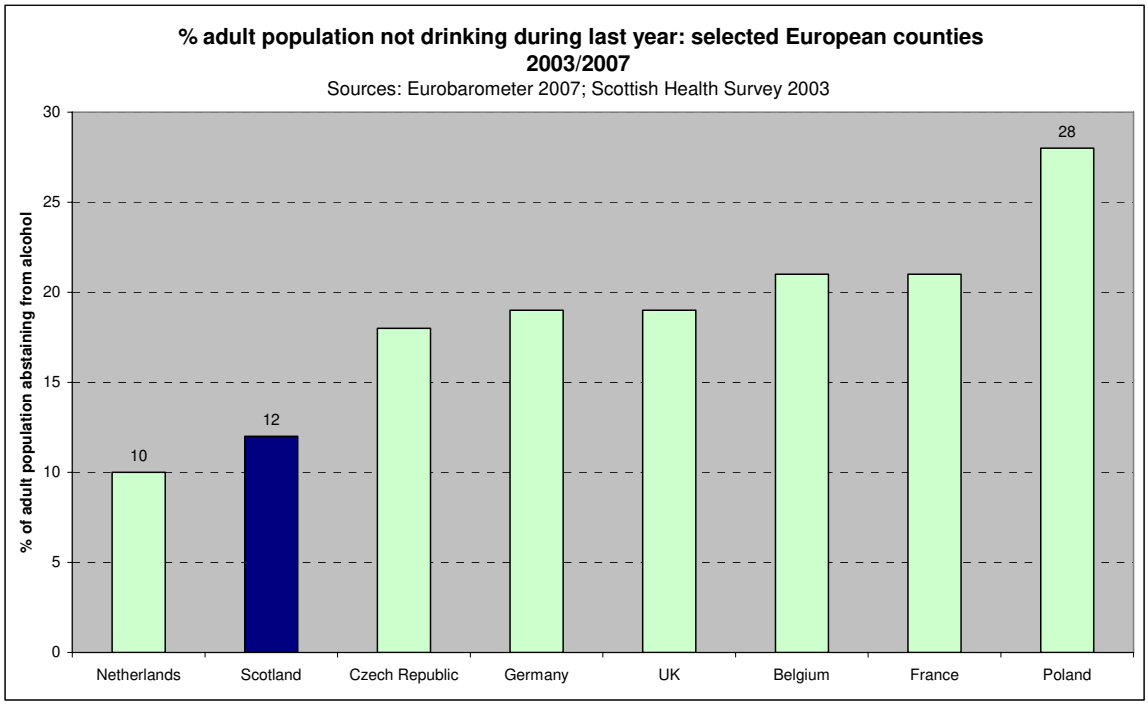
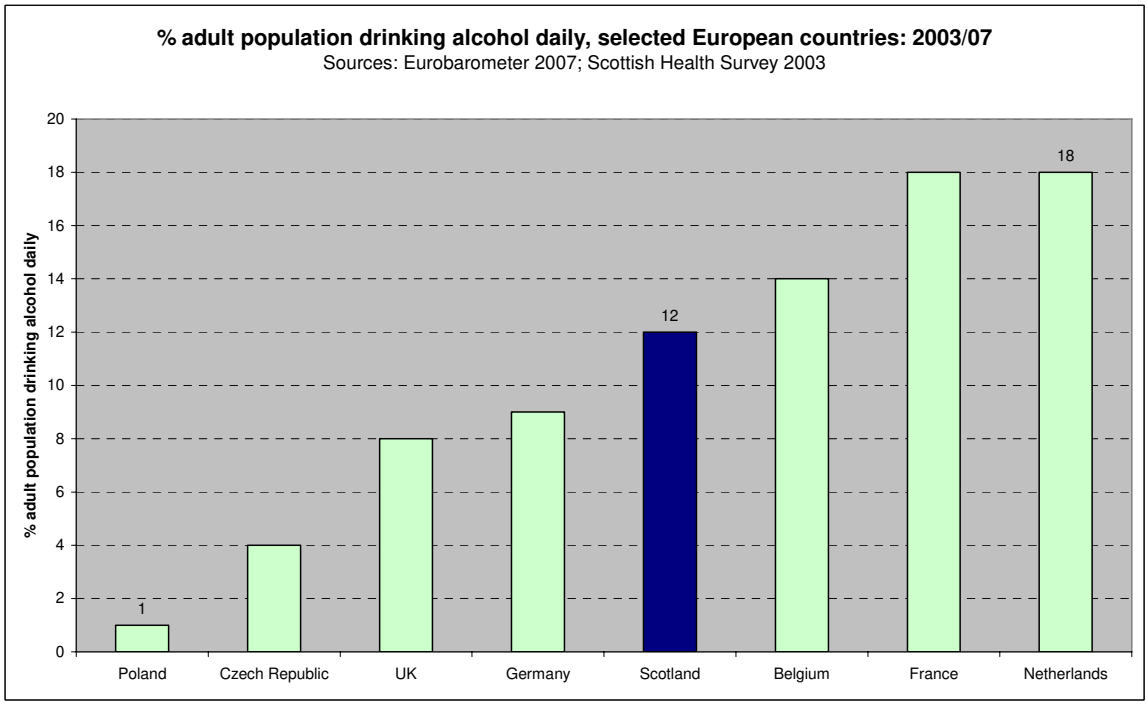


Figure 4.10



The same 'Special Eurobarometer' report also suggests that UK residents were more likely to drink on two to three occasions a week and were among the most likely (along with adults in Germany and the Czech Republic) to consume five or more drinks at a single sitting.

Clearly, however, the mortality data presented in Part Three of the report showing higher, and rising, mortality from cirrhosis and chronic liver disease points to higher levels of consumption among the Scottish/West of Scotland population compared to the other regions. That said, the link between consumption levels and alcohol related harm is more complex than might be thought. For example, within Scotland, there is a large deprivation gradient in alcohol-related *harm* which is not always matched by a similar pattern of deprivation related alcohol *consumption*. Whether this is purely attributable to the well-known unreliability of self-reported alcohol consumption survey data (an issue highlighted for Scottish data in a forthcoming report[xxxvii]) is unclear.

Additional evidence for the two factors discussed above, **smoking prevalence** and **alcohol consumption**, as well as relevant data on **physical activity** and levels of **obesity**, are available from a separate study comparing lifestyle data in Greater Glasgow with other UK and European urban settings[77]. In terms of smoking, this analysis confirms the higher prevalence rates among women in Greater Glasgow, these being significantly higher than a number of urban areas in: England (including Cheshire & Merseyside, and Greater Manchester); Wales (Cardiff); Belgium (including Hainaut and Namur in Wallonia); Germany (including Saxony, and North Rhine-Westphalia); as well as cities in Spain and Scandinavia. Importantly, these findings remained significant even when controlling for measures of social class.

The results were more mixed for alcohol consumption, physical activity and obesity. They showed that in comparisons made with a smaller number of UK areas only, alcohol

[xxxvii] This research (reported in: Catto, S. and Gibbs, D. How much are Scots really drinking? A review of data from Scotland's routine national surveys. NHS Health Scotland; 2008 (in press)) confirms the suspected levels of underreporting of alcohol consumption in Scottish surveys (estimated at around half the true levels) and suggests that underreporting has become more pronounced over time.

consumption in Greater Glasgow was not significantly higher – with the one exception of a region of Northern Ireland (and only among males). Recorded levels of physical activity appeared to be significantly higher in Greater Glasgow compared to some parts of the UK. However, comparisons of levels of obesity in Greater Glasgow with a broader number of European areas showed significantly higher rates compared with parts of Belgium (including Liège in Wallonia for both males and females, and Namur and Hainaut (both also in Wallonia) for females only) and parts of Germany (including North Rhine-Westphalia and, among women, Lower Saxony). This also reinforces recent published findings[78] showing Scotland to have the highest obesity levels in Europe, second only to USA among seventeen OECD countries, including France, Germany and the Czech Republic.

6. The West of Scotland is more deprived than the other areas

In the absence of any comprehensive and robust pan-European socio-economic deprivation index, we can only speculate as to the role and relative influence of deprivation on the health trends described in this report. Nonetheless, some data are available that provide a partial picture of deprivation. These data are subject to limitations and caveats but, on balance, they suggest that current or recent levels of deprivation *per se* are unlikely to be the total explanation for Scotland's higher levels of mortality.

First, unemployment is an important element of many deprivation indices. Evidence from the European Labour Force survey shows that unemployment, and especially long-term unemployment, is many times higher in a number of the selected European regions than in Scotland, and relevant parts of Scotland. For example, unemployment levels in 2005 in Silesia[xxxviii] in Poland and in Saxony and Saxony-Anhalt in Germany were around three to four times higher than in Scotland and the West of Scotland. Yet, life expectancy in each of these regions is not only improving faster than in Scotland, it is significantly higher for both males and females in both German states and is higher among Silesian females. Furthermore, even when the more comprehensive worklessness-related measure

[xxxviii] As stated elsewhere, Katowice makes up the industrial 'core' of Silesia.

('not in employment') was analysed, the rate for the West of Scotland was found to be lower than half the areas examined.

Second, while comparisons of data between UK and continental regions are more difficult because data on the determinants of health are often collected differently, comparisons within the UK are easier because comparable data are available. Other research has already shown that although deprivation has always been an important contributor to Scotland's excess mortality compared to England & Wales, not all of the excess can explained simply in terms of deprivation alone, with the remaining portion that could not be explained by the Carstairs and Morris deprivation index[79] having been described as the 'Scottish Effect'[80]. The 'Scottish Effect' is the subject of ongoing analysis which has revealed that, at least in more recent years, it is primarily a 'Glasgow' or 'West Central Scotland' Effect[81]. We can employ a similar methodology[xxxix] to these analyses to compare mortality and deprivation in Scottish areas (the West of Scotland, the Clydeside conurbation[xl]) and the main English region included in this report, Merseyside. Table 4.2 presents standardised mortality ratios (SMRs) for Clydeside relative to Merseyside adjusting first for only age and sex and, second, for age, sex and deprivation (specifically, the Carstairs and Morris deprivation decile). Data are presented for three-year periods around the 1981, 1991 and 2001 censuses. These results are important as they show that in each period mortality in Clydeside was around 7-8% higher than in Merseyside (adjusting for age and sex only) but when Clydeside's higher levels of deprivation were also included in the adjustment the excess, although reduced, was far from eliminated. For example, in the most recent period, Clydeside had 7% more mortality than Merseyside (SMR = 107.2) of which less than a third was accounted for by differences in deprivation (after adjustment for deprivation, the SMR fell by 2.2 percentage points to 104.0).

[xxxix] Note that the analysis in this section was undertaken by Jamie Reid of Glasgow University, and relates to his PhD thesis referenced above

[xl] Clydeside conurbation defined in terms of the following local authority areas: Glasgow City, East Dunbartonshire, East Renfrewshire, Inverclyde, North Lanarkshire, Renfrewshire, South Lanarkshire, and West Dunbartonshire

Table 4.2. Standardised mortality ratios, Clydeside conurbation relative to Merseyside

Year	SMR adjusting for age and sex only	SMR adjusting for age, sex and deprivation decile
1981	**107.9** (107.1 – 108.7)	**105.3** (104.6 – 106.1)
1991	**108.5** (107.7 – 109.4)	**106.0** (106.2 – 106.8)
2001	**107.2** (106.4 – 108.1)	**104.0** (103.1 – 104.8)

Although this analysis, like the previous 'Scottish Effect' analyses, is constrained by the information available by which we *measure* deprivation, it nonetheless suggests that the additional mortality experienced by the West of Scotland is unlikely to be explained by deprivation alone.

7. Deindustrialisation in the West of Scotland was more severe than in the other regions

This is an important hypothesis and one that has been suggested by other commentators to help explain Scotland's poor health profile[7, 8, 9]. To investigate its veracity in the specific context of this report, an analysis of changes in industrial employment was undertaken for each of the 10 selected regions, plus the West of Scotland.

Methodological note

The analysis compared industrial employment between a base year and 2005 for each region. In obtaining 'base year' data for Western European areas, industrial employment data was obtained for years as close to 1970 (the peak year of industrial employment in Western Europe) as possible[xli]. The years were: 1968 (Netherlands); 1971 (UK); and 1970 (rest of Western Europe). The period 1968-1971 also pre-dates the collapse of the Bretton Woods monetary system and the OPEC 'oil shock' of 1973, which are thought to have contributed to deindustrialisation indirectly through recession, increased costs of production and uncertainty [xlii]. For the Central and Eastern European regions, data

[xli] Note, however – and as acknowledged in Part Two – that the precise peak of industrial employment varied nationally and regionally across Europe.

[xlii] However, it should be noted that the first phases of deindustrialisation pre-dated these events, and also that particular sectors and particular countries were affected by structural weaknesses before 1970.

availability largely determined the base year: 1980 for Katowice, 1991 for Saxony and 1993 for Northern Moravia. Nonetheless, these dates are close to the peaks of industrial employment for their parent countries, although Saxony's loss of industrial employment in 1989-91 (following reunification) is likely to have already been extensive. Throughout, 'industrial employment' is the number of residents in each region working in mining, manufacturing, utilities and construction. The sources for both the base year and the 2005 data are listed fully in Appendix 2. The geographies used were consistent with the 11 regions (including WoS) selected in Part Two.

Results

The results, presented in Table 4.3 below, show the share of employees in each region working in industry in the base year and in 2005. In seven of the 11 regions, industrial employment was just under 50% in the base year – that is, almost half the people working in that period were engaged in the listed industries. The exceptions were the Ruhr and Swansea & the S. Wales Coalfields (where it was closer to 60%) and Northern Ireland (which had a lower proportion of its workforce in industry, at just under 40%). The West of Scotland was typical of the other regions at this period.

Table 4.3: Percentage share of employees working in industry, by region, base year and in 2005

Region (and base year)	Base year	2005	% decrease[xliii]
West of Scotland (1971)	47.5	19.9	-58.1 (over 34 years)
The Ruhr (1970)	58.4	28.1	-51.9 (over 35 years)
Wallonia (1970)	46.7	22.6	-51.6 (over 35 years)
Merseyside (1971)	45.4	22.3	-50.9 (over 34 years)
Limburg (1968)	47.8	23.9	-50.0 (over 37 years)
Swansea & SW Coalfields (1971)	59.9	33.0	-44.9 (over 34 years)
Nord-Pas-de-Calais (1970)	46.5	26.4	-43.2 (over 35 years)
Northern Ireland (1971)	37.3	23.9	-35.9 (over 34 years)
Saxony (1991)	47.2	31.1	-34.1 (over 14 years)
Katowice (1980)	53.2	42.8	-19.5 (over 25 years)
Northern Moravia (1993)	48.8	42.0	-13.9 (over 12 years)

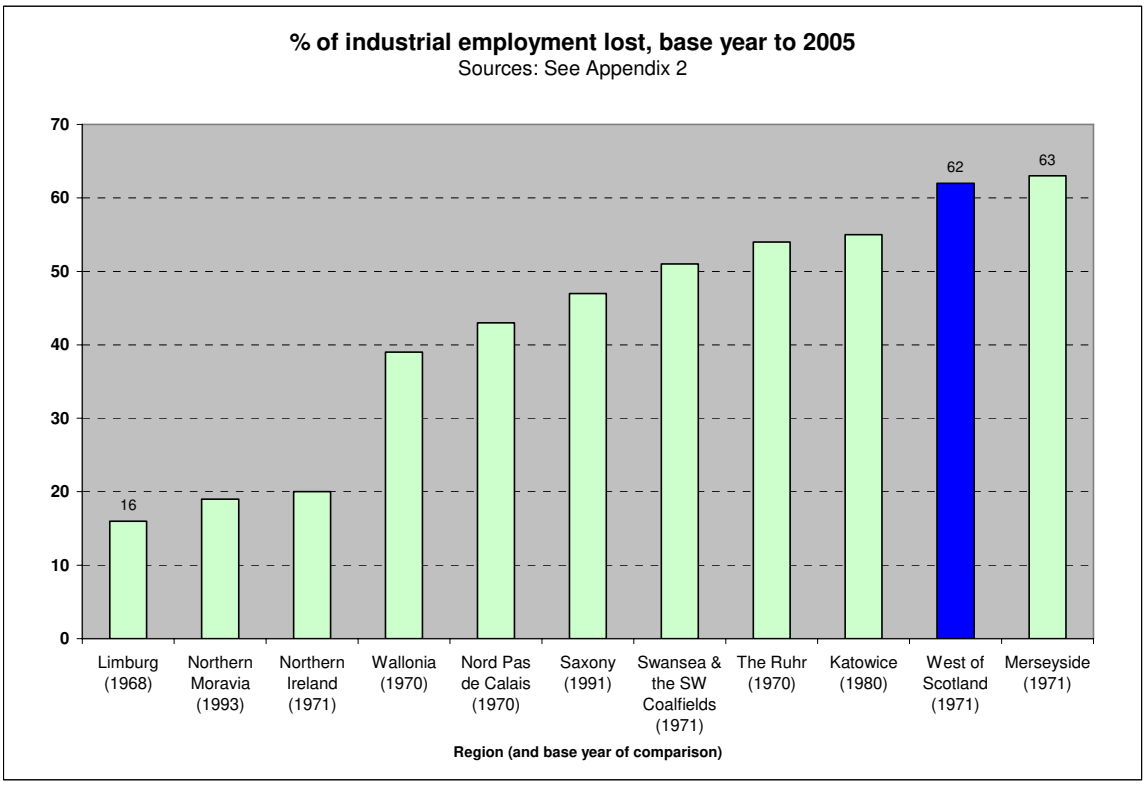
By 2005, the share of industrial employment (as a percentage of total employment) had fallen in every region. This decline was least marked among Northern Moravia and Katowice residents, where four out of 10 employees were still working in industry by that date (although in both cases this is obviously based on a considerably shorter time period). In contrast, six regions (Limburg, Wallonia and the four UK areas) had become unequivocally dominated by service-sector employment, with less than a quarter of workforce employed in industry. The West of Scotland was at one extreme with the lowest proportion of residents working in industry.

The change can also be expressed in terms of the absolute number of employee jobs lost (Figure 4.11). Over the period 1970/71 to 2005, the West of Scotland shed almost two-thirds (62%) of its employee jobs in industry. Along with Merseyside, this suggests its loss of industrial employment was especially severe. At the other end of the spectrum,

[xliii] Difference between base year and 2005 *expressed as a percentage* (i.e. 2005 rate minus base year rate, divided by base year rate and multiplied by 100), not as a simple subtraction.

Northern Ireland, Northern Moravia and Limburg saw much smaller reductions in industrial employment – down by a fifth or less over the same period.

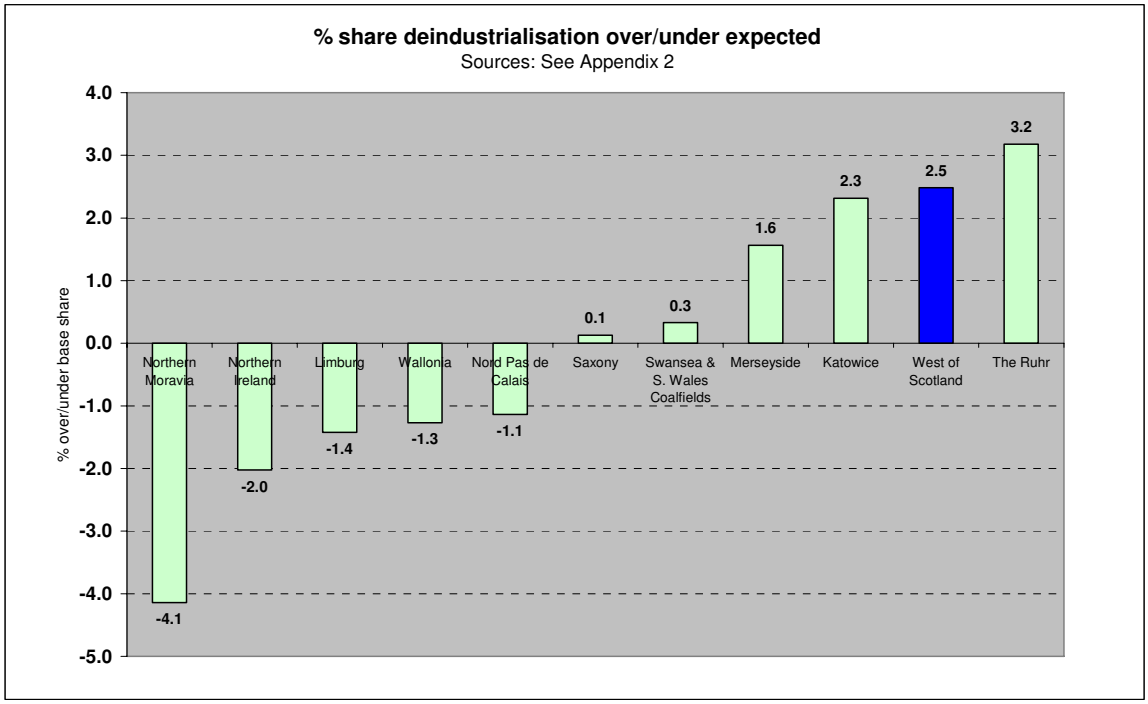
Figure 4.11



Lastly, it is possible to examine how industrial job losses were distributed among the 11 regions (including the West of Scotland). This was done by calculating the share of the 6.3 million industrial jobs attributable to each region in the base year, the share of the 2.9 million industrial job losses among the same areas between 1970 and 2005, and the difference between the two. A positive figure would mean that a region had lost a greater share of industrial employment than expected; a negative figure less than expected. To give an example, Wallonia had 7.4% of the regions' industrial employees in 1970, and its industrial job losses amounted to 6.1% of the total seen in the eleven regions for the period. This might suggest its share of industrial job losses was slightly less than the 'expected' level.

Figure 4.12 shows the results of this analysis for the 11 regions. Four regions (The Ruhr, the West of Scotland, Katowice and Merseyside) bore a greater 'share' of job losses than might have been expected. Five regions (Northern Moravia, N. Ireland, Limburg, Wallonia and Nord-Pas-de-Calais) saw losses of industrial employment below that which might have been expected, while losses in Swansea & the coalfields and Saxony were broadly in line with what might have been expected.

Figure 4.12



If all three measures of deindustrialisation are taken into account, then the West of Scotland was among the most severely affected of the regions examined, alongside the Ruhr and Merseyside. Northern Moravia, Northern Ireland and Limburg and appear to compare more favourably in this respect. Thus, the answer to the question of 'was deindustrialisation more severe in the West of Scotland compared to elsewhere?' would appear to be 'Yes'[xliv]. The West of Scotland has transformed itself from an industrial to a

[xliv] Fuller analysis of 95 Western European regions that shed industrial employment between 1970 and 2005 ranks the West of Scotland 5th (with 1st=most severe deindustrialisation). Nine of the 10 regions worst affected by deindustrialisation were in Britain, though of those regions ranked higher than the West of

post-industrial economy but the process of transformation appears to have been more far reaching than in comparable European regions and may, as a result, have caused greater social trauma and adverse health outcomes.

A final point: one important omission from the analysis above revolves around the **timing of deindustrialisation**. Clearly the earlier an area deindustrialises, the longer it has either to recover or, perhaps in some cases, stagnate. Similarly, **the speed of deindustrialisation** has not been considered. However, an in-depth analysis and discussion of the potential effects of both these issues on the subsequent socio-economic and health profiles of the various regions lies outwith the scope of this part of the project.

Scotland only Merseyside had weaker levels of labour market demand over the period 1981-2001. Further details available on request from the authors.

Summary of Part Four

Part Four suggests a number of possible hypotheses to explain the mortality trends presented in this report:

- Although **data quality** is a fundamental issue for any research, it is unlikely that the overall findings of the report are likely to have been weakened to any great extent by mortality data quality issues.

- Similarly, the trends do not appear to be driven by any one **'age cohort**'.

- **Migration** is an important issue to consider in the context of any mortality analysis, and although population levels in the West of Scotland have fallen over the last two decades, without much more detailed and sophisticated research it is difficult to quantify the effect of this.

- **Income inequality** is also a potentially very important factor. However, we are again constrained by limited data and it is not possible to draw any firm conclusions. The collation and analysis of such data are among the aims of the next stage of the project.

- Similarly, analysis of the role of **health behavioural factors** also suffers from a lack of comparable and accurate information. Despite this, there does appear to be evidence suggesting higher levels of obesity and female smoking prevalence in Scotland and parts of the West of Scotland compared to elsewhere. However, it is difficult to disentangle health behavioural factors from their social context; and relevant to the latter is the issue of **deprivation**, a key factor in any argument regarding differing health trends. Although we are not able to draw firm conclusions from the limited data available, what information we do have suggests deprivation is unlikely to fully explain the differences in mortality

outcomes between the West of Scotland and the other comparable post-industrial regions.

- The analysis does suggest, however, that the West of Scotland has experienced a more **severe dose of deindustrialisation** than the majority of the other regions.

PART FIVE:
CONCLUSIONS

Conclusions

At the outset we reminded ourselves that health is created and destroyed by the complex interaction of a number of diverse factors, played out at different geographical levels over long periods of time. From this perspective it is obvious why all post-industrial areas tend to suffer poor health: they are all characterised by material deprivation, social disruption and health damaging behaviours. The conundrum is why Scotland, which is now wealthier than most of the comparable European regions, continues to suffer comparatively high rates of death.

Some possible explanations emerged from the early examination of different hypotheses in Part Four. The West of Scotland has experienced more severe deindustrialisation than most other areas. In Scotland there are currently higher levels of alcohol consumption (as witnessed by trends in alcohol harm), smoking among women, and obesity. Furthermore, despite our relative prosperity overall, it is possible that levels of inequality are greater in Scotland than in other regions, so our average level of wealth gives a misleading picture – hiding significantly large numbers of people who live in relative poverty. Even more speculatively, migration and other demographic forces may be important. However, these observations only provide speculative and partial explanations at best.

The wisest conclusion might be that the reasons for the West of Scotland's poor health profile compared to similar UK and European regions remain unclear. It would be unwise, however, simply to put the explanation down to 'deprivation' – which in our experience is one of the most commonly cited explanations used in a Scottish context. Deprivation is key to understanding the poor health of all post-industrial regions (including Scotland) but it is not yet clear if it explains differences between Scotland and other similar regions.

One of the most important findings in this report is the relatively good performance (in terms of improving mortality trends) of regions that share the well recognised problems of the West of Scotland. If these regions are improving faster than Scotland, what can we learn from them?

More work is needed to advance our understanding and plans are being made for the next stage of this project. It is hoped that through further, and more detailed, collaboration with key figures in some of these European regions, we may be able to gain greater insight into the likely causes of the differences in health and health improvement rates between the West of Scotland and elsewhere – causes that are likely to include some of the factors outlined above but also cultural, social, environmental and, perhaps, other as yet unknown dynamics that are at play.

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Appendix 1. The regions defined

In the majority of cases, regions are defined by 'NUTS' geographies. NUTS stands for the 'Nomenclature of Territorial Units for Statistics' and is the geographical system of national and sub-national geographies used by Eurostat. There are three main levels:

- NUTS 1: *average* population size range: 3 million – 7 million
- NUTS 2: 800,000 – 3 million
- NUTS 3: 150,000 – 800,000.

Regions are generally defined by either one, or a group of, NUTS 1, NUTS 2 or NUTS 3 geographies, all of which relate to different administrative boundaries in each country (and which are shown in the table below). More information on NUTS geographies is available from the Eurostat website:
http://ec.europa.eu/comm/eurostat/ramon/nuts/introduction_regions_en.html

The principal exception to this is Katowice in Poland which has been defined on the basis of Polish counties ('powiats'). In addition, the West of Scotland is defined by individual local authority areas.

Region	Country	Population at 2005[1]	Geographical composition
The Ruhr area	Germany	5,289,251	Defined by the following 15 NUTS 3 geographies, relating to a combination of districts ('kreise') and urban districts ('kreisfreie stadt'). The NUTS 3 codes are shown in brackets. • Duisburg (DEA12) • Essen (DEA13) • Mülheim an der Ruhr (DEA16) • Oberhausen (DEA17) • Wesel (DEA1F) • Bottrop (DEA31) • Gelsenkirchen (DEA32) • Recklinghausen (DEA36) • Bochum (DEA51) • Dortmund (DEA52) • Hagen (DEA53) • Hamm (DEA54) • Herne (DEA55) • Ennepe-Ruhr-Kreis (DEA56) • Unna (DEA5C) This definition of the Ruhr was agreed with colleagues at the Institute for Health and Work in Bielefeld, North Rhine-Westphalia. It has been used in published analyses, and is identical to that used by the regional Association of the Ruhr (Regionalverband Ruhr)[2].
Saxony-Anhalt	Germany	2,482,447	The federal state ('land') of Saxony-Anhalt (in German, Saschen-Anhalt) – NUTS 1 code DEE.
Saxony	Germany	4,285,019	The federal state ('land') of Saxony (Saschen) – NUTS 1 code DED.
Chemnitz (in Saxony)	Germany	1,545,304	The government region ('regierungsbezirk') of Chemnitz (NUTS 2 code DED1).
Leipzig (in Saxony)	Germany	1,074,635	The government region ('regierungsbezirk') of Leipzig (NUTS 2 code DED3).
Wallonia	Belgium	3,404,969	Belgian autonomous 'région' of Wallonia (NUTS 1: BE3).
Lorraine	France	2,328,231	French 'région' of Lorraine (NUTS 2: FR41).

[1] Population at 2005 for all regions except those in France, for which the year is 2003. See Appendix 4 for sources of population data.
[2] http://www.rvr-online.de/wirtschaft/images/bindata-2/Tabelle02.pdf

Region	Country	Population at 2005[1]	Geographical composition
Moselle	France	1,031,739	Moselle is a sub-region ('département') of Lorraine, and is defined by NUTS 3 code FR413.
Nord-Pas-de-Calais	France	4,024,420	French 'région' of Nord-Pas-de-Calais (NUTS 2: FR30).
Alsace	France	1,789,217	French 'région' of Alsace (NUTS 2: FR42).
Katowice	Poland	4,151,325	The geography used to define Katowice relates to the old (pre-1999) Polish province ('województwa', or voivodeship) of the same name. The boundaries of the province were redrawn in 1999, and the Katowice voivodeship became part of the slightly larger Silesia (or Slaskie) province. For this project, colleagues at the Cancer Centre & Institute of Oncology in Warsaw combined smaller counties ('powiats') to recreate the boundaries of the old Katowice voivodeship. However, the pre-1999 voivodeships were created from a different small geography – 'gminy' (roughly translated as 'communes') – the boundaries of which do not exactly match those of the counties ('powiats'); thus, there is a slight difference in the definition of Katowice pre- and post 1999, with the 1999 version containing around 10% more population. This can be clearly seen in the population trends displayed in Figures 4.3 and 4.4 in Part Four of the report.
Northern Moravia	Czech Republic	1,889,930	Northern Moravia is made up of two of the Czech Republic's thirteen regions ('kraje'), namely Moravskoslezský (translated as the Moravian-Silesian region, and defined by NUTS3 code CZ080), and Olomoucký (Olomouc - NUTS3 code CZ071). These were selected a best-fit geography following examination of historical maps of the Northern Moravian region, and comparisons with maps of the current (2000) administrative regions of the Czech Republic.[3]

[3] Geographic map with historic regions: http://www.travel.cz/guide/588/index_en.html (accessed 11 December 2007). Map of Czech Republic NUTS 2/3 areas from: http://www.czso.cz/csu/2004edicniplan.nsf/engt/8C00282149/$File/136304u.pdf (accessed 11 December 2007).

Region	Country	Population at 2005[1]	Geographical composition
Limburg	Netherlands	1,149,143	'Province' of Limburg (NUTS 2 NL42).
Greater Manchester	England	2,547,800	Metropolitan county – NUTS 2 code UKD3.
Tees Valley & Durham	England	1,151,800	Grouped counties (historically Durham and Cleveland) - NUTS2 code UKC1.
Northumberland & Tyne and Wear	England	1,406,700	Grouped counties- NUTS 2 code UKC2.
Merseyside	England	1,366,900	Metropolitan county - NUTS 2 code UKD5.
West Midlands	England	2,592,200	Metropolitan county - NUTS 2 code UKG3.
Swansea & South Wales Coalfields	Wales	1,114,500	Defined by the following NUTS 3 codes: UKL15 (Central Valleys, made up of the Merthyr Tydfil & Rhondda Cynon Taff local authorities); UKL16 (Gwent Valleys, covering the Blaenau Gwent, Caerphilly & Torfaen local authorities); UKL17 (including Bridgend and Neath Port Talbot local authorities); UKL18 (Swansea local authority).
Northern Ireland	Northern Ireland	1,724,408	All of Northern Ireland has been used. In NUTS terms, the region/country is defined by NUTS 1 code UKN.
West of Scotland	Scotland	2,114,590	The 'West of Scotland' area used in this report is defined in terms of eleven local authority areas. These are: East Ayrshire, East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, and West Dunbartonshire. This definition was used in the recent Let Glasgow Flourish report[4], published by the Glasgow Centre for Population Health

[4] Hanlon P., Walsh D., Whyte B. Let Glasgow Flourish. Glasgow Centre for Population Health. 2006

Appendix 2. Definitions and sources of data presented in the report

Table/Figure No.	Description	Source	Notes
Table 2.1	List of 20 post-industrial regions, together with (for comparison) Scotland and the West of Scotland (including total population and year of peak industrial employment).	Sources of population data for each region are listed in Appendix 4. Peak industrial employment data from: United Nations Industrial Development Organisation (UNIDO) Industrial Statistics Database 2006; Office for National Statistics. Additional UK data from Annual Abstract of Statistics. For Scotland, Scottish Register of Employment (for 1952-1997) & Office for National Statistics, Annual Business Inquiry (for 2002) (compiled by Scottish Executive). West of Scotland data from Census of Population (residence based data). Definitions of areas listed in Appendix 1.	Population data for 1995 except French regions (1993). UNIDO define industrial employment as total employees working in manufacturing (International Standard of Industrial Classification of All Economic Activities (ISIC)). Scottish trend shown in Chart A4.4, Scottish Economic Statistics 2005.
Fig 2.1	Map of all the post-industrial areas.	Map produced using European NUTS 1, NUTS 2 and NUTS 3 boundaries provided with ESRI ArcGIS 9 software.	Map shows Saxony, but not its sub-regions of Chemnitz and Leipzig. Similarly, French region of Lorraine is shown, but not its sub-region of Moselle. Note that the West of Scotland is for convenience here defined by NUTS 3 areas, which differs from the definition used in the mortality analyses: the more accurate geographical boundary (defined by 11 local authority areas) is displayed in Figure 2.2. Note also that the Polish province of Silesia is shown, rather than the slightly smaller, older Katowice region for the mortality analyses presented in the report.
Fig 2.2	Map of the West of Scotland	Map showing 11 local authority areas making up the West of Scotland (see Appendix 1 for more details).	This map is: © Crown copyright. All rights reserved, Glasgow City Council 100023379, 2008.
Figs 2.2 – 2.7	Maps of individual regions.	See notes to Figure 2.1 above.	See notes to Figure 2.1 above.
Fig 2.8	Gross Domestic Product per	Eurostat.	Data downloaded from Eurostat at NUTS 2

Table/Figure No.	Description	Source	Notes
	head of population 2004, in Euros, adjusted for 'purchasing power parity' to compare standards of living on a consistent basis between regions. NUTS 2 level only.		and NUTS 3 level. Note, however, that data for the Ruhr, Northern Moravia and Swansea/S. Wales coalfields are values averaged across the relevant NUTS 3 areas. Regional Gross Domestic Product (GDP) is an indicator calculated by Eurostat based on data from the European System of Accounts ESA 1995, using a harmonised methodology. The ESA95 indicators are sent to Eurostat by the national statistical institutes. Scottish data are presented for all Scotland, and South West Scotland (*not* the West of Scotland (WoS)).
Fig 2.9	Economic activity rate: % of adult population who are economically active (employed or unemployed and seeking work).	Data from European Union Labour Force Survey obtained from Eurostat for all regions except: the Ruhr (Regionalverband Ruhr - Regional Association of the Ruhr: http://www.rvr-online.de); Northern Moravia (Czech Statistical Office); and West of Scotland, and Swansea & the South Wales Coalfields (both from the Annual Population Survey).	Note that population denominator is defined as aged 15+ for all regions except the West of Scotland and Swansea & S. Wales Coalfields, for which it is age 16+. In all other aspects, data from the three sources are comparable, all being derived from the European Union Labour Force Survey, or based on the same methodology. All data are for 2005 except the Ruhr (2005-2006) and West of Scotland and Swansea & S. Wales Coalfields (2006).
Fig 2.10	Unemployment rate: proportion of economically active adult population who are unemployed and seeking work.	Data from European Union Labour Force Survey obtained from Eurostat for all regions except: the Ruhr (Regionalverband Ruhr - Regional Association of the Ruhr: http://www.rvr-online.de); Northern Moravia (Czech Statistical Office); and West of Scotland/Swansea & the South Wales Coalfields (Annual Population Survey).	Note that population denominator is defined as aged 15+ for all regions except the West of Scotland and Swansea & S. Wales Coalfields, for which it is age 16+. In all other aspects, data from the three sources are comparable, all being derived from the European Union Labour Force Survey, or

Table/Figure No.	Description	Source	Notes
			based on the same methodology. All data are for 2005 except the Ruhr (2005-2006) and West of Scotland and Swansea & S. Wales Coalfields (2006).
Fig 2.11	Long-term unemployment rate: proportion of economically active population aged 15+ who are unemployed and have been seeking work for 12 months or more, 2005.	Data from European Union Labour Force Survey obtained from Eurostat except for Northern Moravia (obtained from Czech Statistical Office).	Data available for NUTS 2 geographies only supplemented by data for Northern Moravia obtained from a different source, but based on a methodology consistent with EU Labour Force Survey. Thus, chart does not include data for the Ruhr, and Swansea & S. Wales coalfields (both defined by NUTS 3 geographies); additionally, South West Scotland is used rather than the WoS.
Fig 2.12	% of male population (aged 25+) that are not in employment i.e. unemployed or economically inactive, 2005.	Unemployment, economic inactivity and population data all taken EU Labour Force Survey obtained from Eurostat, except for (1) population data for: Northern Moravia (Czech Statistical Office); Silesia (Polish Central Statistical Office), the Ruhr, and all French and UK regions (various sources cited in Appendix 4); and (2) unemployment data for Wales (taken from Annual Population Survey).	Population data for French regions is for 2003, not 2005.
Fig 2.13	Proportion of the adult (15+) population with tertiary level (post-secondary) qualifications, 2005.	Data from EU Labour Force Survey obtained from Eurostat except for Northern Moravia (obtained from Czech Statistical Office) and Swansea & S. Wales coalfields (from Annual Population Survey).	Data available for NUTS 2 geographies only (from Eurostat), supplemented by data for Northern Moravia and Swansea & S. Wales coalfields obtained from different sources, but based on a methodology consistent with EU Labour Force Survey. Thus, chart does not include data for the Ruhr (defined by NUTS 3 geographies), and additionally, South West Scotland is used rather than the WoS.
Figs 2.14 - 2.20	All-cause mortality rates for relevant regions compared to	Eurostat;	All-cause mortality data (pre-calculated at European age standardised rates per

Table/Figure No.	Description	Source	Notes
	other regions within their parent countries, average annual rates for period 2001-2003 (2002-2004 for Welsh data). NB All charts show data for males only, with the exception of Figure 2.20 (Welsh local authority areas) which presents data for males and females combined.	Institute for Health and Work (LIGA), North Rhine-Westphalia (for Ruhr data); Welsh Annual District Death Extract data reported in: Margaret Webber. Health Needs Assessment, 2006: Demography. National Public Health Service for Wales, 2006 [1].	100,000 population) were downloaded from Eurostat at regional (NUTS 1, NUTS 2 or NUTS 3) level for all regions except the Ruhr (see Appendix 4 for sources) and Wales (obtained from a separate source). Rates for Germany presented at NUTS 1 level (Länder), but include also equivalent rates for Ruhr. Rates for France, Poland, Netherlands and England all presented at NUTS 2 level (French *régions,* Polish *voivodeships,* Dutch *provinces* and English counties/groups of counties respectively*).* Polish data include rates for Silesia, the area which incorporates Katowice (see appendix 1 for more details). Rates for the Czech Republic presented at NUTS 3 level (*kraje*), including the two areas (Moravskoslezský, Olomoucký) which make up Northern Moravia; Welsh data show results for all 22 local authorities, with the seven within the Swansea and South Wales Coalfields boundaries highlighted.
Figs 2.21 - 2.39	Overview of life expectancy in the twenty regions (including – in Fig 2.36 – projections to 2023/25 for male life expectancy in Katowice and Northern Moravia).	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Life expectancy estimates were calculated from the all-cause mortality and population data obtained from the various national and local agencies. With the exception of Limburg, estimates were calculated using Chiang (II) methodology[2] for individual years, and presented as three year rolling

[1] See Table 15 of: http://www2.nphs.wales.nhs.uk:8080/hiatdocs.nsf/85c50756737f79ac80256f2700534ea3/0be3e9595a177ea380257206004aca0e/$FILE/20061010_HNADocument_Demography_v2.doc

[2] Chiang C. L. Life Table and Mortality Analysis, World Health Organisation, 1978

Table/Figure No.	Description	Source	Notes
			averages. Population sizes were large enough, and confidence intervals narrow enough, that it was not deemed necessary to base the calculations on aggregated years of data. Estimates for Limburg were derived in a similar manner, but based on deaths and population data for 10 age-bands, rather than the 19 age-bands used for all other regions. However, comparisons of both calculation methods for similar sized regions showed very little (<1%) difference in results. Projections (Fig 2.36) created applying a simple linear regression to past life expectancy trends for Katowice, Northern Moravia and the WoS.
Table 2.2	Male life expectancy at birth, Saxony and its sub-regions of Leipzig and Chemnitz.	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Data calculated as above.
Fig 3.1	Summary of trends in male and female life expectancy, West of Scotland and ten selected regions.	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Regions included: Katowice; Limburg; Merseyside; Northern Ireland; Northern Moravia; Nord-Pas-de-Calais; Ruhr; Swansea & Coalfields; Saxony; Wallonia. See also notes to figure 2.25 – 2.49 (life expectancy by region).
Fig3.2	Infant mortality trends.	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Infant (age < 1) mortality trends, expressed as a crude rate per 1,000 live births and presented as three year rolling averages, for the West of Scotland compared to the minimum, maximum and average rate of the following regions (plus the WoS itself):

Table/Figure No.	Description	Source	Notes
			Merseyside; Swansea & Coalfields; Northern Ireland; Wallonia; Northern Moravia; Limburg; Nord-Pas-de-Calais; Ruhr; Saxony; Katowice. As outlined in Appendix 4, mortality and population data were not available for every region and every year presented: thus, the number of regions included in every three-year period of analysis is listed at the bottom of each chart. Note also that rates for Nord-Pas-de-Calais for years for which no data were available (i.e. 1984-86; 1988-90; 1992-94; 1996-98; 2000-02) were imputed: this was to avoid creating confusingly-shaped charts.
Figs 3.3-3.4	All-cause mortality trends among children (aged 1-14).	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	All cause mortality rates for children aged 1-14, directly age standardised to the European standard population, and presented as three year rolling averages: West of Scotland compared to the minimum, maximum and average rate of the following regions (plus the West of Scotland itself): Merseyside; Swansea & Coalfields; Northern Ireland; Wallonia; Northern Moravia; Nord-Pas-de-Calais; Ruhr; Saxony; Katowice. As outlined in Appendix 4, mortality and population data were not available for every region and every year presented: thus, the number of regions included in every three-year period of analysis is listed at the bottom of each chart. Note also that rates for Nord-Pas-de-Calais for years for which no data were available (i.e. 1984-86; 1988-90; 1992-94; 1996-98; 2000-02) were imputed: this was to avoid creating confusingly-shaped charts.

Table/Figure No.	Description	Source	Notes
Figs 3.5-3.12 (also relevant to Appendix 7a)	All-cause and cause-specific mortality trends among younger working age adults (15-44).	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	ICD codes for individual causes of death are listed in Appendix 3. Rates for younger working age adults (15-44) calculated as directly age standardised to the European standard population, and presented as three year rolling averages: West of Scotland compared to minimum, maximum and average rate of the following regions (plus the West of Scotland itself): Merseyside; Swansea & Coalfields; Northern Ireland; Wallonia; Northern Moravia; Nord-Pas-de-Calais; Ruhr; Saxony; Katowice. As outlined in Appendix 4, mortality and population data were not available for every region and every year presented: thus, the number of regions included in every three-year period of analysis is listed at the bottom of each chart. Note also that rates for Nord-Pas-de-Calais for years for which no data were available (i.e. 1984-86; 1988-90; 1992-94; 1996-98; 2000-02) were imputed: this was to avoid creating confusingly-shaped charts.
Figs 3.13-3.24 (also relevant to Appendix 7b)	All-cause and cause-specific mortality trends among older working age adults (45-64).	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	ICD codes for individual causes of death are listed in Appendix 3. Rates for older working age adults (45-64) calculated as directly age standardised to the European standard population, and presented as three year rolling averages: West of Scotland compared to minimum, maximum and average rate of the following regions (plus the West of Scotland itself): Merseyside; Swansea & Coalfields; Northern Ireland; Wallonia; Northern Moravia; Limburg; Nord-Pas-de-Calais; Ruhr; Saxony;

Table/Figure No.	Description	Source	Notes
			Katowice. As outlined in Appendix 4, mortality and population data were not available for every region and every year presented: thus, the number of regions included in every three-year period of analysis is listed at the bottom of each chart. Note also that rates for Nord-Pas-de-Calais for years for which no data were available (i.e. 1984-86; 1988-90; 1992-94; 1996-98; 2000-02) were imputed: this was to avoid creating confusingly-shaped charts. Note that data for Limburg was standardised according to different age bands: data for other regions were standardised across four 5-year bands (45-49, 50-54, 55-59, 60-64) while those for Limburg could only be standardised across two bands 10-year bands (45-54 and 55-64). This will affect the comparability of rates between Limburg and other regions to an extent: however, it does not significantly effect the overall maximum, minimum and mean trends shown in any of the figures.
Figs 3.25-3.32 (also relevant to Appendix 7c)	All-cause and cause-specific mortality trends among elderly (65+).	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	ICD codes for individual causes of death are listed in Appendix 3. Rates for adults aged 65+ calculated as directly age standardised to the European standard population, and presented as three year rolling averages: West of Scotland compared to minimum, maximum and average rate of the following regions (plus the West of Scotland itself): Merseyside; Swansea & Coalfields; Northern Ireland; Wallonia; Northern Moravia; Limburg;

Table/Figure No.	Description	Source	Notes
			Nord-Pas-de-Calais; Ruhr; Saxony; Katowice. As outlined in Appendix 4, mortality and population data were not available for every region and every year presented: thus, the number of regions included in every three-year period of analysis is listed at the bottom of each chart. Note also that rates for Nord-Pas-de-Calais for years for which no data were available (i.e. 1984-86; 1988-90; 1992-94; 1996-98; 2000-02) were imputed: this was to avoid creating confusingly-shaped charts.
Table 3.1	Comparison of mortality between N. Ireland and West of Scotland, 2003-2005.	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Table shows the difference between the actual number of recorded deaths in the West of Scotland for each listed cause and age group and the 'expected' number of deaths if the West of Scotland had experienced the same mortality profile in the period as Northern Ireland. The 'expected' number of deaths were calculated by applying age specific crude mortality rates to the West of Scotland population. Numbers are shown as annual averages for the period 2003 to 2005. ICD codes for the individual causes of death are listed in Appendix 3.
Table 3.2	Standardised mortality ratios (age 0-64) for West of Scotland relative to Northern Ireland, 1983-85; 1993-95; 2003-05.	Sources of mortality and population data for both regions are listed in Appendix 4.	Estimates of 'observed' and 'expected' numbers of deaths calculated as per above (Table 3.1); by dividing the total 'observed' deaths for all ages by the equivalent 'expected' figures, we obtain standardised mortality ratios (SMRs) for each cause, time period and gender.
Table 4.1	All-cause crude mortality	Sources of all mortality and population data are listed in	This table is employed merely to illustrate

Table/Figure No.	Description	Source	Notes
	rates by 'age cohort', West of Scotland, 1981-85, 1986-90, 1991-95, 1996-2000, 2001-05.	Appendix 4.	an aspect of the methodology used in the 'age cohort' analysis i.e. to show which mortality rates for which age bands at which time period were examined in the analysis (and which are illustrated in Figures 4.1 and 4.2).
Figs 4.1-4.2	'Age cohorts' analysis: WoS crude mortality rates by age at 1981-1985, compared to equivalent rates for Ruhr (males (4.1) and females (4.2) shown separately).	Sources of all mortality and population data are listed in Appendix 4.	This 'age cohort' analysis does not define 'cohort' in the normal sense of one group of individuals followed over time, but rather as deaths by age followed over time. In other words deaths at age *x* at the start of the 1980s are analysed in combination with deaths at age *x +10* at the start of the 1990s, and age *x +20* at the start of 2000. The time period was split into five 5-year groups: 1981-1985; 1986-1990; 1991-1995; 1996-2000; 2001-2005. Age was grouped into corresponding five year bands, and defined as 'age at 1981-1985'. Thus, in figs 4.1 and 4.2 the label 'age 15-19' means age 15-19 at 1981-85, which is also age 20-24 at 1986-90, 25-29 at 1991-2995 etc.
Figs 4.3-4.4	Population change 1982-2005.	Sources (and relevant time periods) of population data for each region are listed in Appendix 4.	Total population (all ages) for the ten principal post-industrial regions plus Scotland, West of Scotland and Greater Glasgow & Clyde.
Fig 4.5	Estimated income inequality using Gini Coefficient for selected European regions/countries.	Western European regions/countries (including Saxony): European Community Household Panel (ECHP) data reported in: Ezcurra, R., Pascual, P. and Rapun, M. The Spatial Distribution of Income Inequality in the European Union. Environment and Planning A 2007, Volume 39, pp. 869-890. Eastern European regions: Luxembourg Income Study (LIS) data reported in: Forster, M., Jesuit, D. and Smeeding, T.	Gini Coefficients data relate to 1993-1998 for all regions/countries shown except Netherlands (1993-1999), N. Moravia (1996) and South Poland (1999). UK geographies at NUTS 1 level (Government Office Regions). Netherlands data at national level only. German data at

Table/Figure No.	Description	Source	Notes
		Regional Poverty and Income Inequality in Central and Eastern Europe: Evidence from the Luxembourg Income Study, July 2007, LIS Working Paper No. 324.	NUTS 2 level only. 'South Poland' includes both Opolskie and Slaskie provinces. All other geographies consistent with definitions of post-industrial regions outlined in Appendix 1.
Fig 4.6	Pay inequality measured by Theil Statistic.	Eurostat data reported in: Galbraith, J. and Garcilazo, E. Pay Inequality in Europe 1995-2000: Convergence Between Countries and Stability Inside. The European Journal of Comparative Economics Vol. 2, n. 2, 2005, pp. 139-175.	Theil statistics calculated for years 1995-2000 (where available) at NUTS 2 level, from payroll data.
Fig 4.7-4.8	Adult smoking prevalence rates.	*Northern Ireland* Analysis of Northern Ireland Continuous Household Survey[3] *Merseyside* 2003 Health Survey for Greater Merseyside[4] *Swansea and the SW Coalfields* Welsh Health Survey, 2003/05, Local Authority Report (average prevalence figure for the eight relevant local authorities in the region: Merthyr Tydfil, Rhonnda Cyon Taff, Blaenau Gwent, Caerphilly, Torfaen, Bridgend, Neath Port Talbot, Swansea)[5]. *Scotland & Greater Glasgow* Scottish Health Survey 2003. *Wallonia* Belgian Health Interview Survey - Interactive analysis, accessed 22nd June 2007 *Czech Republic* Sample Survey of the Health Status of the Czech Population 2002 *Limburg*	Data comparability is constrained by different survey methodologies, particularly in relation to the different age bands of the surveyed population. The relevant populations denominators are: • Age 12+: Limburg. • Age 15+: Czech Republic, Wallonia North Rhine Westphalia. • Age 15-75: Nord-Pas-de-Calais. • Age 16+: Scotland and its regions, Northern Ireland, Merseyside, Merseyside and Swansea and South Wales Coalfields. • Age 18-80: Saxony. • Age 18+: Southern Poland.

[3] Reported in Evandrou, M. and Falkingham, J. Cigarette Smoking and Drinking Behaviour in Northern Ireland 1986-2002: A Cohort Analysis. Belfast: Department of Health, Social Services and Public Safety, Northern Ireland; 2004.
[4] Reported in Capewell, S., Lloyd-Williams, F. and Ireland, R. In Sickness and in Health: 2003 Health Survey for Greater Merseyside – Full Technical Report. NatCen and Heart of Mersey; October 2005.
[5] See Table 14 of: http://new.wales.gov.uk/docrepos/40382/40382313/statistics/health/health-2006/sb51-2006-pt2.pdf?lang=en
[6] See: http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&uid=11556212&cmd=showdetailview&indexed=google

Table/Figure No.	Description	Source	Notes
		CBS Netherlands Statsline, accessed July 2007 *Nord-Pas-de-Calais* Insee, Conseil régional, Direction Régionale des Affairs Sanitares et Sociales (DRASS), Observatoire Régionale de la Santé (ORS), Cresge - Enquête Santé 2002-2003 *Saxony* German Microcensus, 2005 *North Rhine Westphalia* German Microcensus, 2003. *Southern Poland* Data for 1997 from Southern Poland Epidemiological Survey (covers two regions: Katowice and Bielsko), reported in: Tendera M et al. Prevalence of main risk factors for ischemic heart disease in a cohort of 41,972 participants from Southern Poland Epidemiological Survey. Wiad Lek. 2001;54(5-6):292-304[6]	
Fig 4.9	% adult population not drinking during last year.	Special Eurobarometer: Attitudes towards Alcohol, 2006[7]; and Scottish Health Survey (SheS) 2003.	SHeS 2003 defines adults as aged 16+, while Eurobarometer defines adults as aged 15+.
Fig 4.10	% adult population drinking alcohol daily.	Special Eurobarometer: Attitudes towards Alcohol, 2006; and Scottish Health Survey 2003.	NB (and as noted in main report) Scottish data are based on a much shorter time period than that reported in the Special Eurobarometer – consumption over a week compared to consumption over a month – which may impact on figures presented. SHeS 2003 defines adults as aged 16+, while Eurobarometer defines adults as aged 15+.
Table 4.2	Standardised mortality ratios, Clydeside relative to Merseyside, 1981, 1991,	Analysis carried out by Jamie Reid, Department of Public Health & Health Policy, University of Glasgow as an extension to his PhD thesis[8].	Clydeside conurbation defined as the area encompassed by the following Scottish Unitary Authorities: Glasgow City, East

[7] European Commission. Special Eurobarometer 27b/ Wave 66.2: Attitudes towards Alcohol. TNS Opinion and Social; March 2007.
[8] Reid, J. Excess mortality in the Glasgow conurbation: exploring the existence of a 'Glasgow Effect'

Table/Figure No.	Description	Source	Notes
	2001.		Dunbartonshire, East Renfrewshire, Inverclyde, North Lanarkshire, Renfrewshire, South Lanarkshire, and West Dunbartonshire. Merseyside defined as those Unitary Authorities that were previously part of the Merseyside Metropolitan County (which was abolished in 1992): City of Liverpool, Sefton, Wirral, Knowsley, Wigan and St Helens. Indirect standardisation was carried out (a) by age and sex, and then (b) by age, sex and deprivation decile, to calculate two sets of standardised all-cause mortality ratios for Clydeside relative to Merseyside. This was achieved using three years of mortality and population data for periods around the 1981, 1991 and 2001 censuses. Deprivation decile was based on Carstairs & Morris deprivation scores for the United Kingdom.
Table 4.3	% share of employees working in industry by region, 'base year' compared to 2005.	Base year data: Eurostat Regional Statistics Yearbook, 1971 (all Western European regions except: the Ruhr (Regionalverband Ruhr) ; Northern Ireland (Department of Manpower Services[9]); and UK regions (Linking Censuses through Time (http://cdu.mimas.ac.uk//software/lct/). Other sources: Eurostat (Saxony); Czech Statistical Office (Northern Moravia) and Polish Central Statistical Office (CSO) Regional Statistics Yearbook 1981[10] (Katowice).	Industrial employment defined as "all residents working in manufacturing, utilities, mining or construction." With the exception of the 1971 British data (based on a 10% sample), all figures are based on a survey sample using harmonised definitions. Total employment includes all residents in employment.

[9] Reported in Rowthorn, B. Northern Ireland: an economy in crisis. Cambridge Journal of Economics 1981; 5; 1-31.
[10] Reported in Grzegorz, G. Crisis or Recovery? Recent Developments in the Regional Processes in Poland. GeoJournal 1987; 15.1; 113-119

Table/Figure No.	Description	Source	Notes
		2005 data: Eurostat On-line Database; Annual Population Survey (UK regions); Czech Statistical Office (Northern Moravia); and the Polish CSO Regional Data Bank.	
Fig 4.11	% industrial employment lost, 'base year' to 2005.	As above.	Absolute change in the number of industrial employees for each region, between the base year and 2005, expressed a percentage.
Fig 4.12	% share of deindustrialisation over/under expected.	As above.	Regional share of the total change in industrial employment (between base year and 2005) minus the regional original (all base years combined) share of industrial employment. For example, of the 6.3m people employed in industry in the base year (across all regions), 7.4% were resident in Wallonia. Of the 2.9m industrial jobs lost between the base year and 2005, 6.1% were lost in Wallonia, suggesting that the region's share of de-industrialisation was slightly below the 'expected' level.
Appendix 7a	See notes to Figs 3.5-3.12 above.		
Appendix 7b	See notes to Figs 3.13-3.24 above.		
Appendix 7c	See notes to Figs 3.25-3.32 above.		
Appendices 8a-8j	Age standardised mortality rates, Scotland, the WoS and Greater Glasgow & Clyde compared to 10 other regions.	Sources (and relevant time periods) of mortality and population data for each region are listed in Appendix 4.	Rates calculated as directly age standardised to the European standard population, and presented as three year rolling averages. Data for some causes/time periods not shown – see Appendix 4 for availability of data for each region. NB

Table/Figure No.	Description	Source	Notes
			Similar rates for ages 15-44, 45-64, 65+ are available on request.

Appendix 3. Causes of death definitions

Cause	ICD9 codes	ICD10 codes
All malignant neoplasms	140-208	C00-C97
Breast cancer (malignant neoplasm of female breast)	174	C50
Lung cancer (malignant neoplasm of trachea/bronchus/lung)	162	C33-C34
Oesophageal cancer	150	C15
Colorectal cancer	153,154	C18-C21
Stomach cancer	151	C16
Prostate cancer	185	C61
Diseases of circulatory system	390-459	I00-I99
Cerebrovascular disease	430-438	I60-I69
Ischaemic heart disease	410-414	I20-I25
Chronic obstructive pulmonary disease (COPD) & related conditions (bronchitis, emphysema, asthma, other COPD)	490-493, 495, 496	J40-J46, J67
All external causes	E800-E999	V01-Y98
Suicide & self-inflicted injury (including undetermined intent)	E950-E959; E980-E989	X60-X84; Y10 – Y34
Motor vehicle traffic accidents	E810-E819	V02-V04, V09, V12-V14, V20-V79, V82-V87, V89
Chronic liver disease & cirrhosis	571	K70, K73, K74, K76

Appendix 4. Availability and sources of mortality and population data by region/country

Region	Country	Data sources	Time period covered by data	Notes/caveats
The Ruhr area	Germany	North Rhine-Westphalia Institute for Health and Work (LIGA)	1980-2005 (mortality and population data for calculation of age, sex and cause specific mortality rates); 1990-2005 (for calculation of life expectancy estimates)	For calculation of age, sex and cause specific mortality rates, deaths and population data were obtained for five-year age bands with the exception of data relating to children, which were grouped together within 'age 1-14' banding. The calculation of life expectancy estimates using Chiang (II) methodology (see Appendix 2) required data to be split by age 0, 1-4, 5-9 and 10-14: thus, a separate extract was requested, and this was only available for the period 1990-2005.
Saxony-Anhalt	Germany	Statistical Office Saxony Anhalt (Landesamt für Verbraucherschutz Sachsen-Anhalt)	1995-2005	Only all-cause mortality data available.
Saxony	Germany	Statistical Office of Free State of Saxony (Statistisches Landesamt des Freistaates Sachsen)	1983-2005	
Chemnitz (in Saxony)	Germany	As above	As above	
Leipzig (in Saxony)	Germany	As above	As above	
Wallonia	Belgium	Scientific Institute of Public Health, Centre of Operational Research of Public Health, Brussels	1987-1997	Data could not be obtained post 1997.

Region	Country	Data sources	Time period covered by data	Notes/caveats
Nord-Pas-de-Calais	France	CépiDc, Institut National de la Santé et de la Recherche Médicale (INSERM)	Data made available for individual years: 1983; 1987; 1991; 1995; 1999; and 2003;	Rates calculated for the individual years for which data were made available. However, note that in charts 3.2-3.32 and those presented within Appendices 7a, 7b and 7c rates for years for which no data was available were imputed: this was to avoid creating confusingly-shaped charts. Note also that a marked decrease in deaths from COPD and related conditions (see Appendix 3 for detailed definitions) was noticeable between 1999 and 2003 in all the French regions: when queried, this was put down to the change in ICD coding - ICD9 codes were in use for the first five years of the data obtained (1983, 1987, 1991, 1995, and 1999), but ICD10 was in operation for the final year (2003). However, no such difference was visible in the analyses of any other of the regions. As a result, COPD deaths for 2003 for French regions are excluded from the analyses presented in the report.
Lorraine	France	As above	As above	
Moselle	France	As above	As above	
Alsace	France	As above	As above	
Katowice (Silesia)	Poland	Department of Cancer Epidemiology and Prevention, Cancer Centre and Institute of Oncology, Warsaw	1975-2005	Note that due to Marshal Law in Poland between 1980 and 1982, data for suicide and self-inflicted injury and motor vehicle traffic accidents are “not reliable in this period" – and have thus been excluded.
Northern Moravia	Czech Republic	Institute of Health Information and Statistics of the Czech Republic	1991-2005	

Region	Country	Data sources	Time period covered by data	Notes/caveats
Limburg	Netherlands	CBS Statsline; GGD Nederland, Utrecht	1996-2005	Deaths and population data only available for 10 age bands: 0, 1-24, 25-44, 45-54, 55-64, 65-69, 70-74, 75-79, 80-84 and 85+; thus, standardised rates and life expectancy calculations differ slightly from those shown for all other regions. Note that comparable data on deaths from motor vehicle transport accidents were not available.
Greater Manchester	England	Office for National Statistics (ONS)	1988-2005	
Tyne Tees & Durham	England	As above	1988-2005	
Northumberland & Tyne and Wear	England	As above	1988-2005	
Merseyside	England	As above	1988-2005	
West Midlands	England	As above	1988-2005	
Swansea & South Wales Coalfields	Wales	As above	1988-2005	
Northern Ireland	N. Ireland	Northern Ireland Statistics and Research Agency (NISRA)	1979-2005	
Scotland	Scotland	General register Office for Scotland (GRO(S))	1980-2005	
West of Scotland	Scotland	As above	1982-2005	
Greater Glasgow & Clyde NHS Board	Scotland	As above	1982-2005	

Appendix 5. Assessing the contribution of individual causes of death: West of Scotland vs. Saxony, expressed as absolute numbers of deaths

The Table below is the equivalent of Table 3.1 (section 3.3), but based on the comparison of the West of Scotland's mortality profile with Saxony, rather than with Northern Ireland. By applying the age and sex-specific mortality rates of Saxony to the West of Scotland population, we can obtain the numbers of deaths we would expect to see if the West of Scotland experienced the same proportional levels of mortality for these causes as is seen in the German federal state. Thus, the Table below shows the difference between the actual numbers of deaths which took place in the West of Scotland between 2003 and 2005 and the 'expected' numbers that would have occurred if the West of Scotland had experienced the same age, sex and cause-specific levels of mortality as Saxony did over the three-year period. Note that the numbers are shown as annual averages. Green represents a decrease, and red an increase. Appendix 2 includes more methodological details (in relation to Table 3.1).

Note that, compared to the equivalent Table for Northern Ireland, much greater decreases are seen within the 'all other' category. The discussion in Section 3.3 on the composition of this category for West of Scotland mortality is clearly also relevant here.

Comparison of mortality between Saxony and West of Scotland, 2003-2005

Difference between actual and 'expected' deaths ('expected' from application of Saxony age-specific rates to WoS population)

Numbers of average annual deaths (green = decrease; red = increase)

	Age group	ALL CAUSE	All Malignant neoplasms	Diseases of circulatory system	COPD & related conditions	All external causes	Suicide (including undetermined intent)	Motor vehicle traffic accidents	External excl. MVTAs & suicide	Chronic liver disease & cirrhosis	ALL OTHER
MALE	**0-4**	-30	1	0	0	2	0	2	0	0	-33
	5-9	-1	0	0	0	0	1	-1	1	0	-1
	10-14	2	-1	0	0	1	0	0	1	0	2
	15-19	-11	0	-1	0	0	-1	7	-6	0	-9
	20-24	-29	-1	-1	0	-7	-8	11	-9	-1	-19
	25-29	-33	0	0	0	-12	-10	3	-4	-2	-20
	30-34	-75	-2	-4	0	-20	-17	2	-5	-5	-43
	35-39	-73	-1	-8	0	-23	-18	0	-6	-8	-33
	40-44	-31	7	-10	-1	-5	0	1	-7	-8	-14
	45-49	2	24	-17	-3	5	8	1	-5	-15	9
	50-54	-39	5	-29	-6	12	9	4	-1	-16	-4
	55-59	-131	-14	-74	-12	12	14	3	-5	-19	-25
	60-64	-327	-87	-115	-28	-1	7	0	-9	-27	-69
	65-69	-413	-141	-138	-48	2	7	0	-5	-3	-84
	70-74	-366	-126	-78	-55	5	8	1	-5	3	-114
	75-79	-434	-155	-22	-80	9	11	2	-4	1	-186
	80-84	-253	-109	89	-48	4	10	0	-6	0	-189
	85+	72	-70	442	-38	29	16	2	11	2	-293
	TOTAL	-2170	-670	30	-320	13	37	40	-64	-97	-1125
FEMALE	**0-4**	-29	-2	-1	0	0	1	0	0	0	-27
	5-9	4	1	0	0	2	0	0	1	0	0
	10-14	-2	-1	0	0	0	0	0	0	0	-1
	15-19	-6	0	-1	0	-3	-3	1	-1	0	-2
	20-24	-2	0	1	0	0	-3	2	0	0	-2
	25-29	-13	0	0	0	-4	-2	0	-2	-1	-7
	30-34	-33	-5	-3	1	-6	-5	1	-2	-6	-13
	35-39	-46	-6	-7	0	-7	-7	2	-2	-4	-22
	40-44	-44	-13	-10	0	-2	-2	1	-1	-9	-10
	45-49	-63	-14	-13	-2	-3	-4	1	0	-14	-16
	50-54	-118	-35	-21	-8	-8	-5	1	-4	-19	-27
	55-59	-202	-79	-36	-19	-6	-1	-1	-4	-18	-46
	60-64	-326	-114	-93	-41	3	3	0	0	-15	-66
	65-69	-439	-163	-119	-73	4	3	1	0	-4	-83
	70-74	-489	-158	-95	-106	1	4	2	-4	-3	-129
	75-79	-619	-207	-38	-136	6	6	-2	1	2	-246
	80-84	-483	-174	139	-112	13	7	1	5	5	-354
	85+	32	-135	1127	-81	26	11	0	15	3	-907
	TOTAL	-2877	-1105	831	-577	17	2	11	4	-84	-1959

Appendix 6. Assessing the contribution of individual causes of death: analysis of SMRs for West of Scotland relative to Saxony

The reasons for undertaking this analysis, and the methodology employed are explained in Section 3.3, and in Appendix 2.

All-cause and cause-specific SMRs for the West of Scotland relative to Northern Ireland are shown in Table 3.2; the Table below presents equivalent data for west of Scotland relative to Saxony. As with the comparison with Northern Ireland, this shows increasing SMRs for males (recorded excess mortality of: 17%, 22%, and 30%) and females (31%, 66%, 75%). Tables for the other age groups, and for both regions, are available on request from the authors.

Standardised mortality ratios (SMRs), age 0-64, for West of Scotland relative to Saxony, 1983-85, 1993-95, 2003-05

		1983-1985	1993-1995	2003-2005
		SMR (95% confidence intervals)	SMR (95% confidence intervals)	SMR (95% confidence intervals)
MALES	All-cause	**116.8** (114.8 - 118.7)	**122.1** (120 - 124.1)	**129.9** (127.3 - 132.4)
	All malignant neoplasms	**118.8** (114.9 - 122.7)	**120.7** (116.7 - 124.7)	**109.0** (104.8 - 113.3)
	Diseases of circulatory system	**167.5** (163.3 - 171.6)	**188.0** (183.3 - 192.7)	**141.0** (135.7 - 146.3)
	COPD & related conditions	**163.2** (149.2 - 177.3)	**236.7** (216.4 - 257.1)	**244.4** (214.7 - 274.1)
	All external causes	**71.7** (68.1 - 75.2)	**74.4** (70.7 - 78)	**109.3** (103.3 - 115.3)
	Suicide & undetermined intent	**49.1** (44.9 - 53.3)	**71.4** (65.3 - 77.4)	**108.2** (99.7 - 116.7)
	Motor vehicle traffic accidents	**104.5** (94.8 - 114.3)	**58.4** (53 - 63.9)	**64.1** (54.8 - 73.4)
	External excl. MVTAs & suicide	**87.3** (80.3 - 94.3)	**97.7** (89.8 - 105.6)	**154.1** (140.2 - 168.1)
	Chronic liver disease & cirrhosis	**63.5** (55.9 - 71.1)	**23.7** (20.9 - 26.6)	**136.0** (128.1 - 144)
	All other causes	**80.7** (77.1 - 84.3)	**107.6** (102.9 - 112.4)	**152.2** (145.9 - 158.5)
FEMALES	All-cause	**131.1** (128.4 - 133.8)	**166.6** (163.2 - 170.1)	**175.1** (170.7 - 179.4)
	All malignant neoplasms	**143.1** (138.2 - 147.9)	**156.5** (151.1 - 161.8)	**150.1** (144.1 - 156.1)
	Diseases of circulatory system	**170.8** (164.7 - 177)	**234.1** (225.6 - 242.5)	**190.4** (179.5 - 201.4)
	COPD & related conditions	**434.4** (391.8 - 477.1)	**538.5** (485.7 - 591.3)	**750.4** (655.6 - 845.1)
	All external causes	**67.2** (61.7 - 72.6)	**92.8** (85.3 - 100.3)	**127.6** (115.8 - 139.5)
	Suicide & undetermined intent	**44.5** (38.6 - 50.5)	**90.2** (78.2 - 102.2)	**148.6** (130.4 - 166.7)
	Motor vehicle traffic accidents	**100.6** (83.4 - 117.7)	**61.3** (50.9 - 71.8)	**67.1** (49.9 - 84.4)
	External excl. MVTAs & suicide	**92.4** (80.7 - 104)	**133.5** (116.7 - 150.3)	**145.6** (120.6 - 170.6)
	Chronic liver disease & cirrhosis	**134.5** (116.3 - 152.7)	**50.7** (43.9 - 57.6)	**199.7** (182.6 - 216.8)
	All other causes	**91.1** (86.6 - 95.6)	**170.5** (162 - 178.9)	**209.0** (197.9 - 220)

Appendix 7a. Working age (15-44) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis

Key to graphs:
- Maximum
- Mean
- Minimum
- West of Scotland

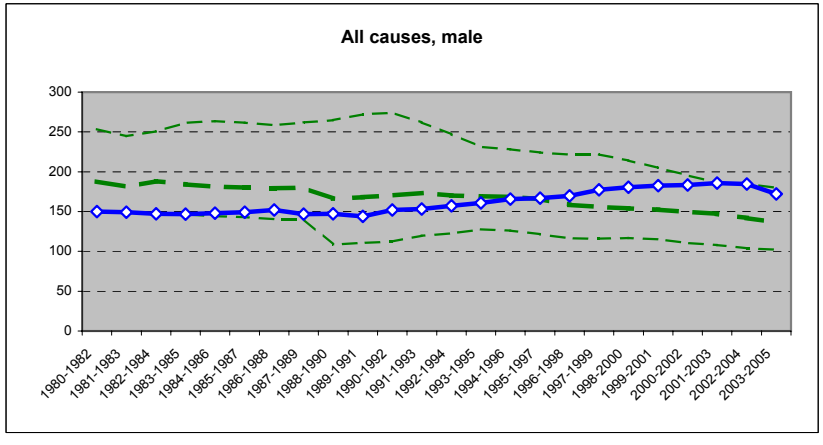
NB Selected causes only: causes with very small numbers in this age group (i.e. various cancers (prostate, oesophageal, stomach, colorectal, female lung cancer) and COPD) are not shown.

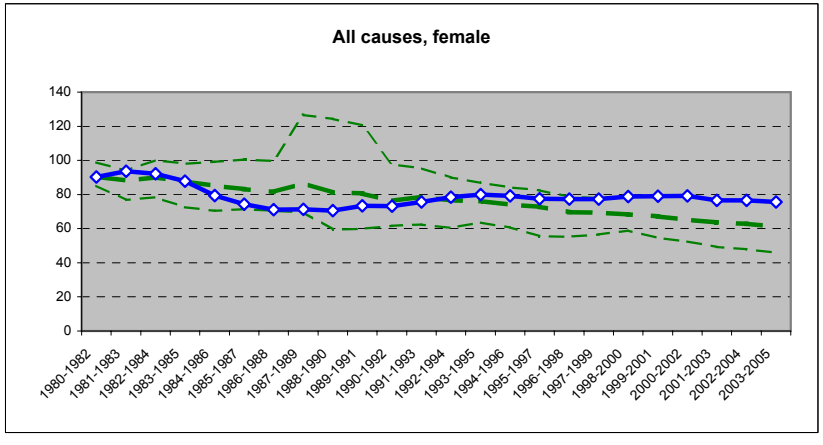
Regions included: Katowice; Merseyside; Nord-Pas-de-Calais; N. Ireland; N. Moravia; Ruhr; Saxony; Swansea & S. Wales Coalfields; Wallonia

No. of regions included in analysis by year (*NB some exceptions apply for some causes & regions - see Appendix 2 for details***)**

1980-1982	1981-1983	1982-1984	1983-1985	1984-1986	1985-1987	1986-1988	1987-1989	1988-1990	1989-1991	1990-1992	1991-1993
4	4	5	6	6	6	6	7	9	9	9	10
1992-1994	1993-1995	1994-1996	1995-1997	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005
10	10	10	10	9	9	9	9	9	9	9	8

See Appendices 2-4 for all definitions, methods and sources.

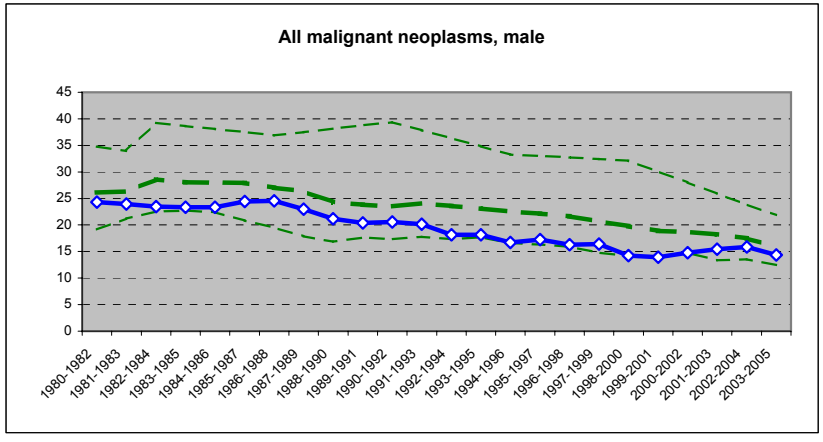


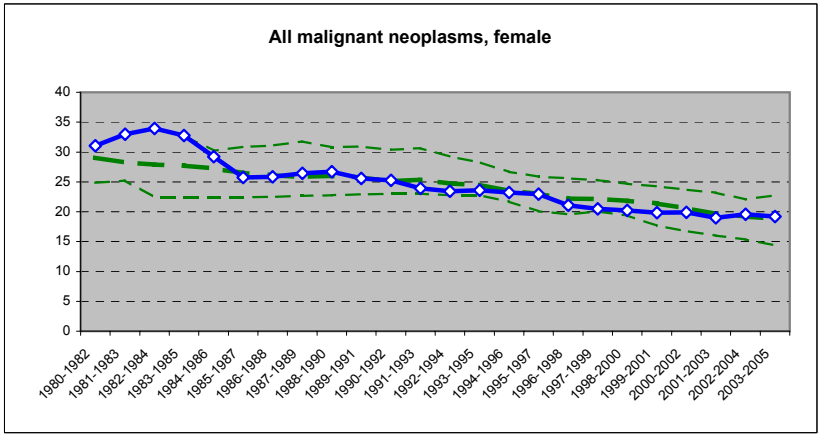


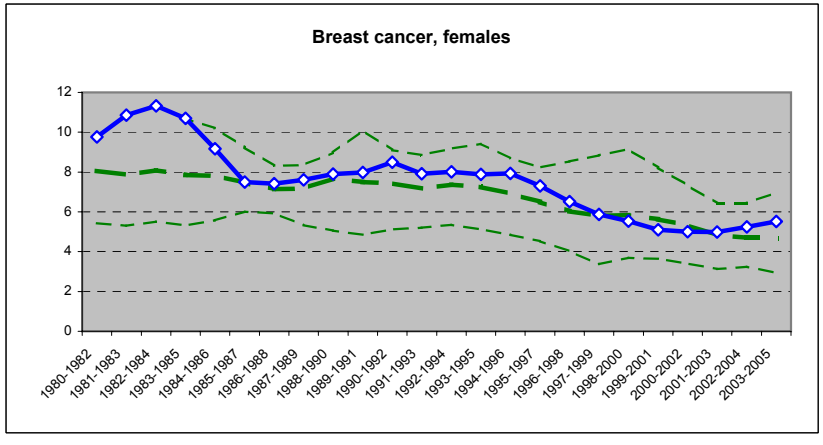
Appendix 7a. Working age (15-44) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

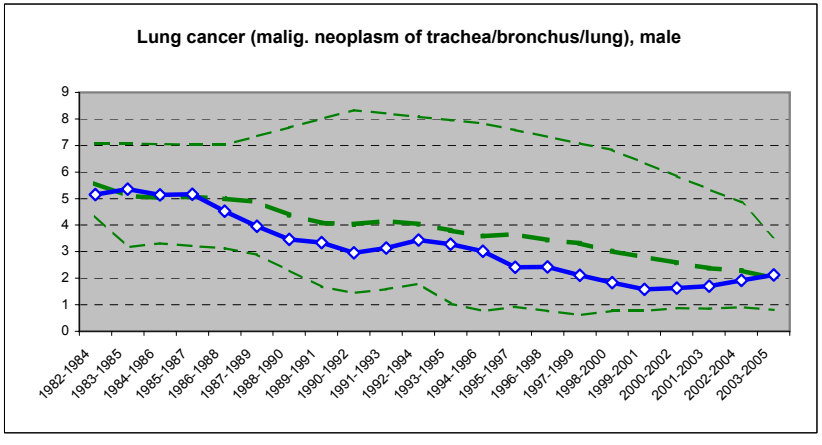
EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis









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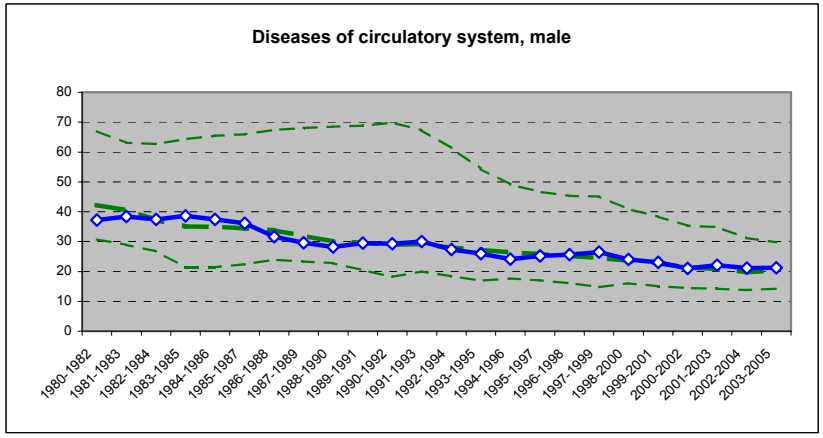

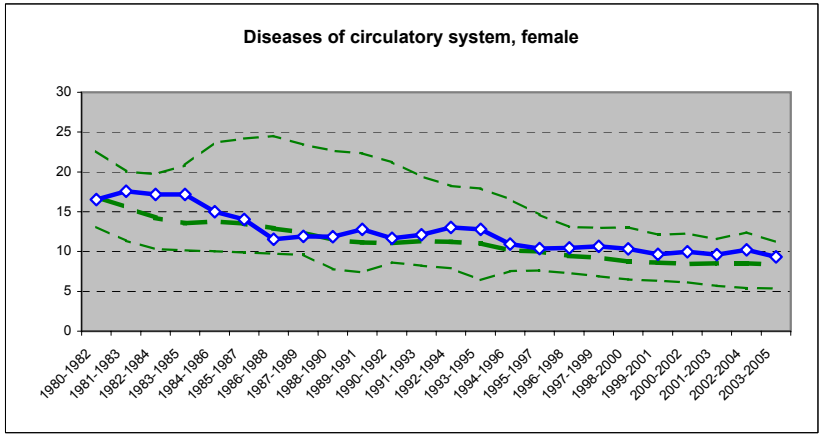

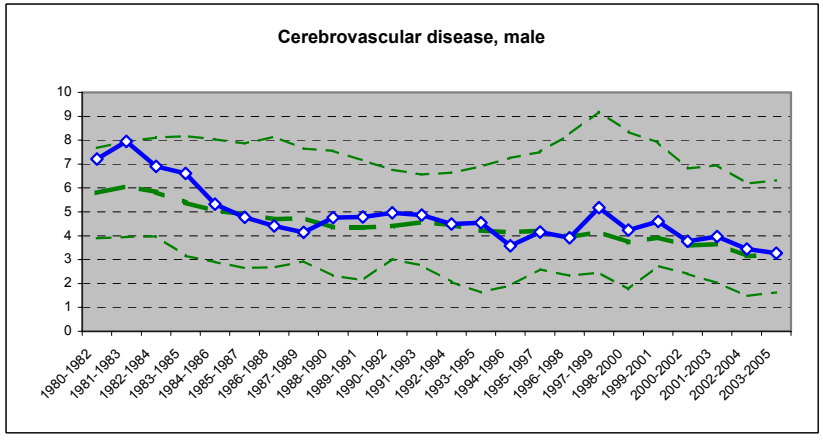

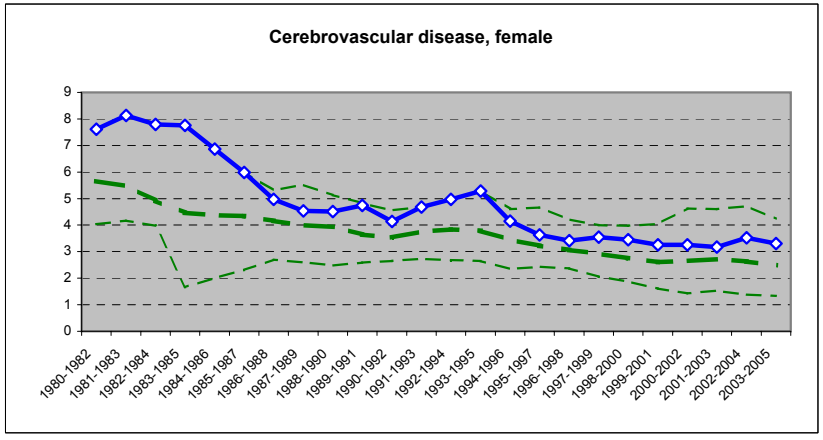

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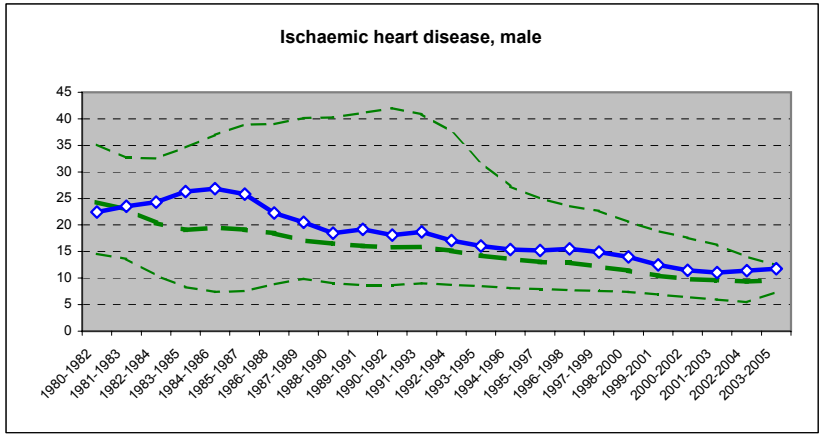

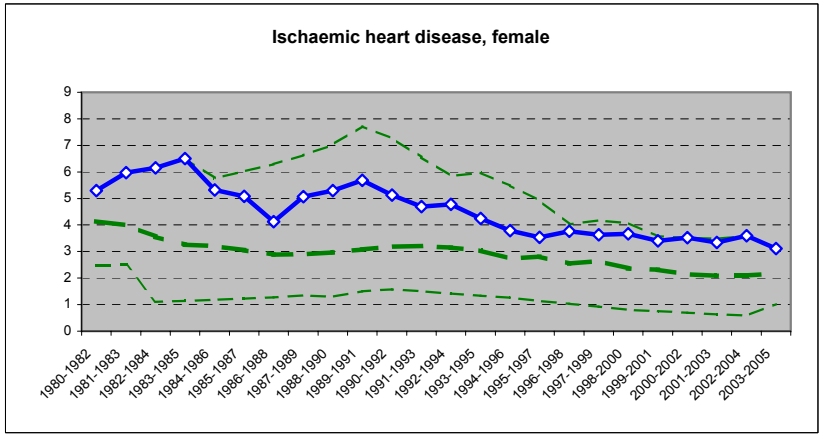

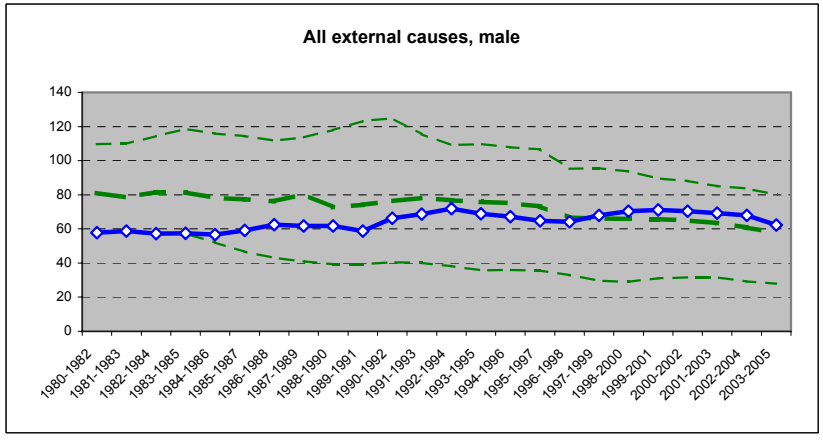

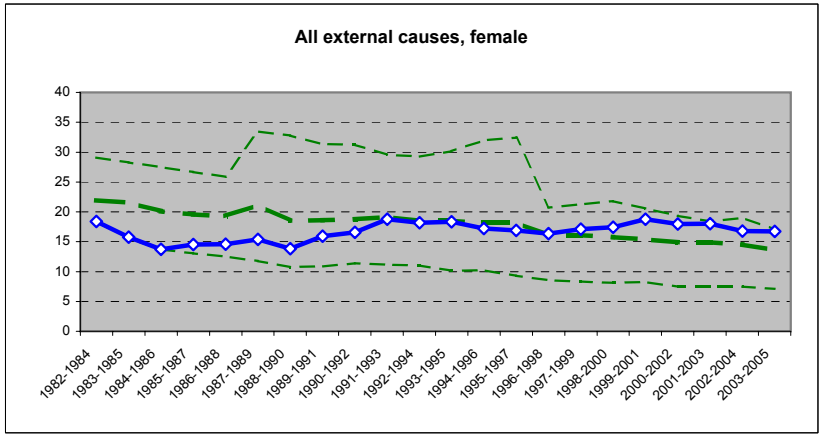

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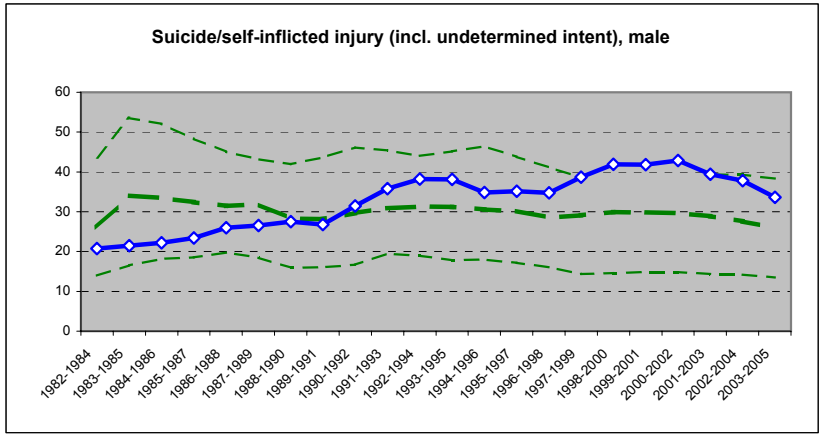
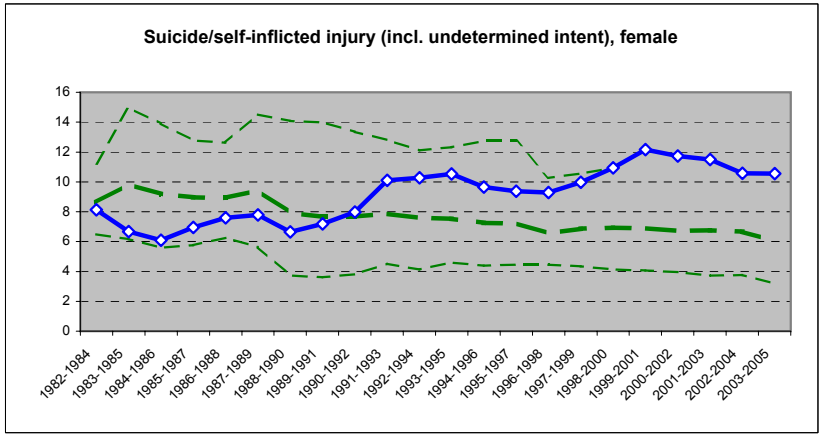
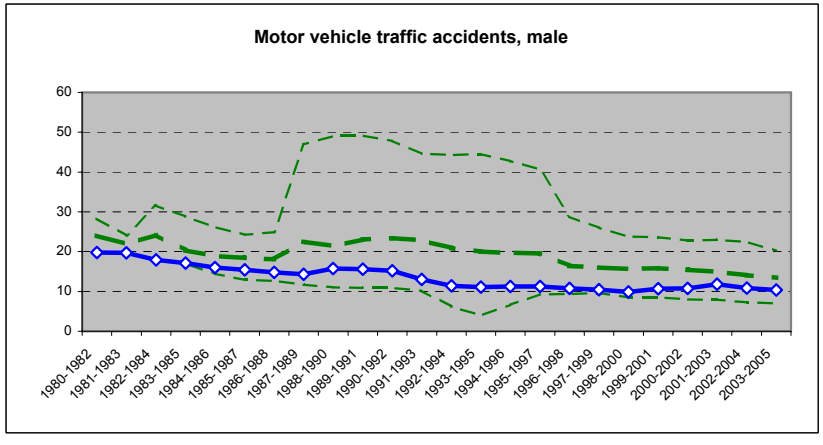
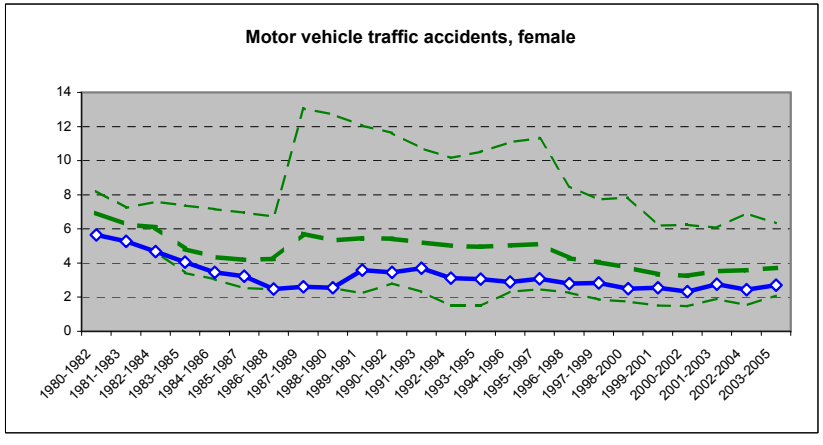
EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis









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EASRs per 100,000 population shown as three year rolling averages

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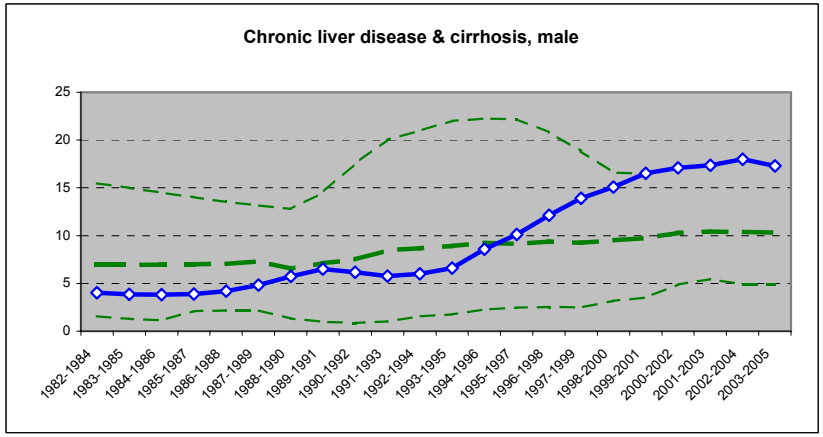
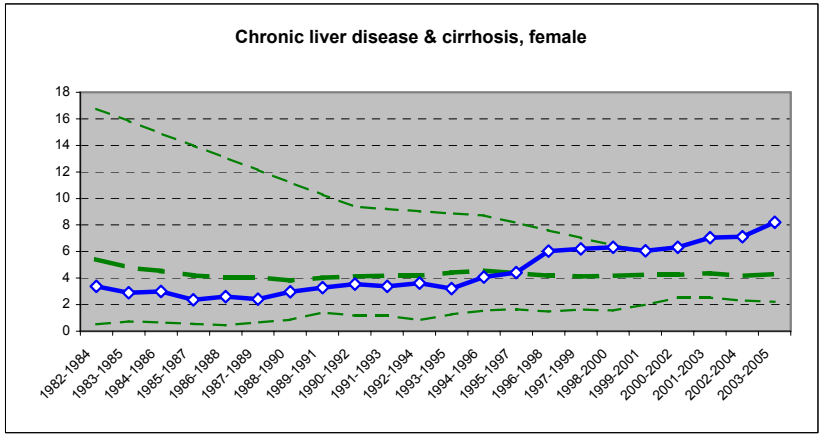




Appendix 7b. Working age (45-64) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis

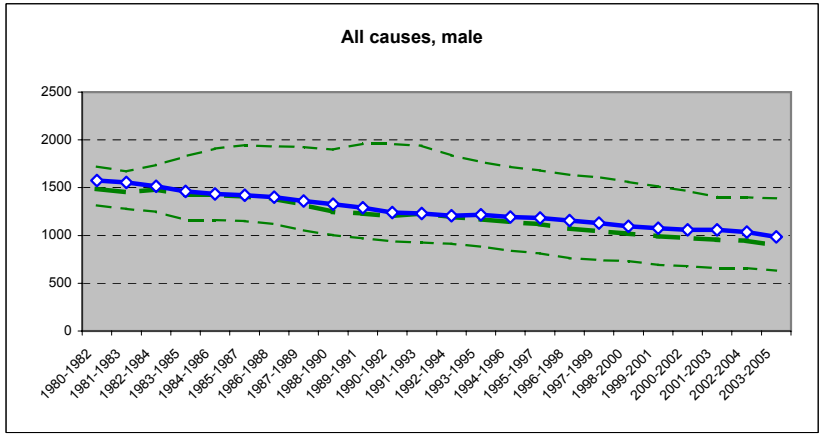
Key to graphs:
- Maximum
- Mean
- Minimum
- West of Scotland

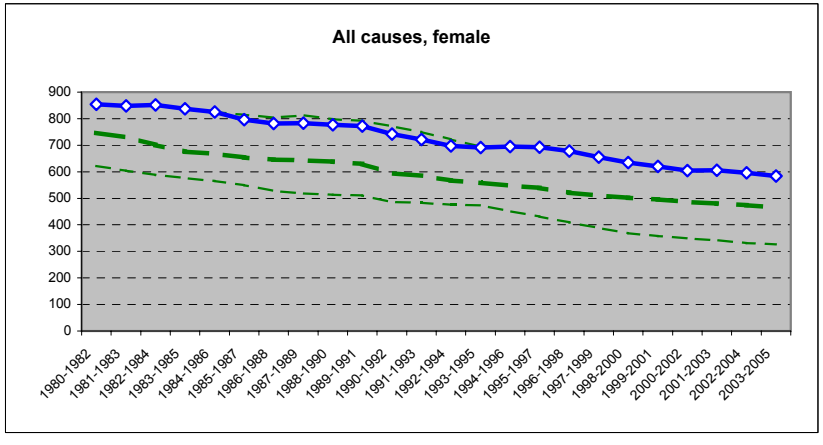
Regions included: Katowice; Merseyside; Limburg; Nord-Pas-de-Calais; N. Ireland; N. Moravia; Ruhr; Saxony; Swansea & S. Wales Coalfields; Wallonia

See Appendices 2-4 for all definitions, methods and sources.

No. of regions included in analysis by year (*NB some exceptions apply for some causes & regions - see Appendix 2 for details***)**

1980-1982	1981-1983	1982-1984	1983-1985	1984-1986	1985-1987	1986-1988	1987-1989	1988-1990	1989-1991	1990-1992	1991-1993
4	4	5	6	6	6	6	7	9	9	9	10
1992-1994	1993-1995	1994-1996	1995-1997	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005
10	10	10	10	10	10	10	10	10	10	10	9





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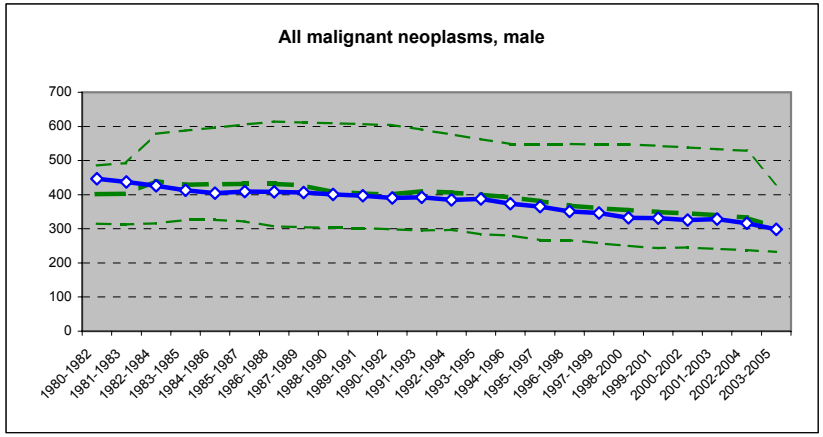

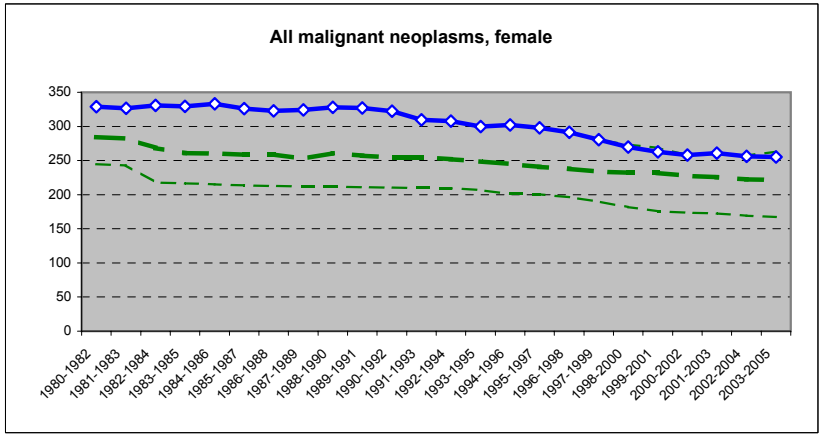

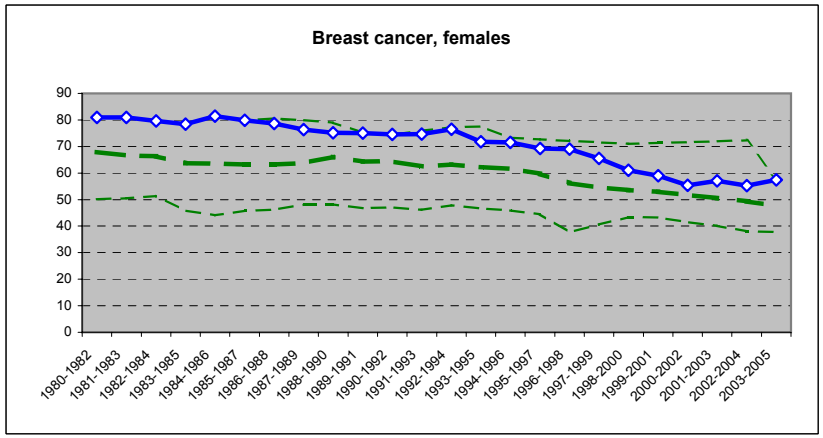

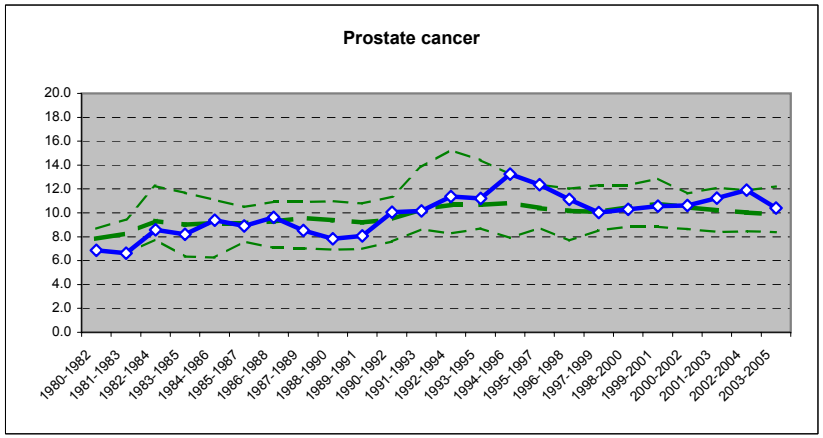

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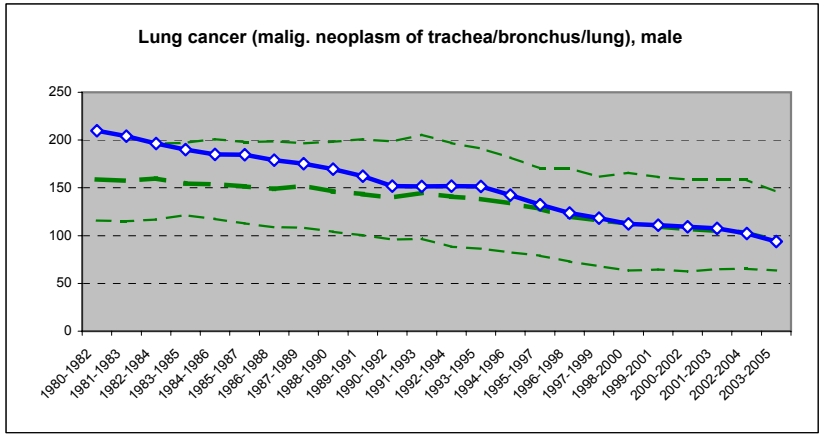
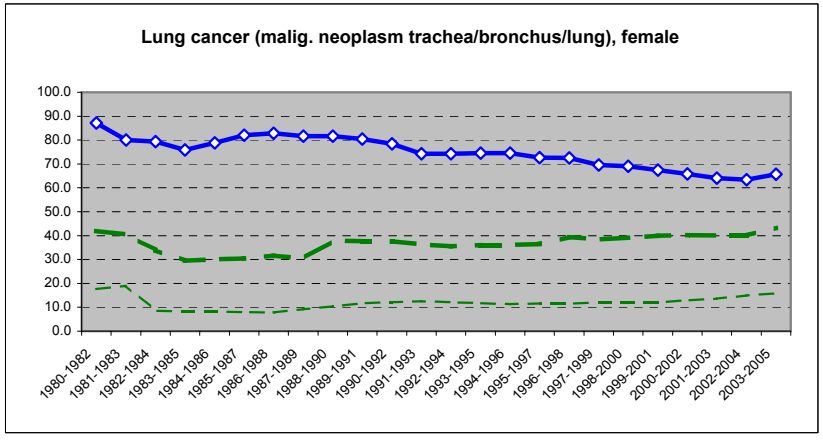
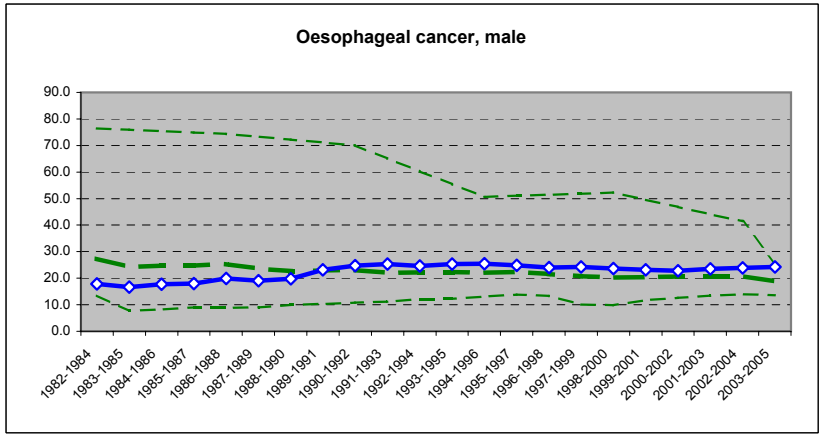
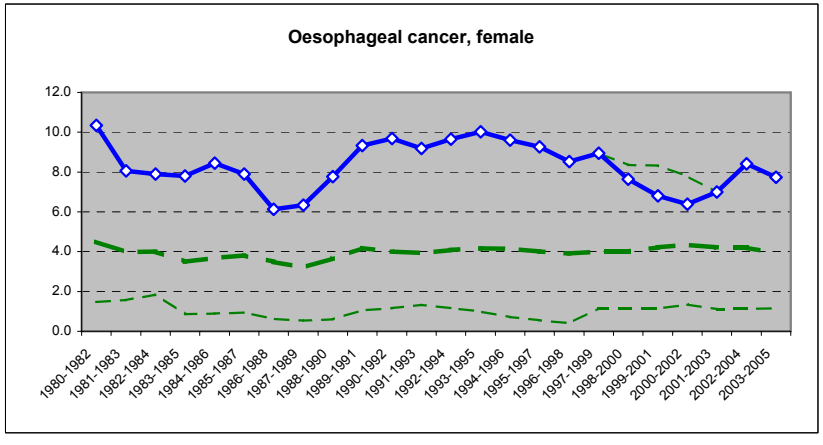
EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis









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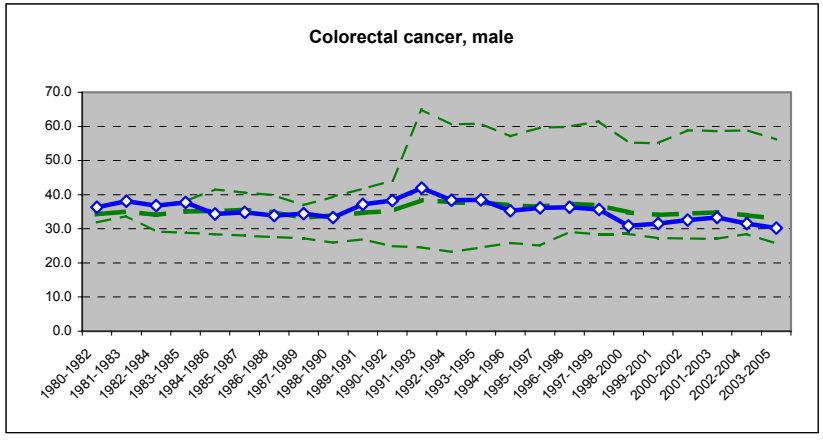

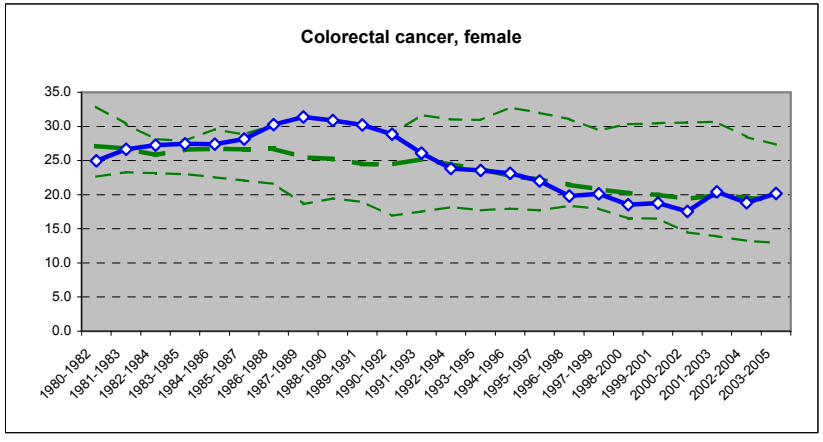

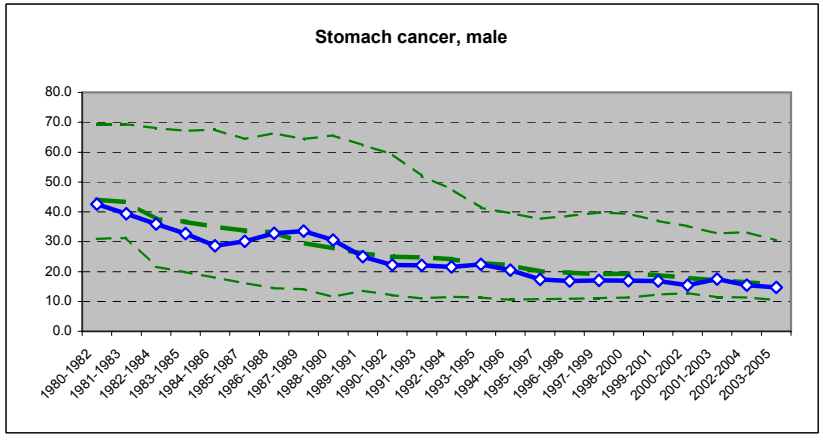

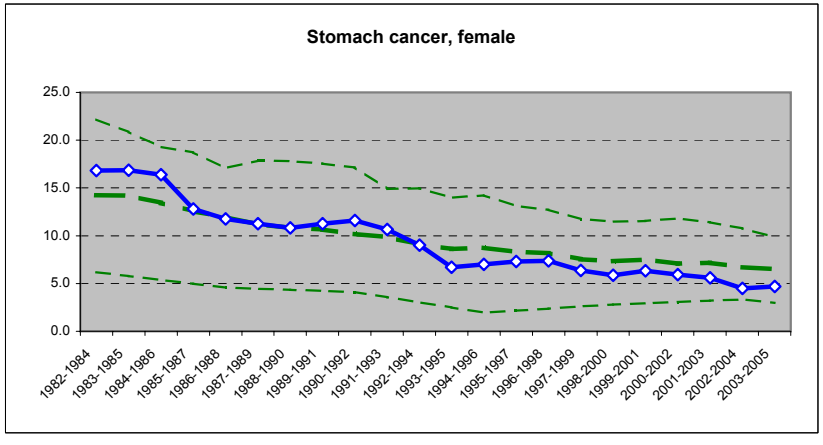

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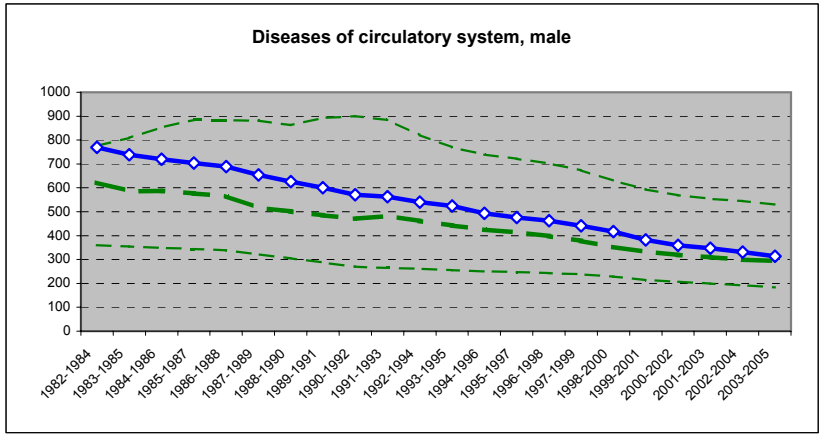
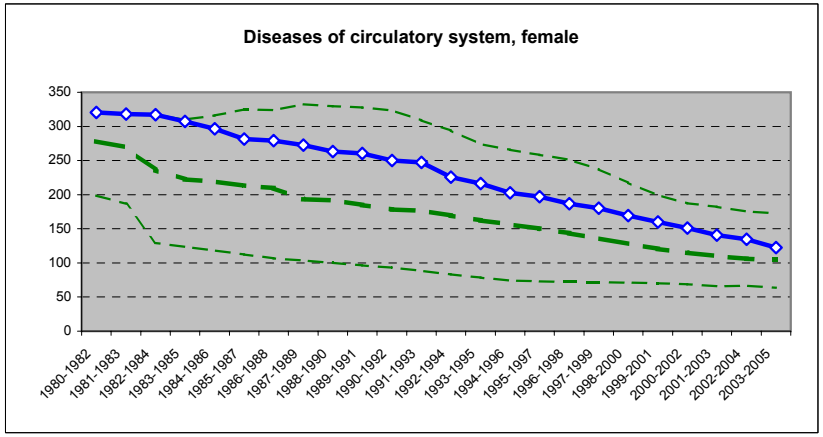
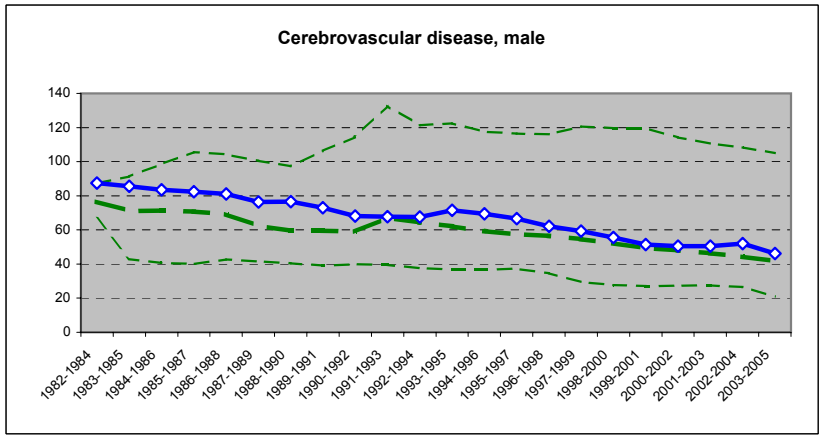
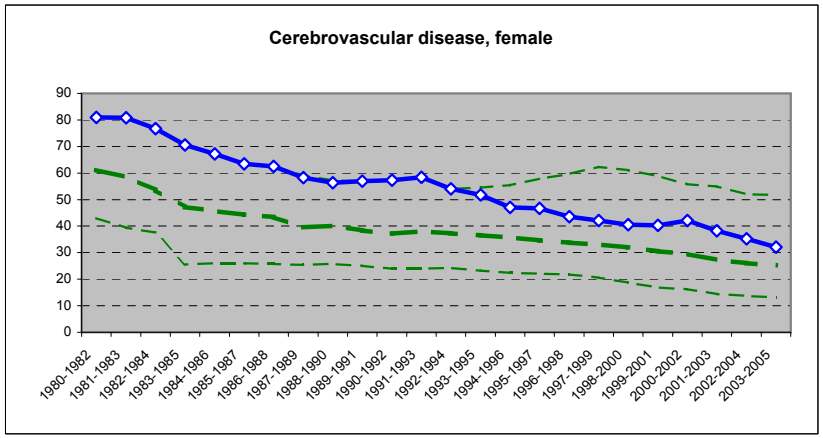




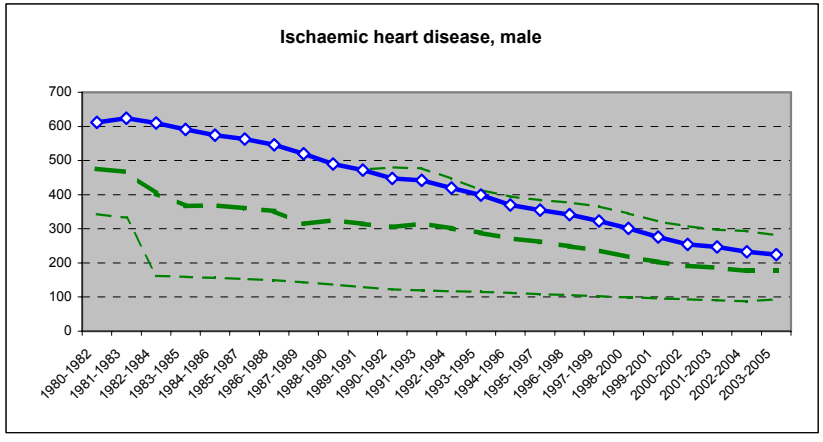


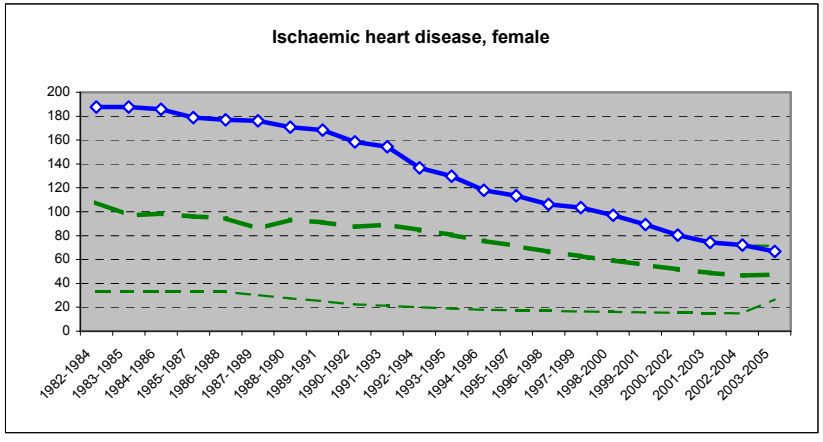


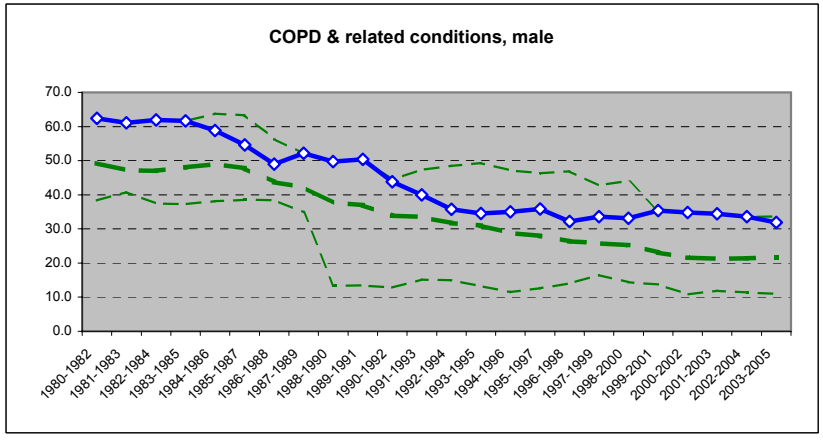
Appendix 7b. Working age (45-64) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

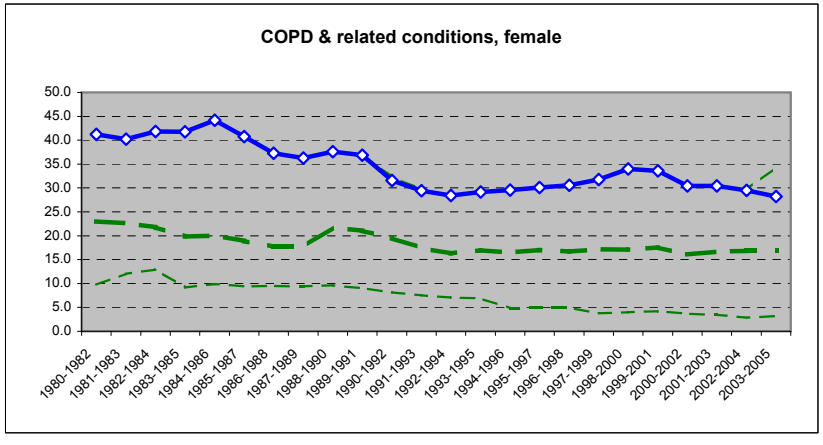
EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis









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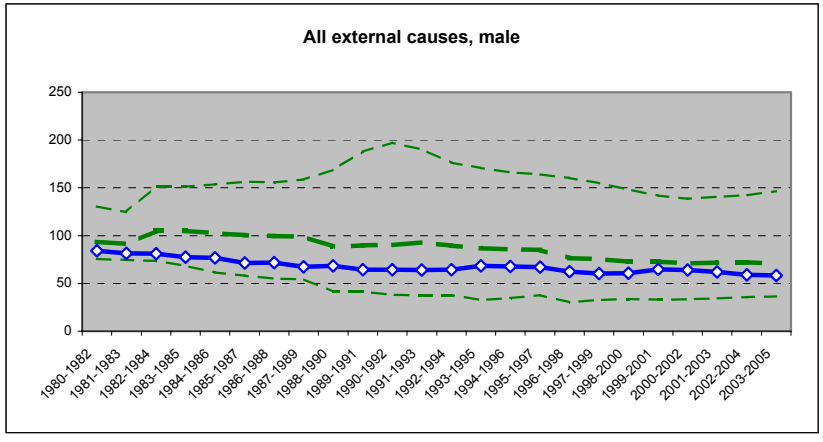

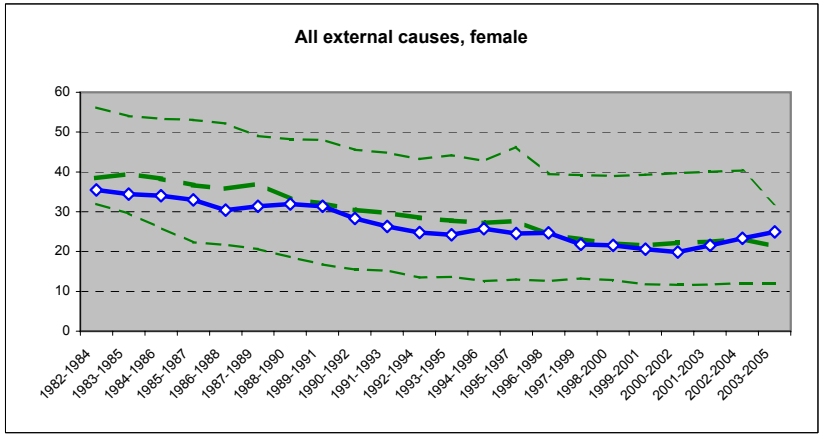

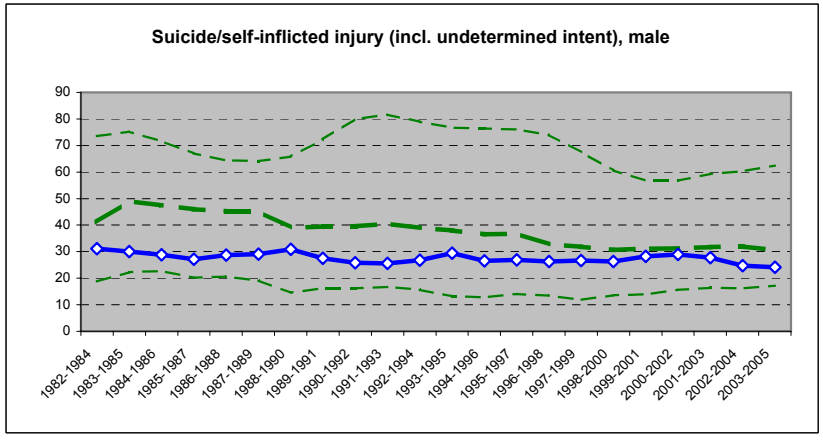

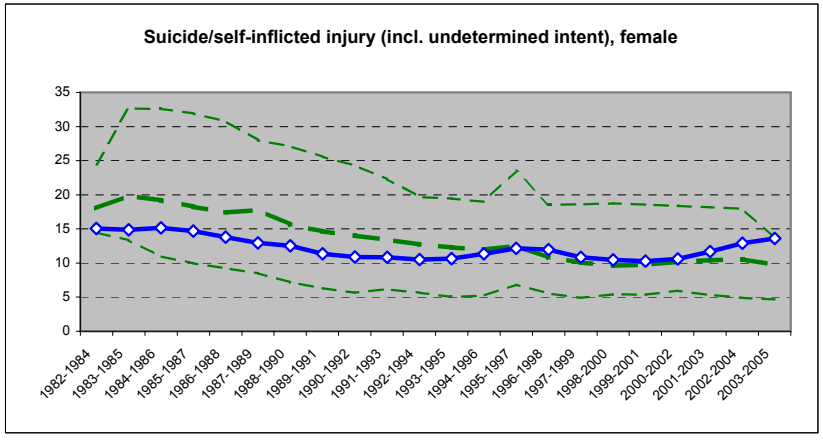

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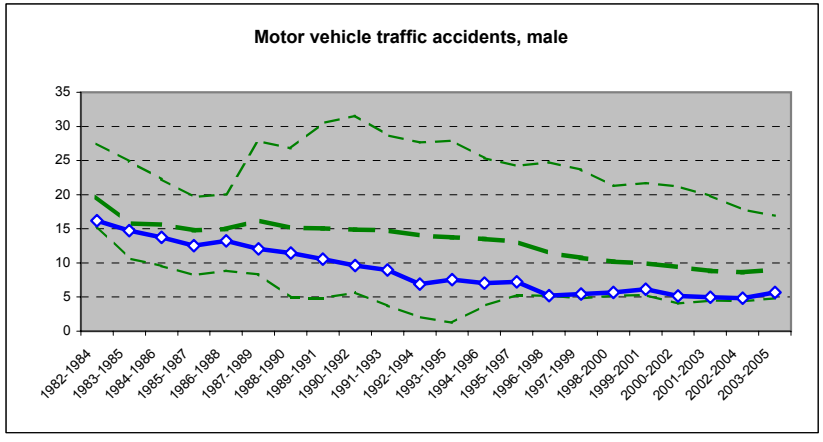
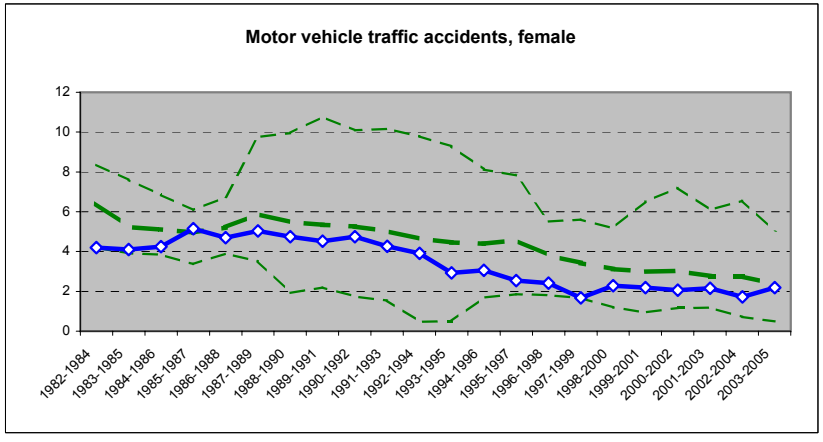
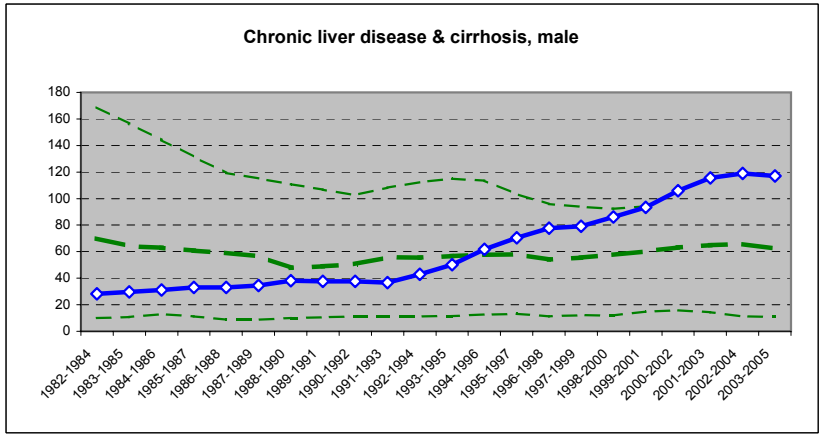
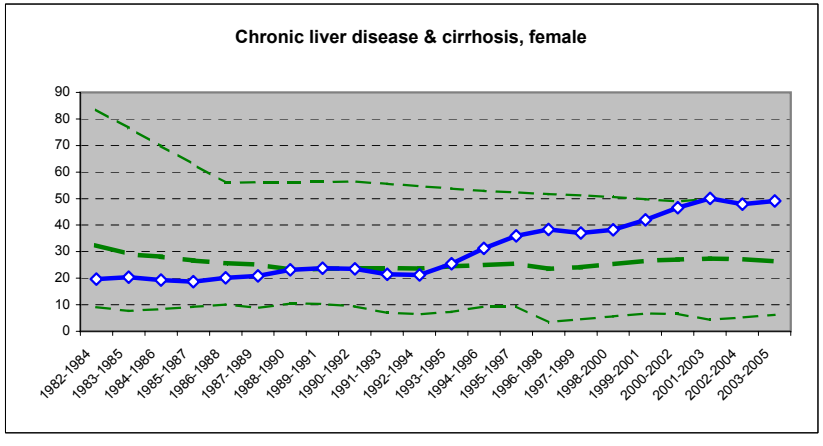








Appendix 7c. Elderly (65+) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

EASRs per 100,000 population shown as three year rolling averages

NB Not all regions are included in each year of analysis

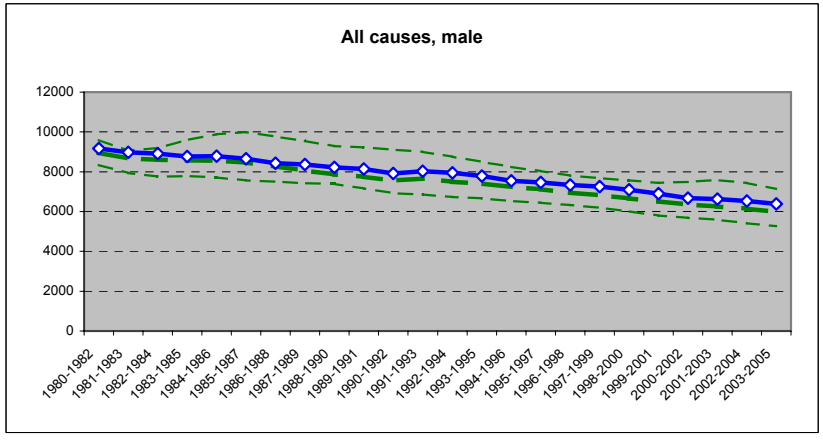
Key to graphs:
- Maximum
- Mean
- Minimum
- West of Scotland

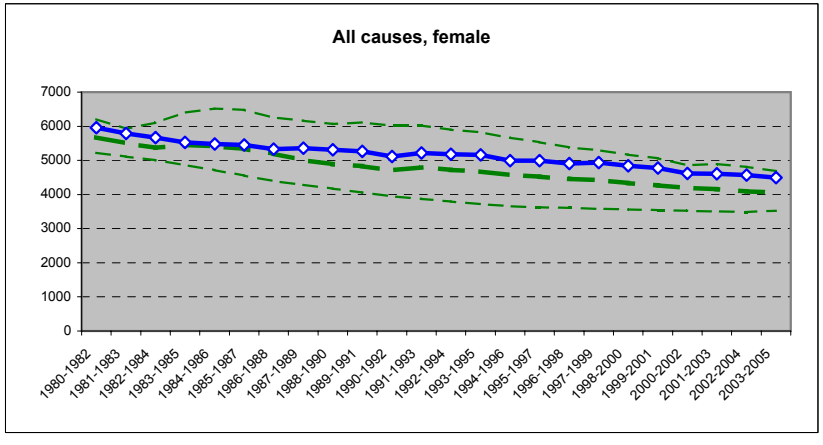
Regions included: Katowice; Merseyside; Limburg; Nord-Pas-de-Calais; N. Ireland; N. Moravia; Ruhr; Saxony; Swansea & S. Wales Coalfields; Wallonia

See Appendices 2-4 for all definitions, methods and sources.

No. of regions included in analysis by year (*NB some exceptions apply for some causes & regions - see Appendix 2 for details***)**

1980-1982	1981-1983	1982-1984	1983-1985	1984-1986	1985-1987	1986-1988	1987-1989	1988-1990	1989-1991	1990-1992	1991-1993
4	4	5	6	6	6	6	7	9	9	9	10
1992-1994	1993-1995	1994-1996	1995-1997	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005
10	10	10	10	10	10	10	10	10	10	10	9





Appendix 7c. Elderly (65+) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

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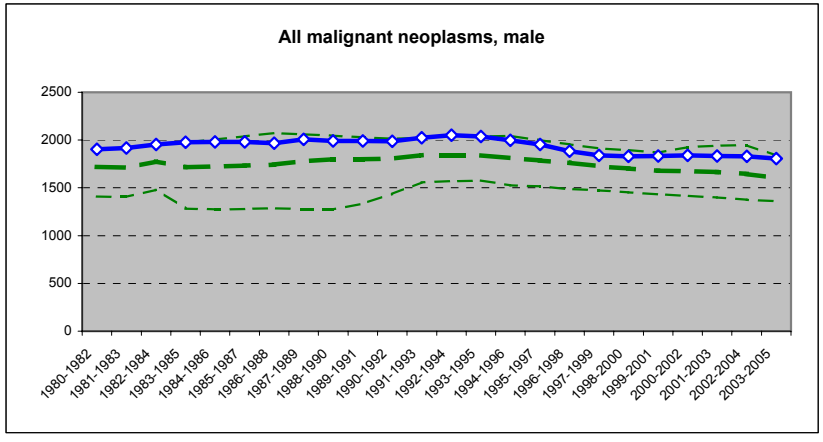

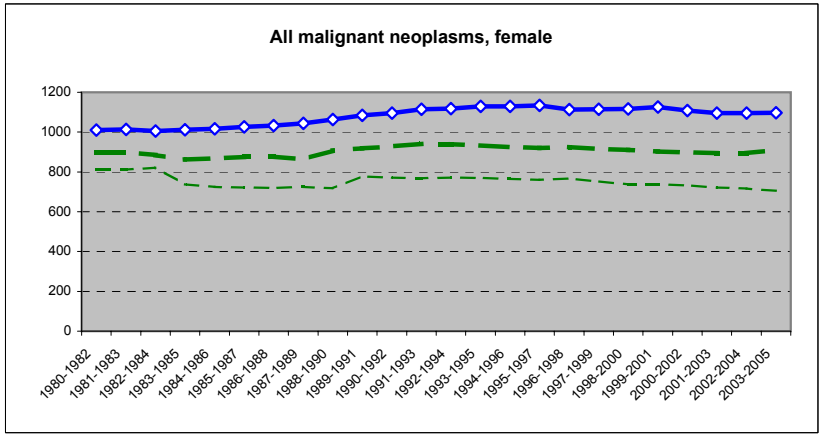

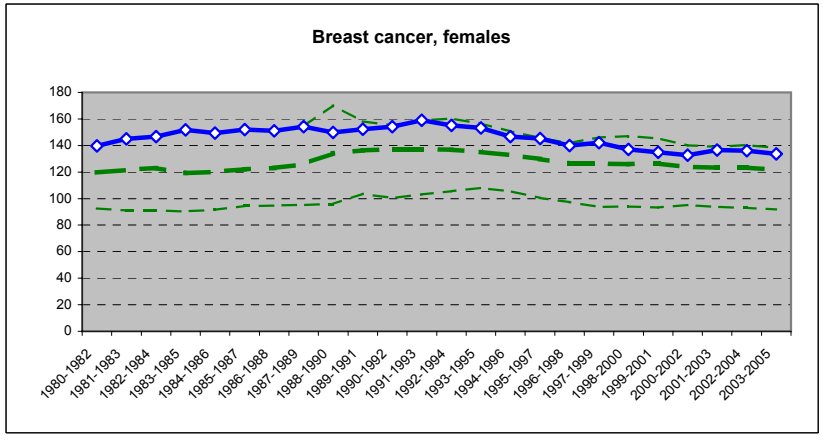

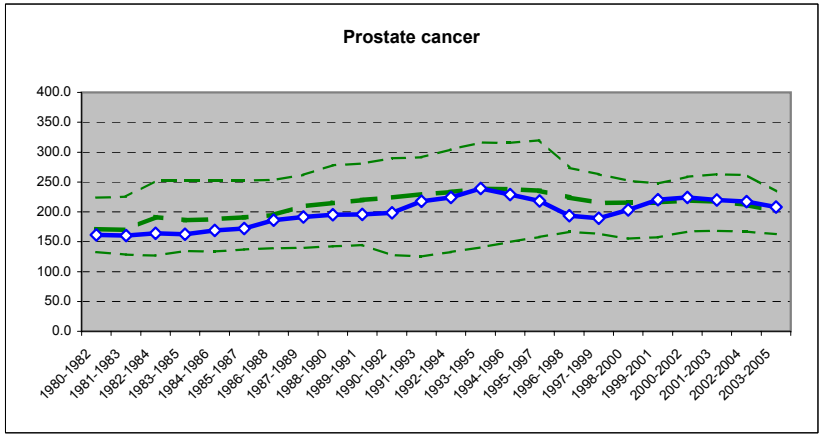

Appendix 7c. Elderly (65+) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

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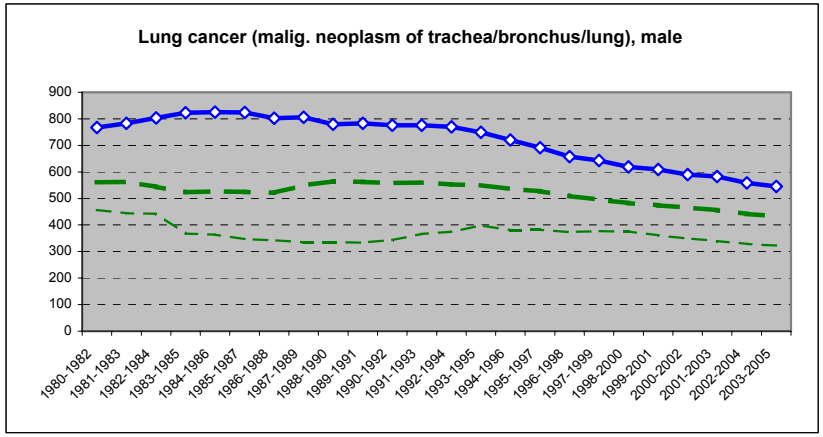

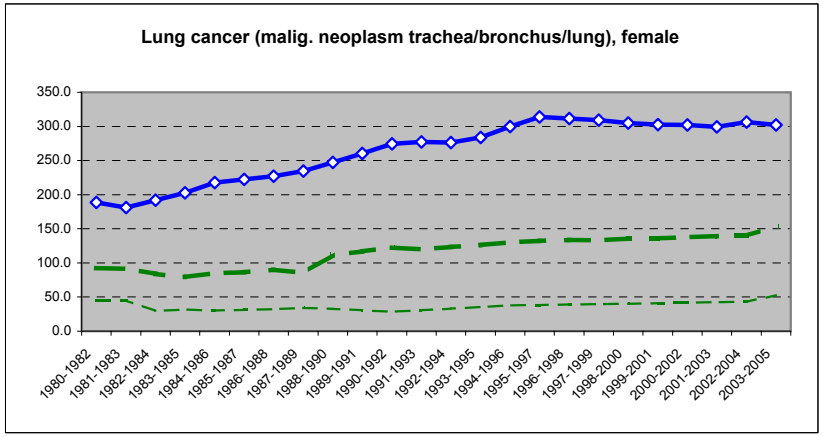

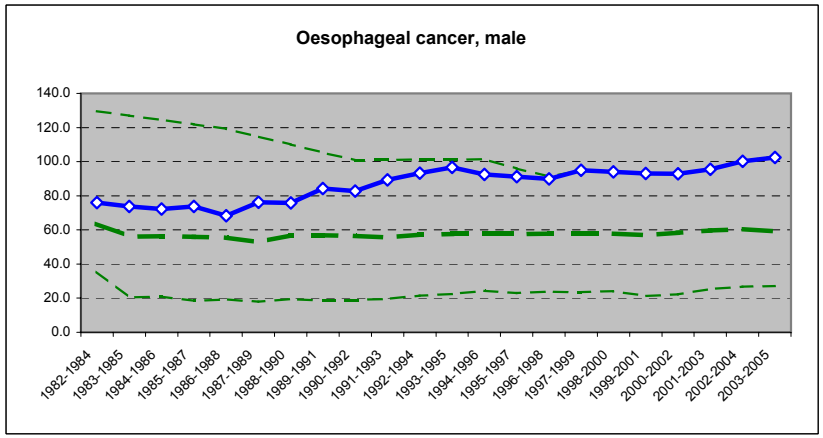

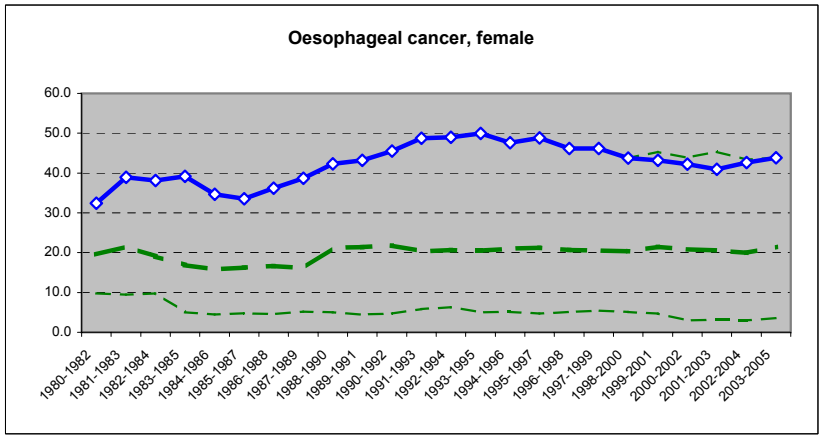

Appendix 7c. Elderly (65+) mortality, 1980-2005: West of Scotland in context of maximum, minimum & mean rates for selected European regions

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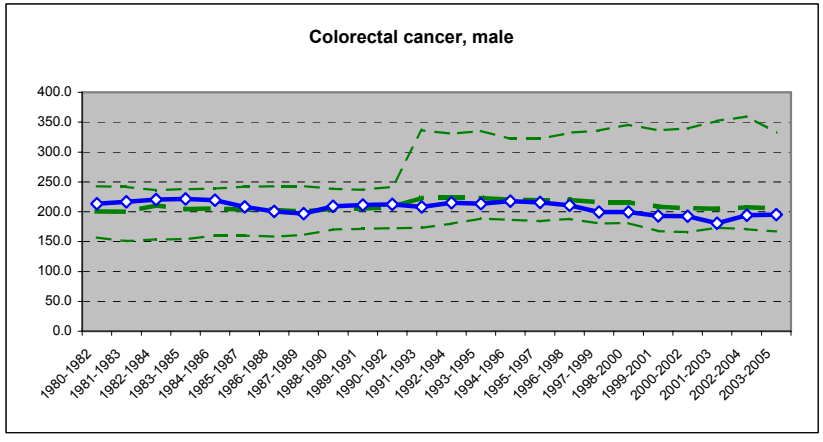

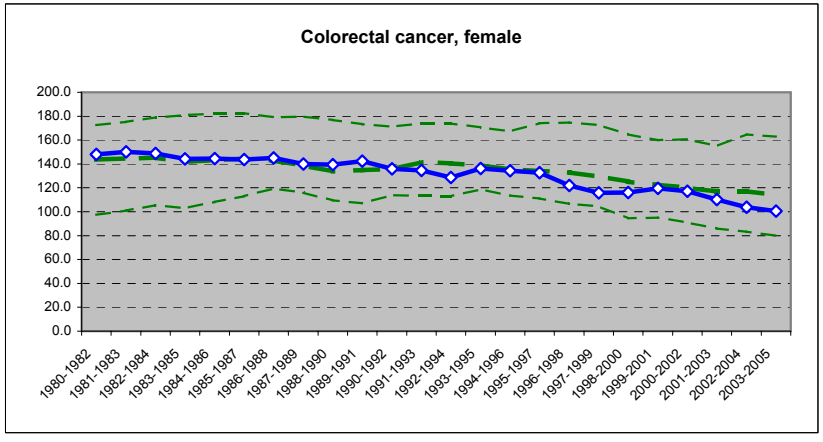

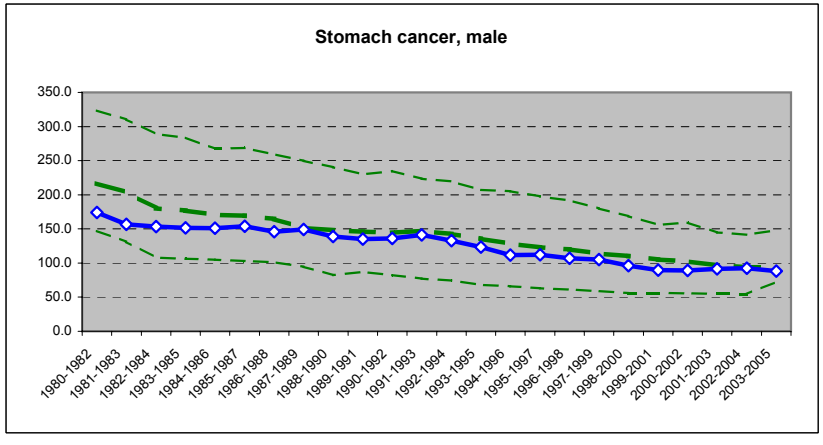

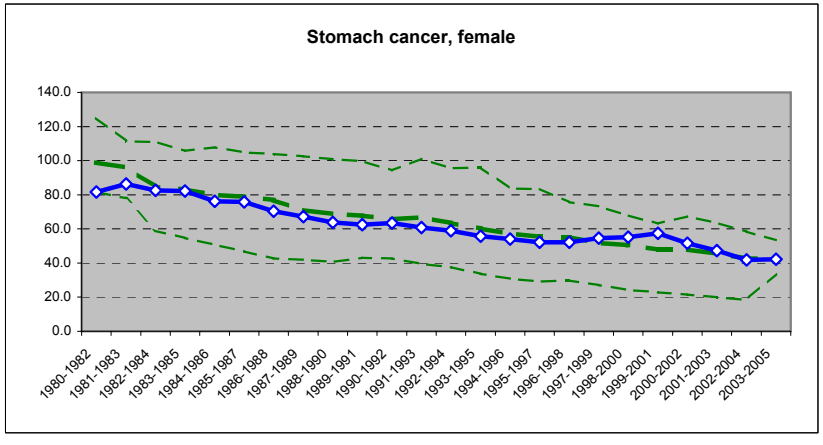

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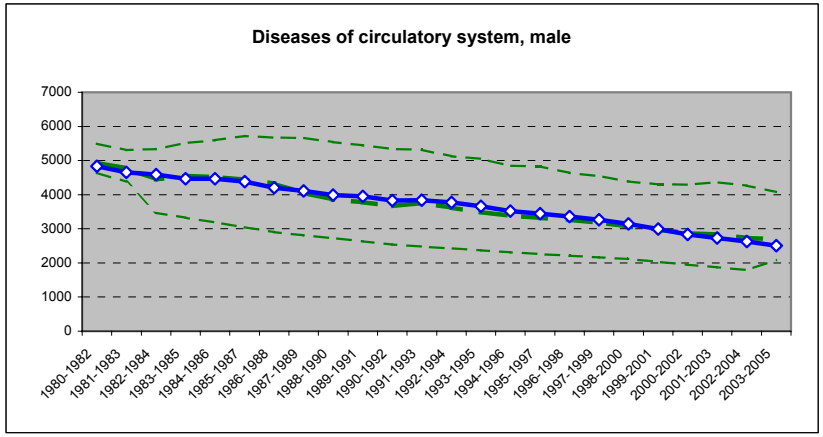

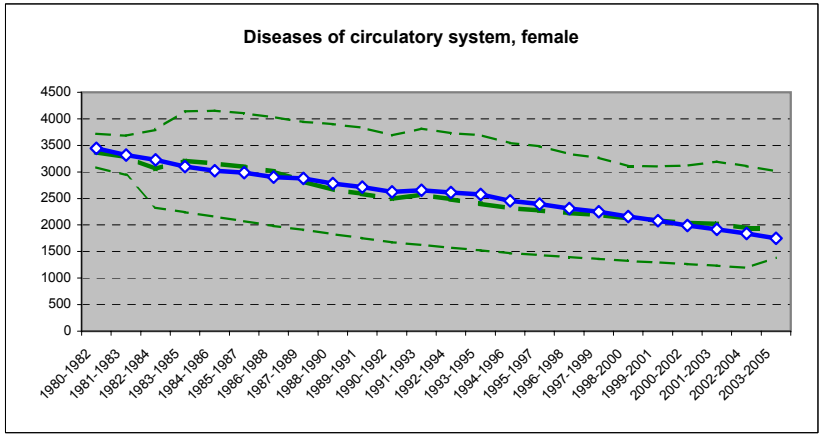

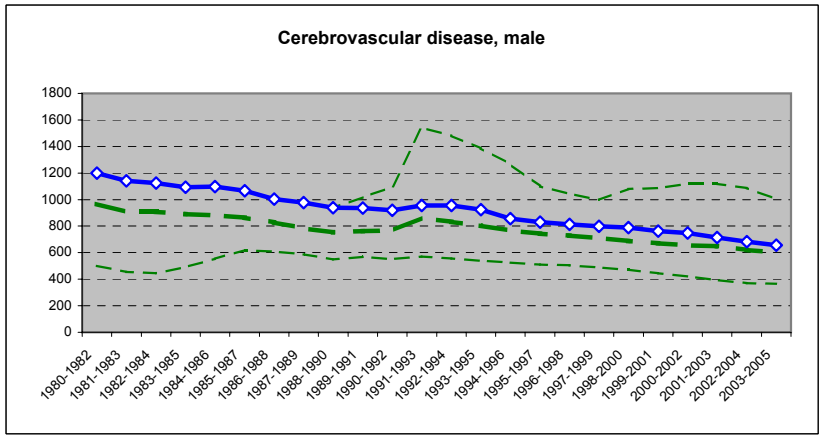

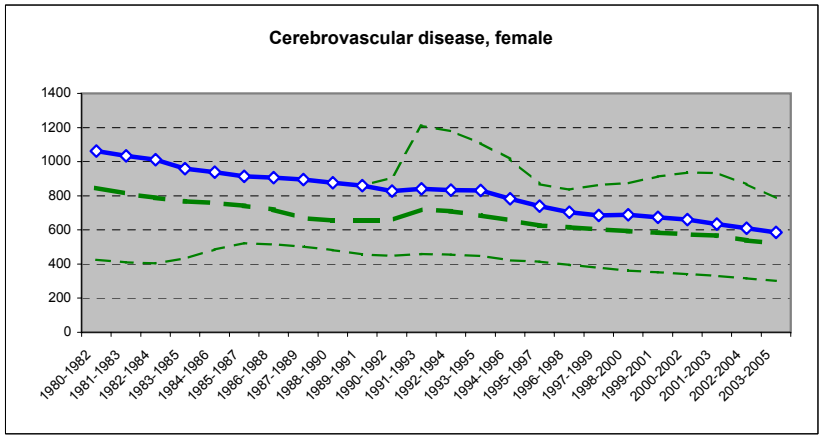

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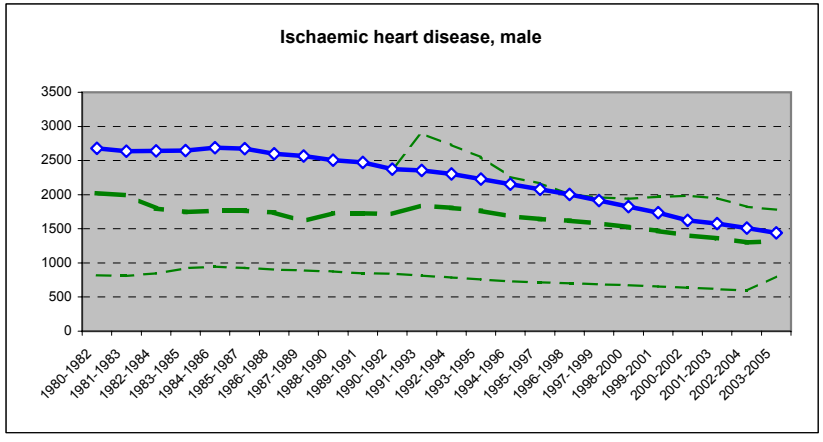

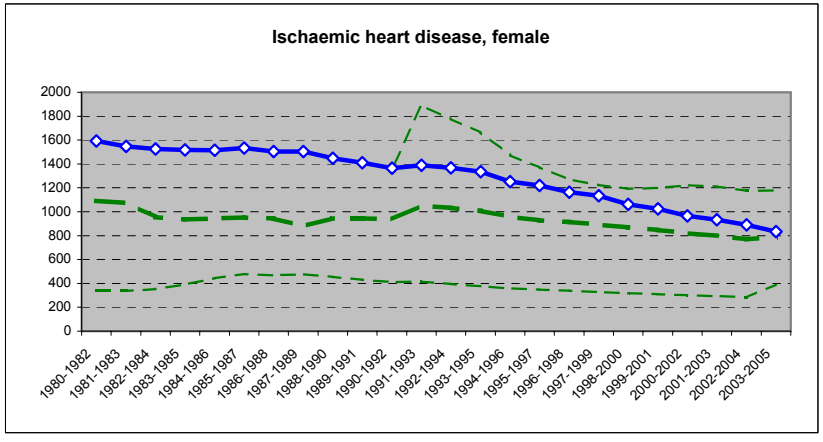

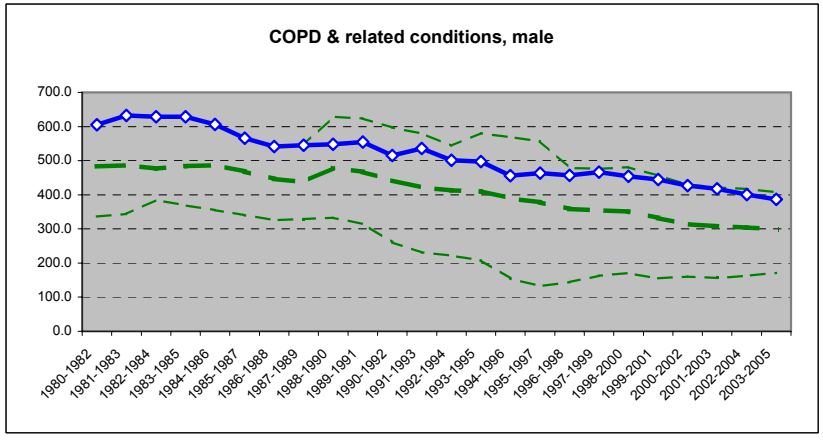

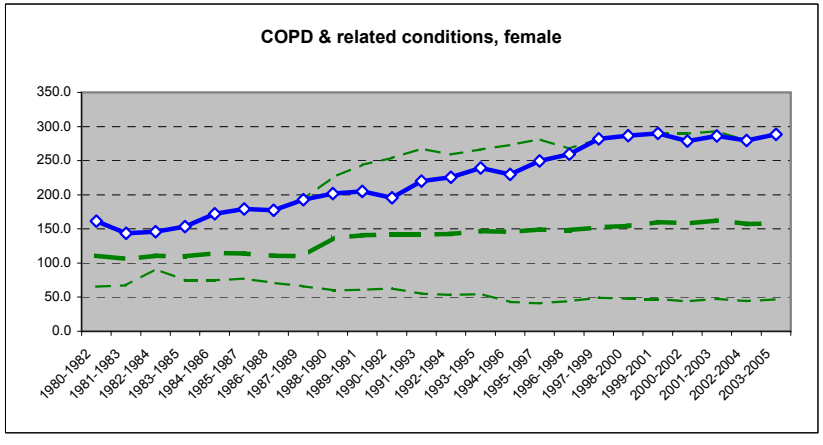

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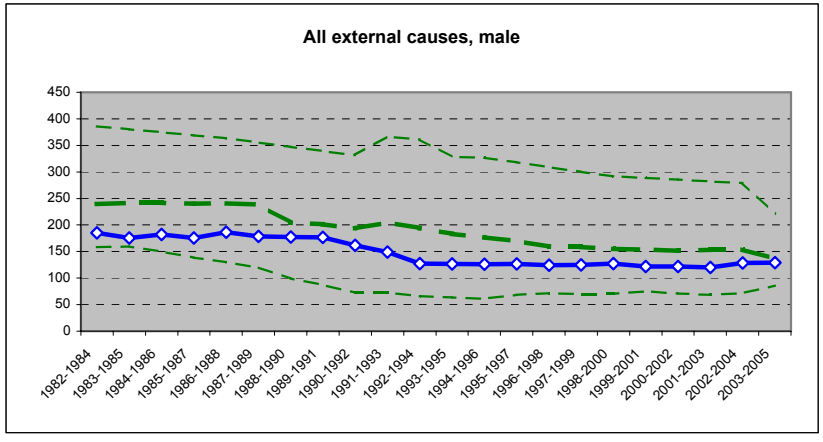

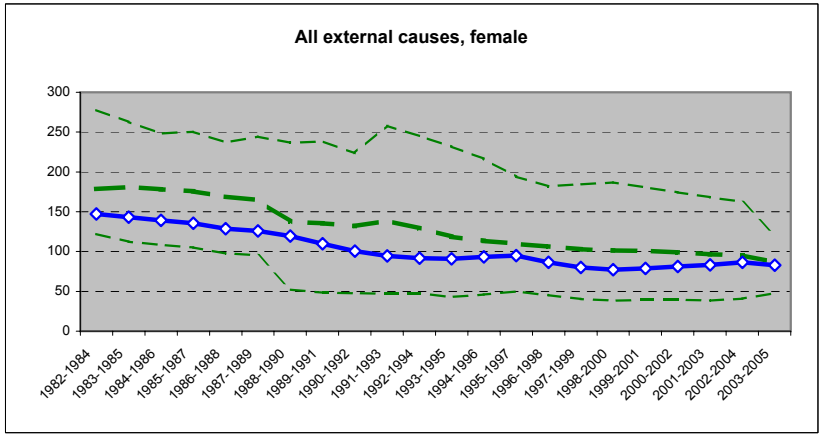

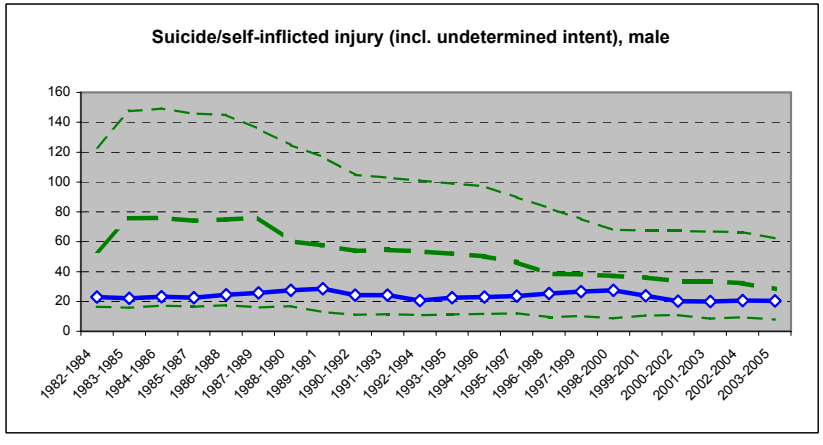

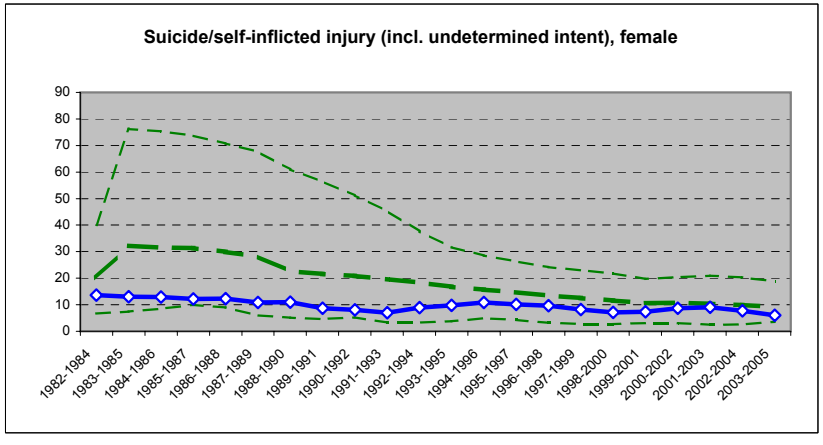

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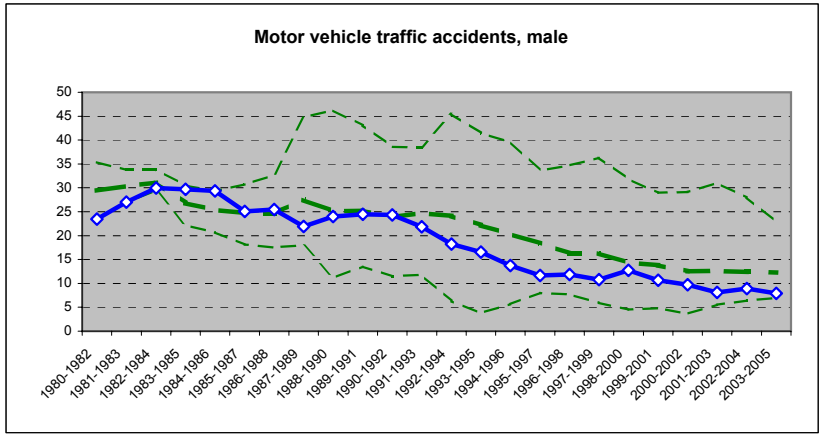
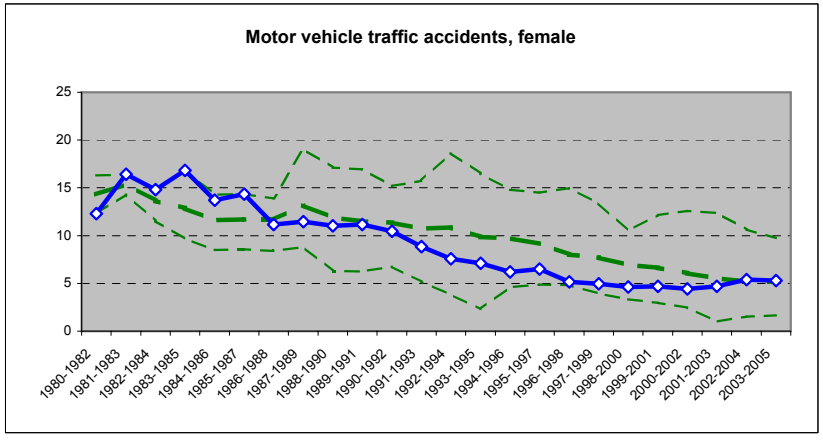
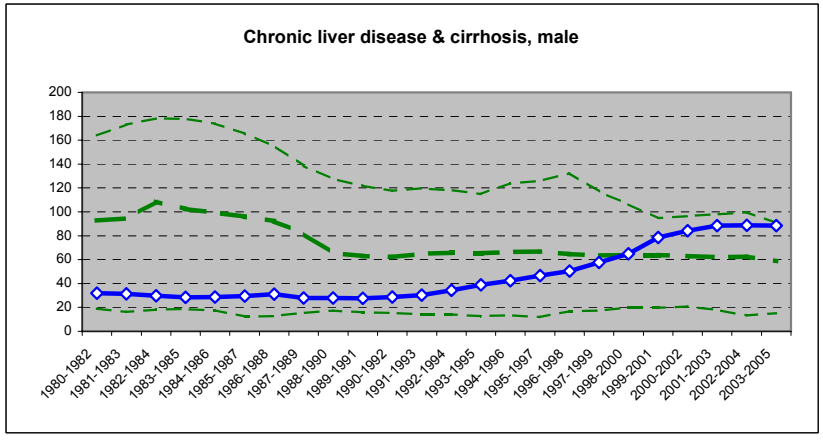
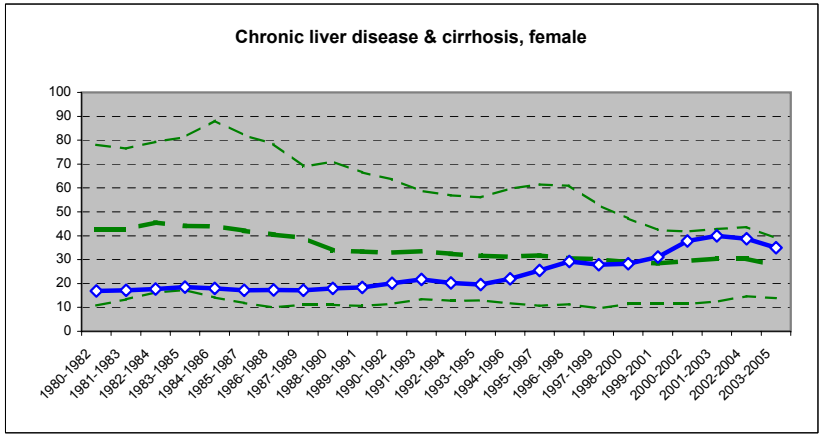


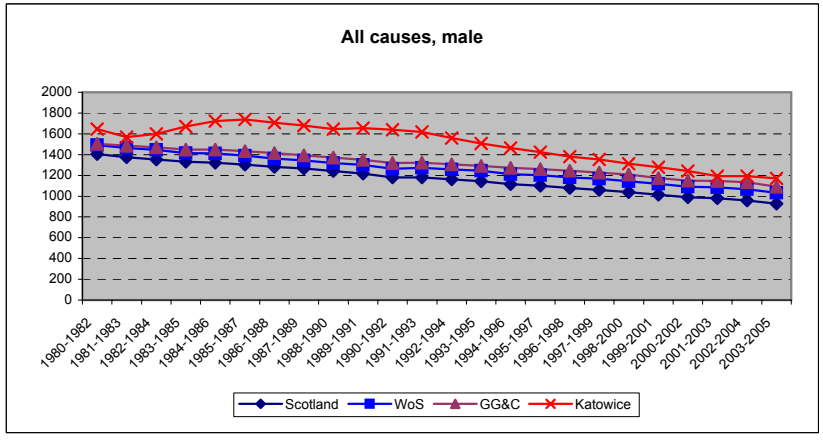


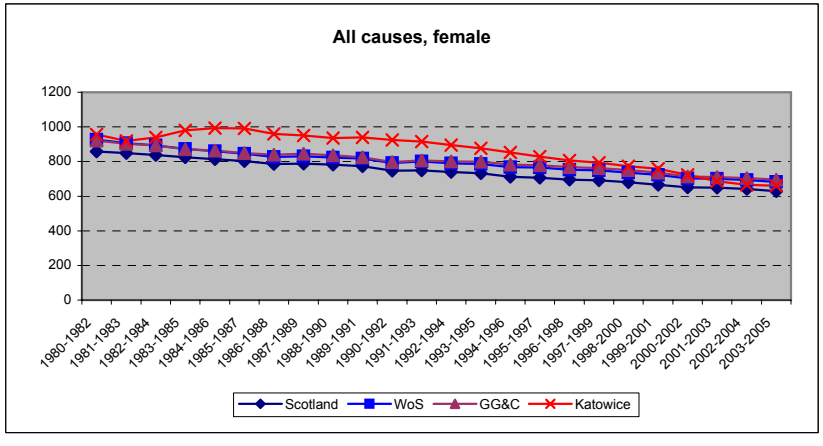


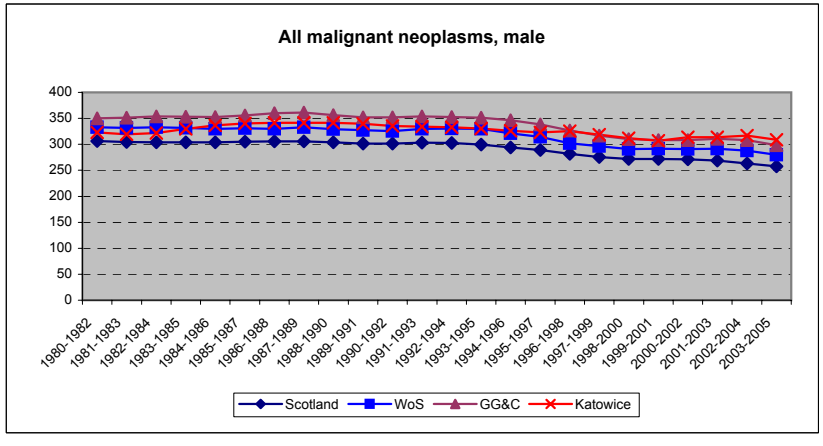


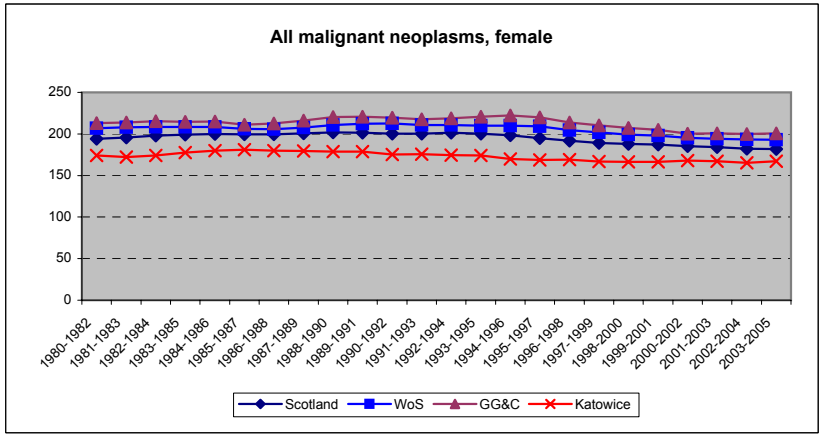
Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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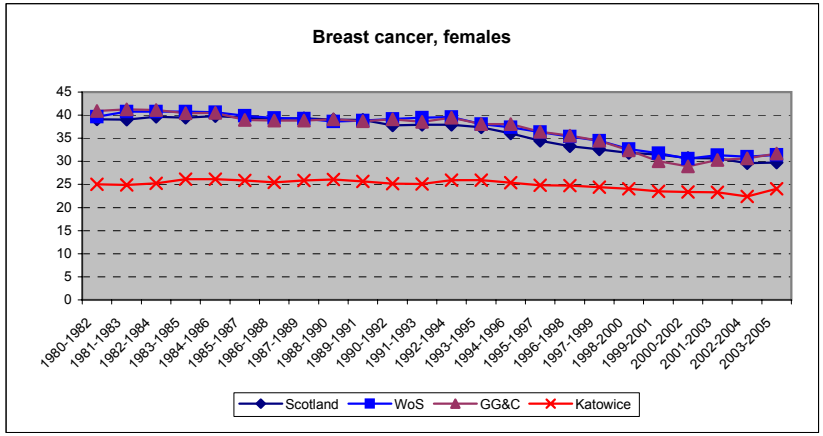

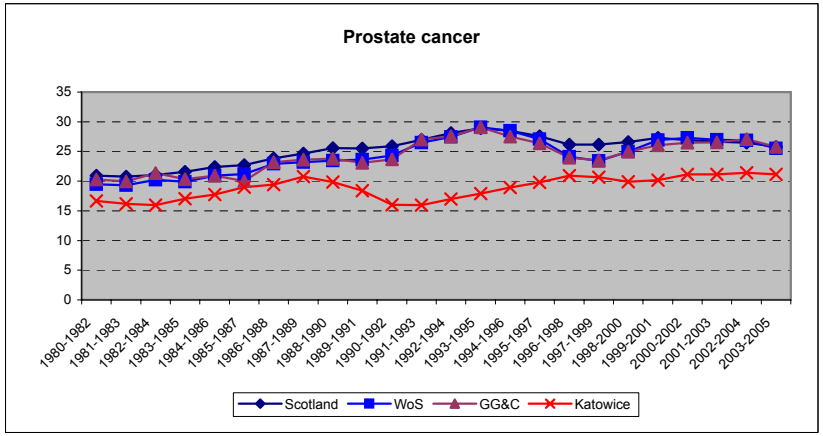

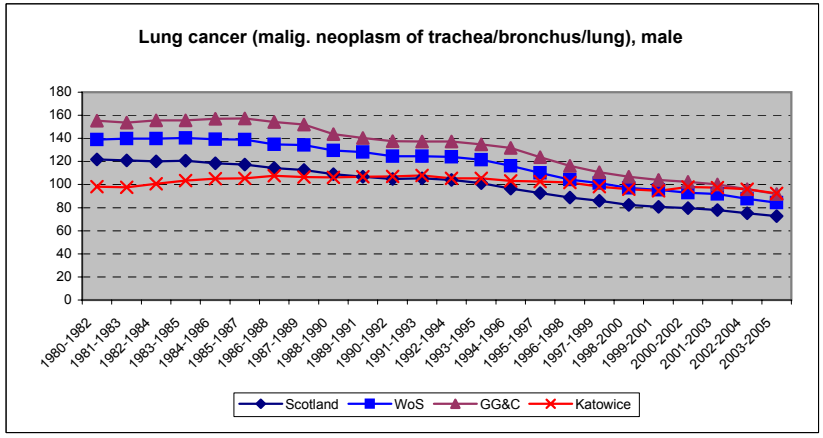

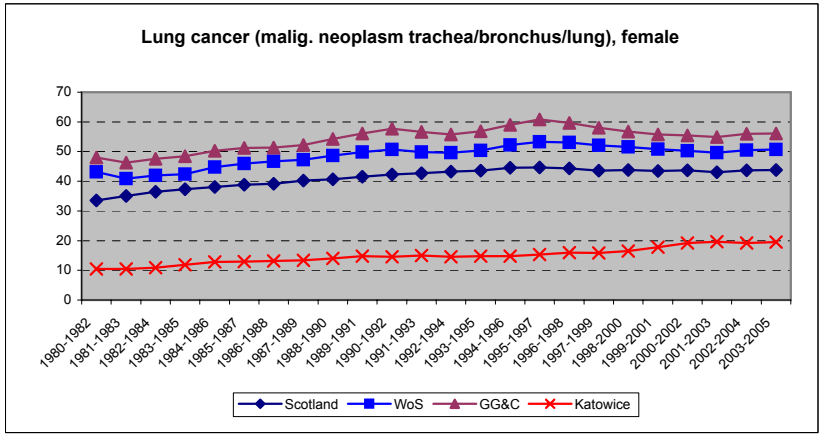

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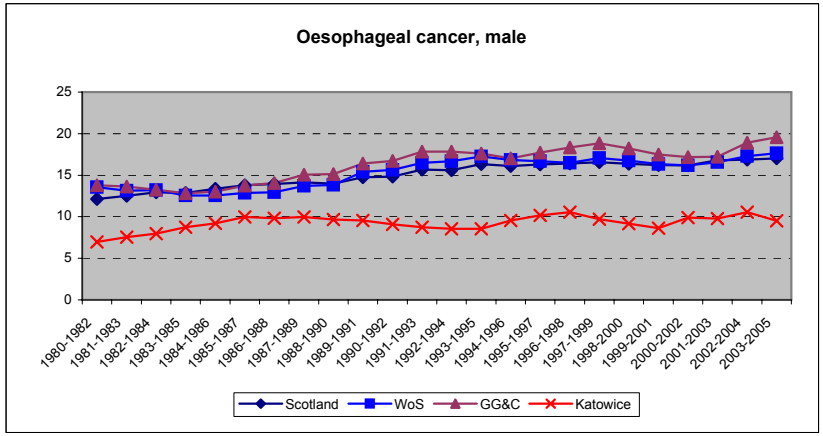
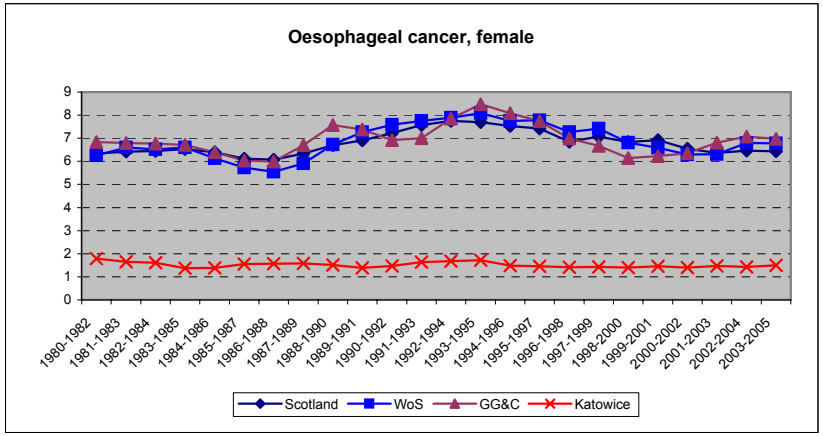
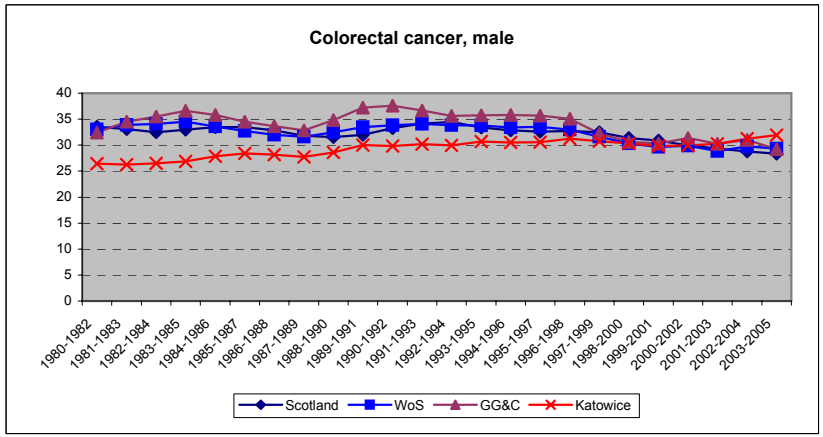
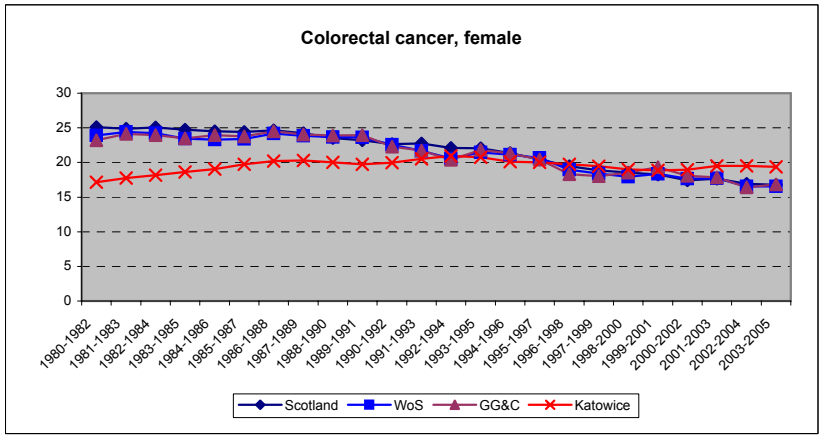
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



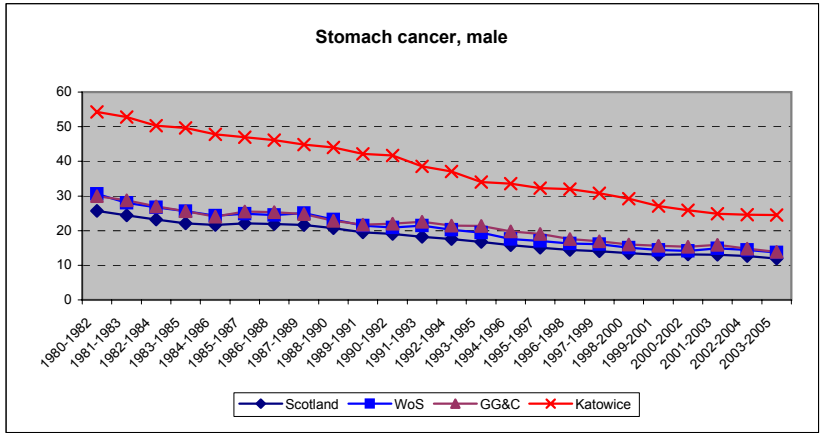


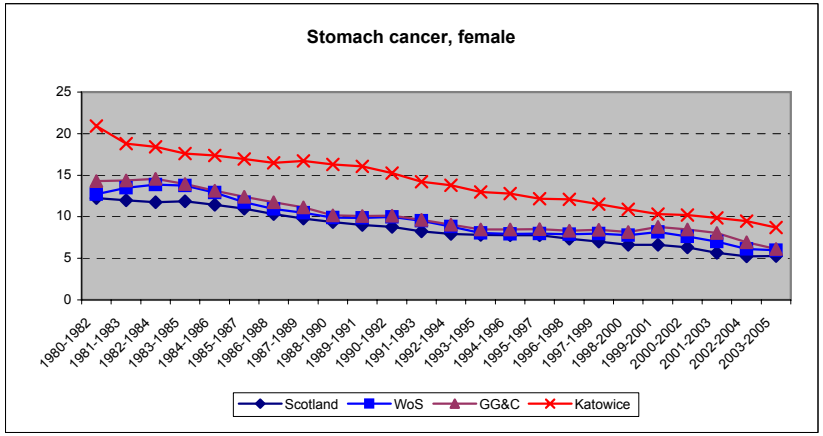


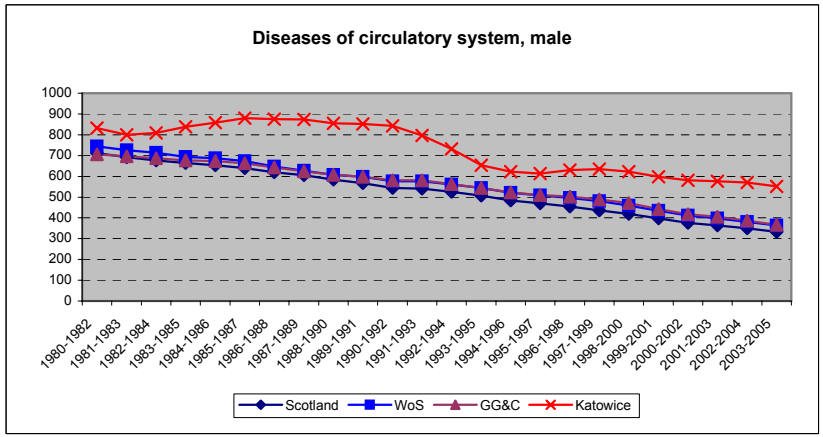


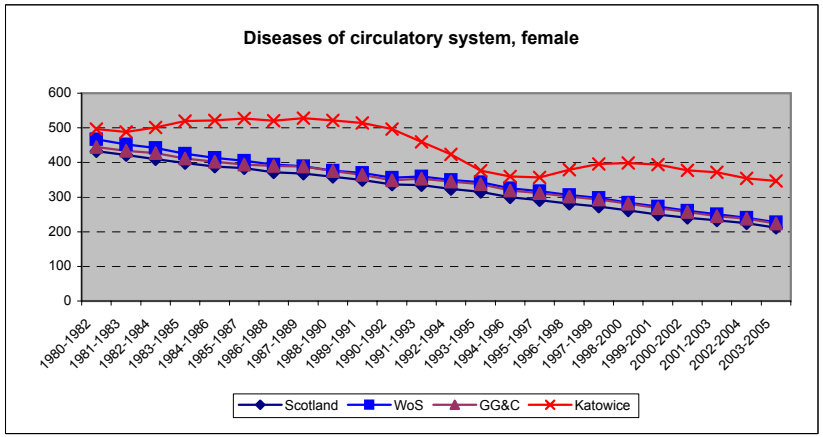
Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



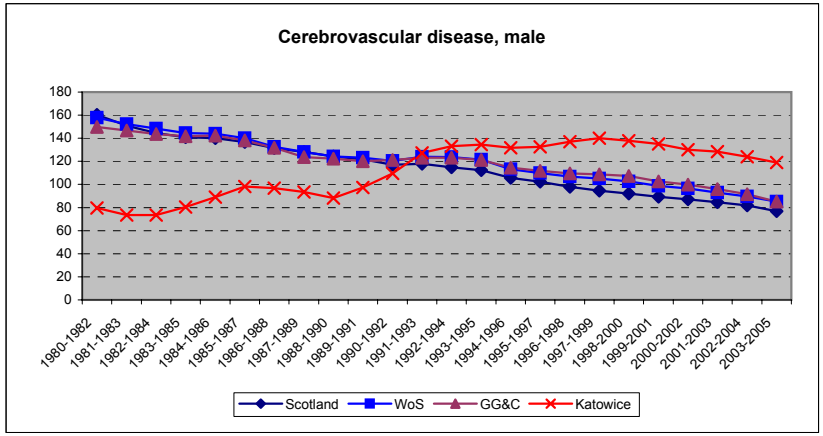


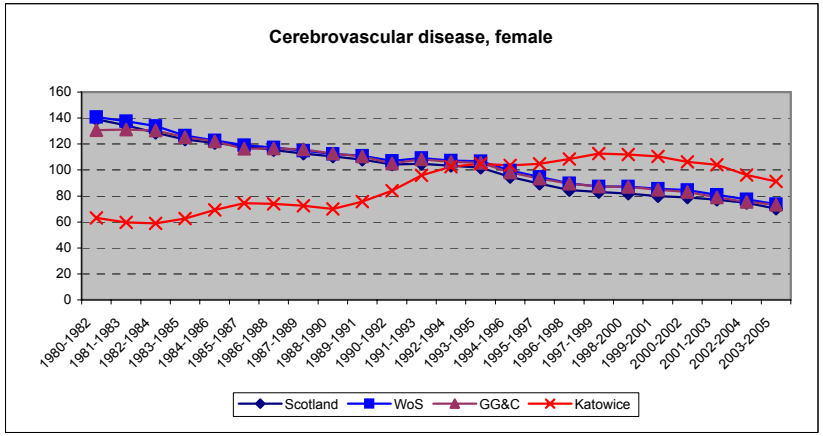


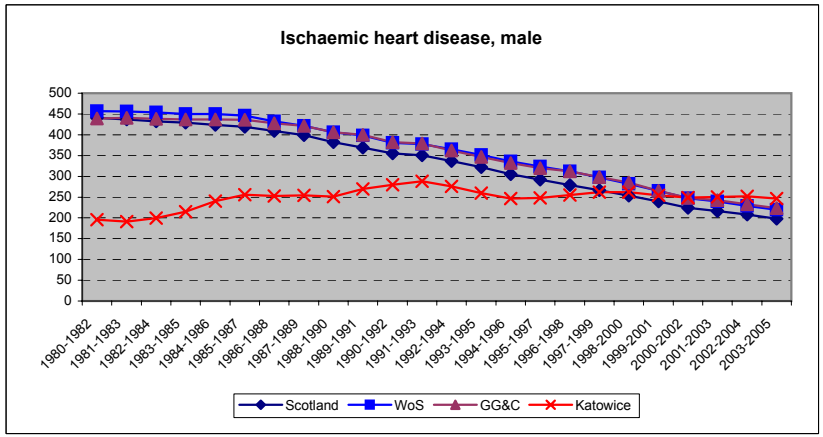


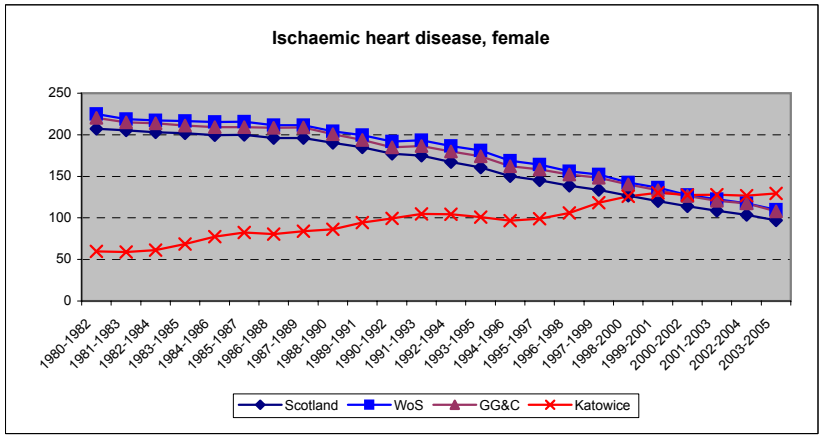
Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



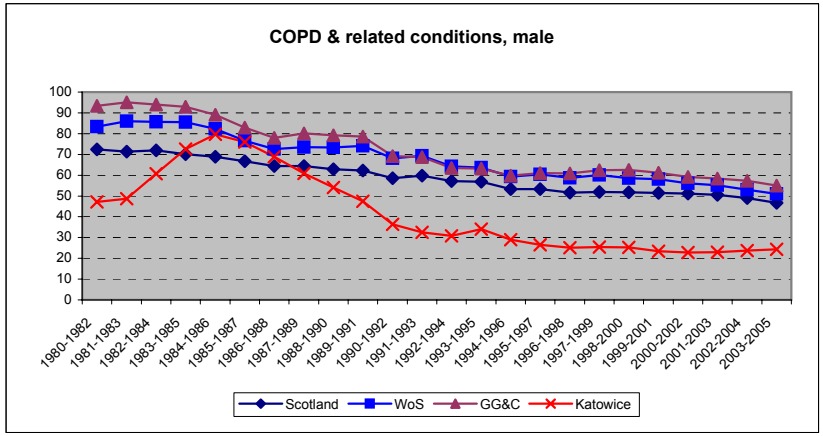


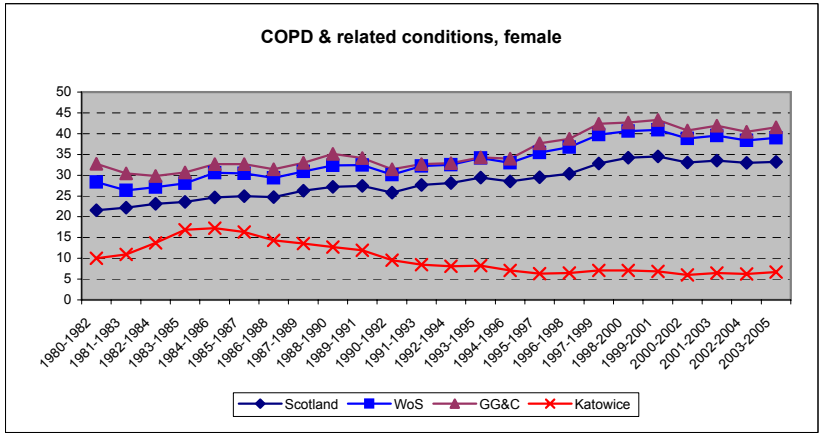


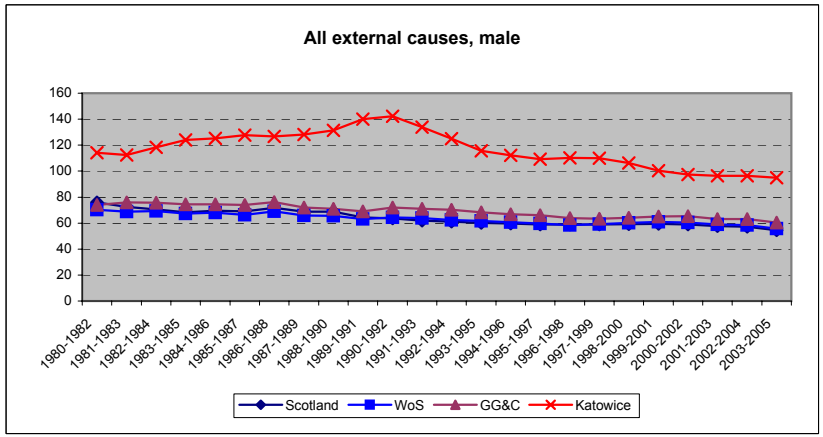


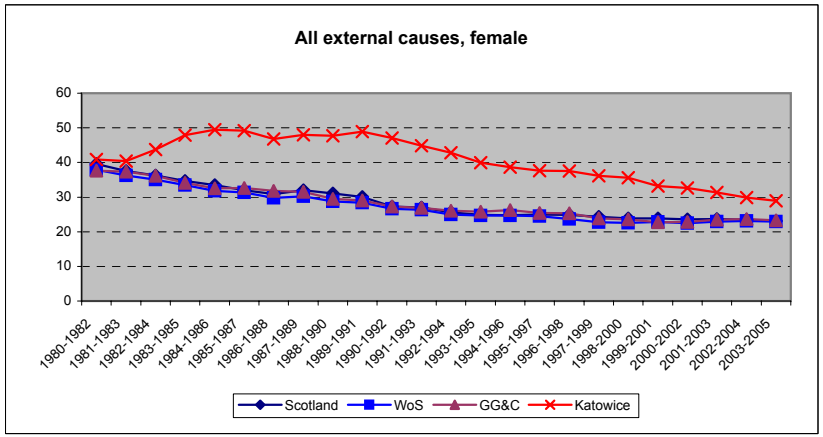
Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



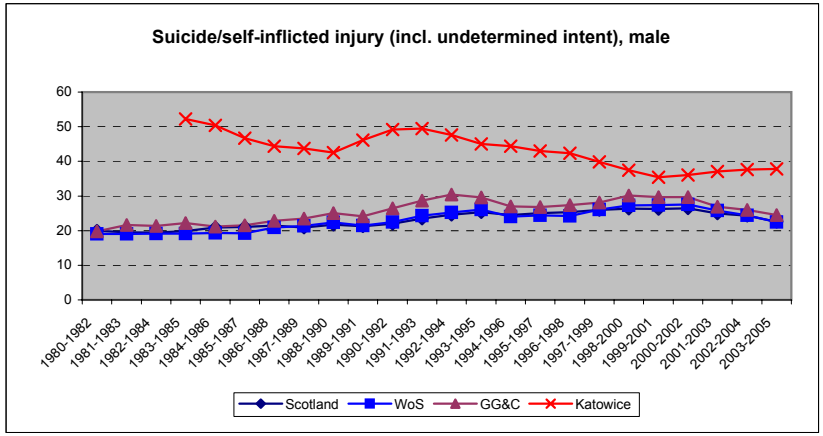


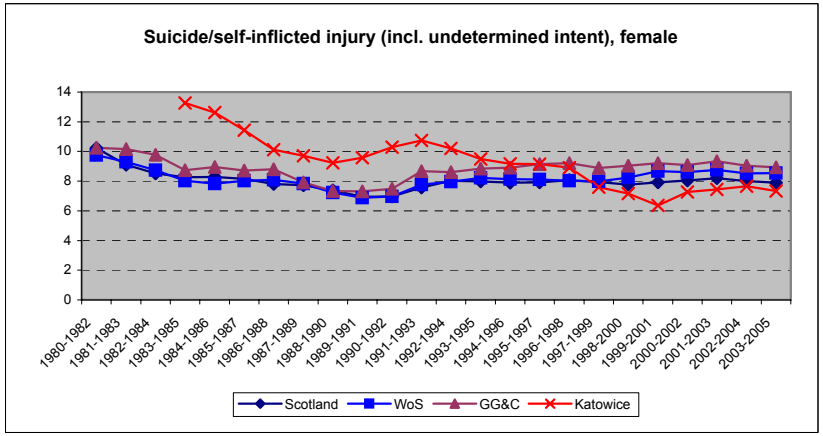


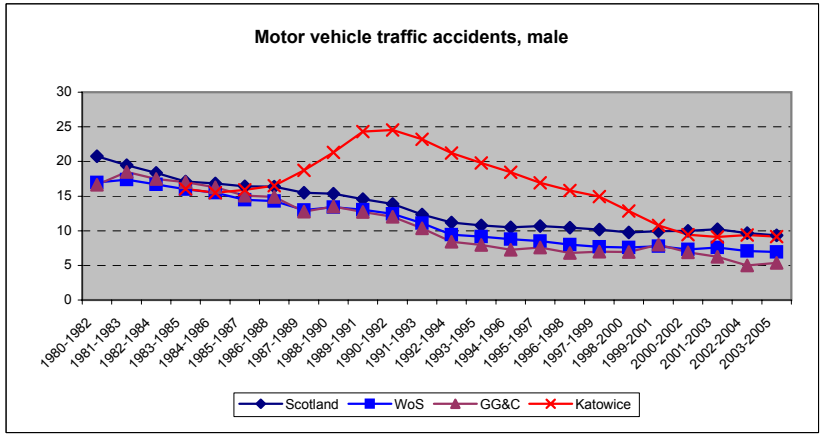


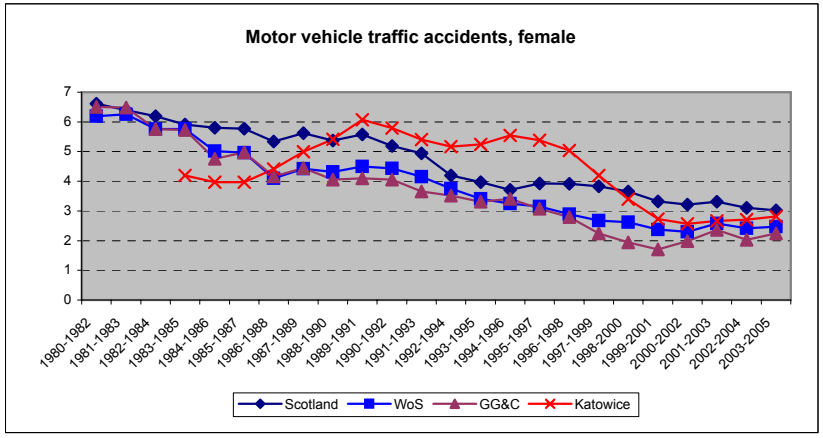
Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



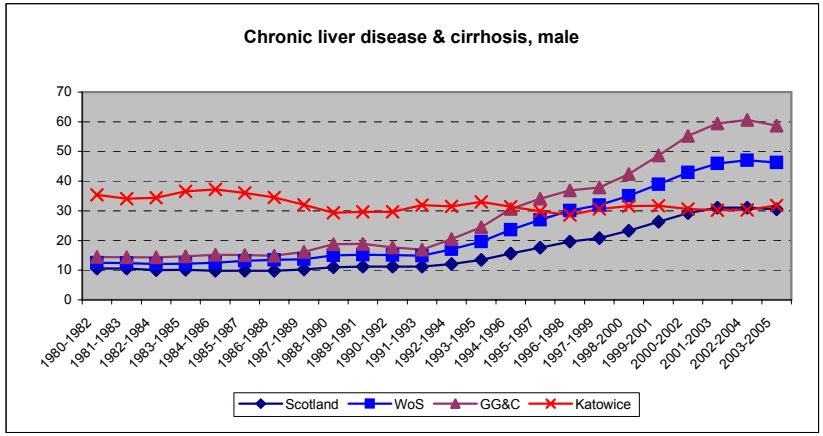


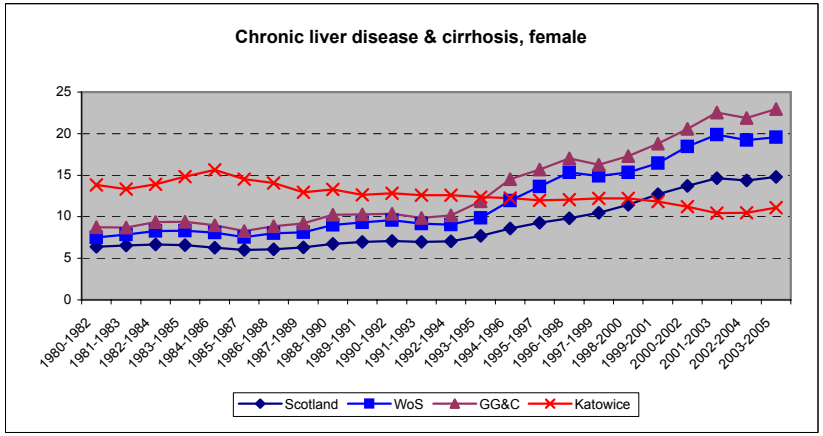




Appendix 8a. Age-standardised mortality rates: Katowice compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

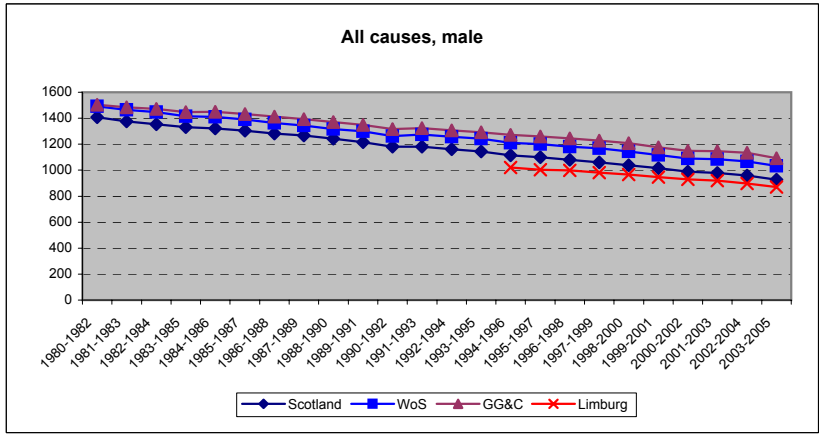
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.

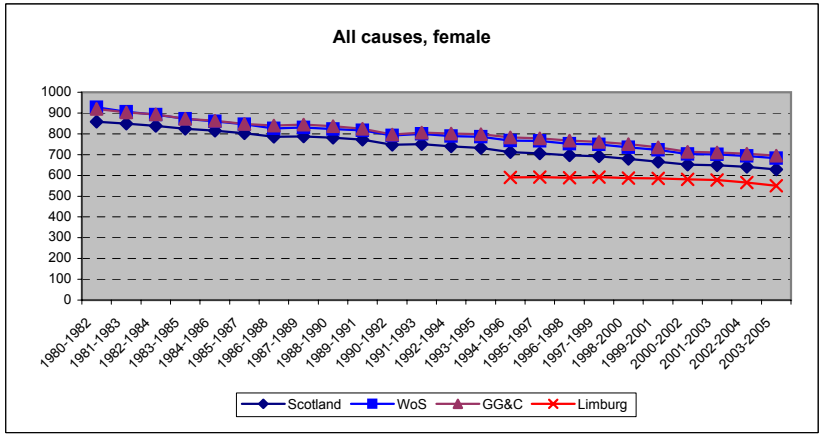


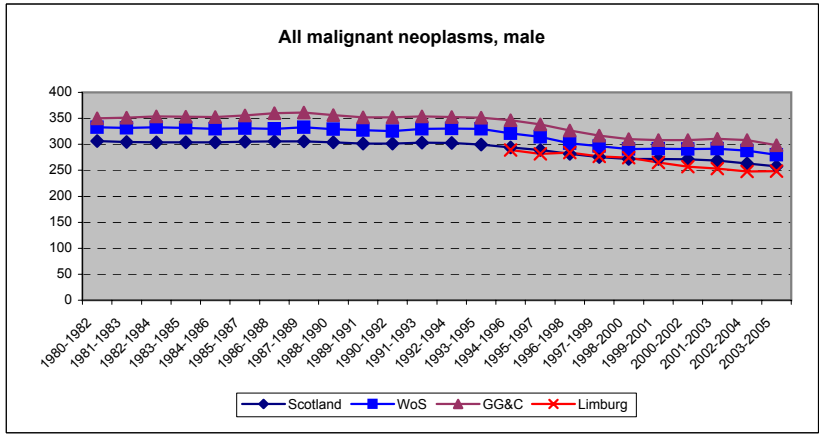


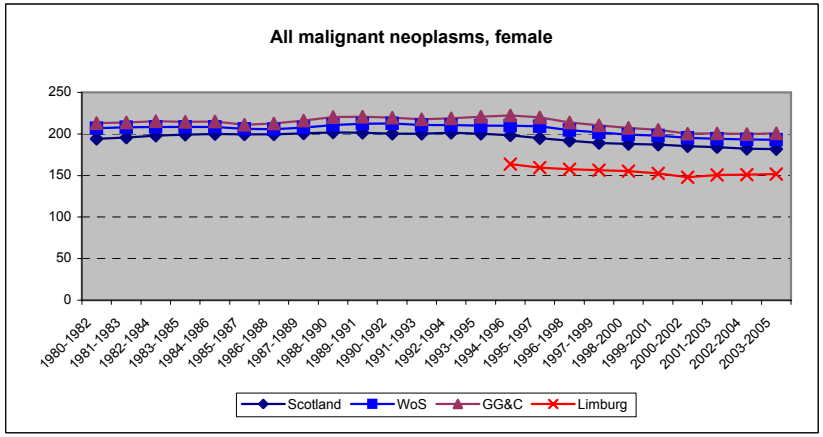
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



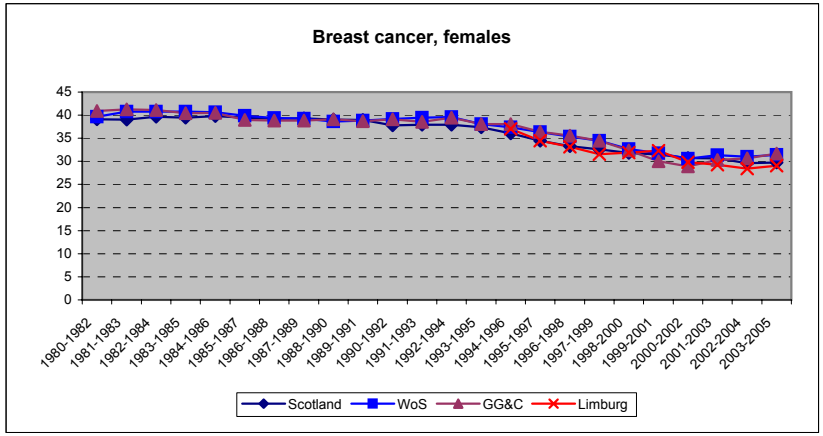


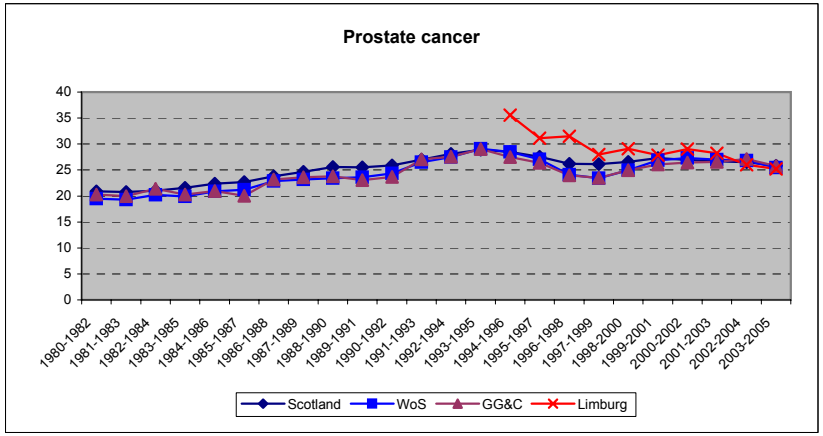


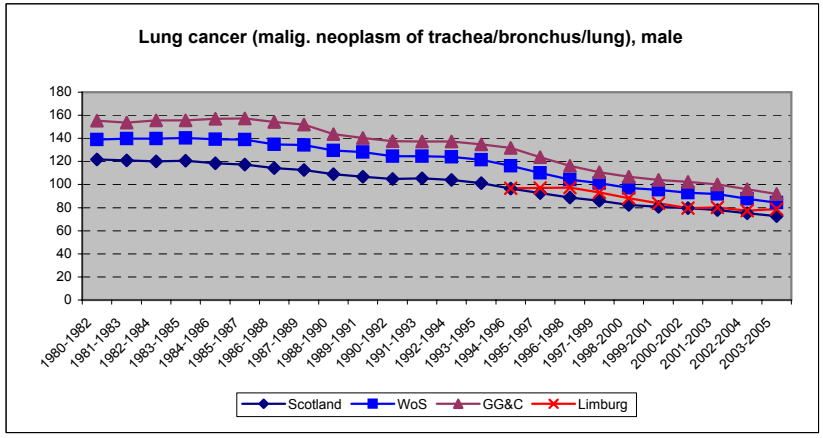


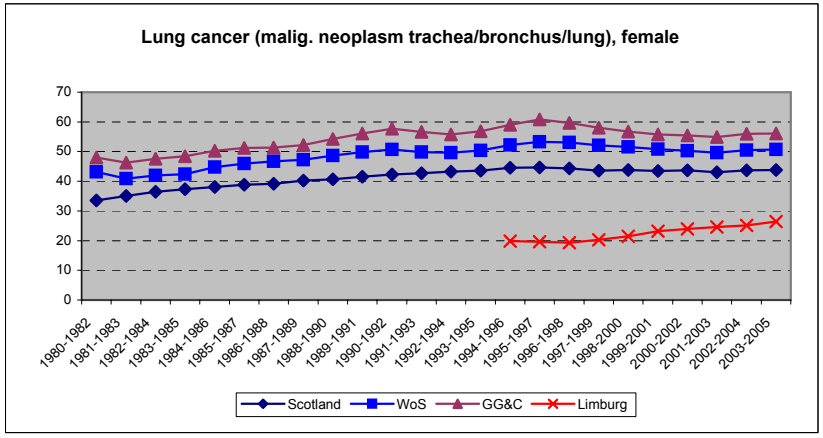
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



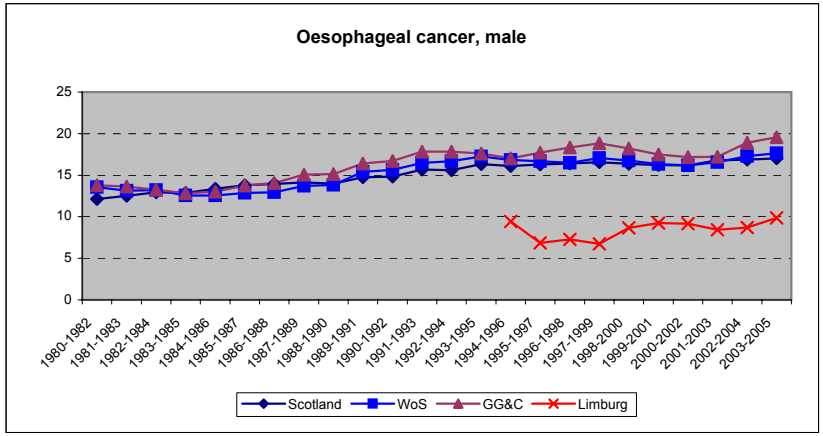


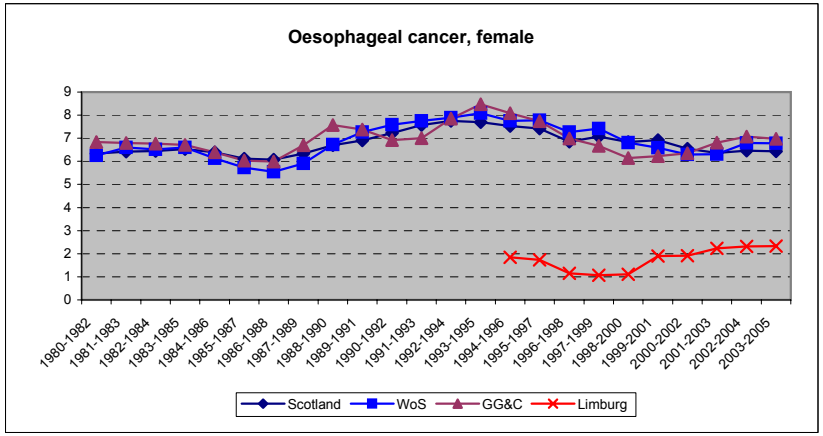


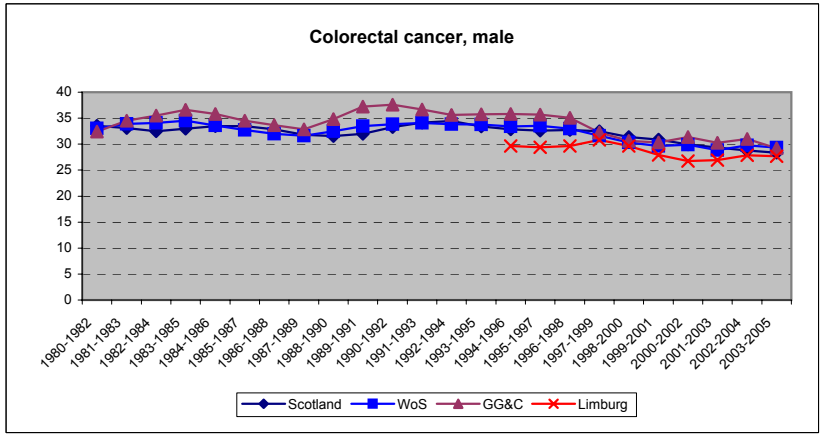


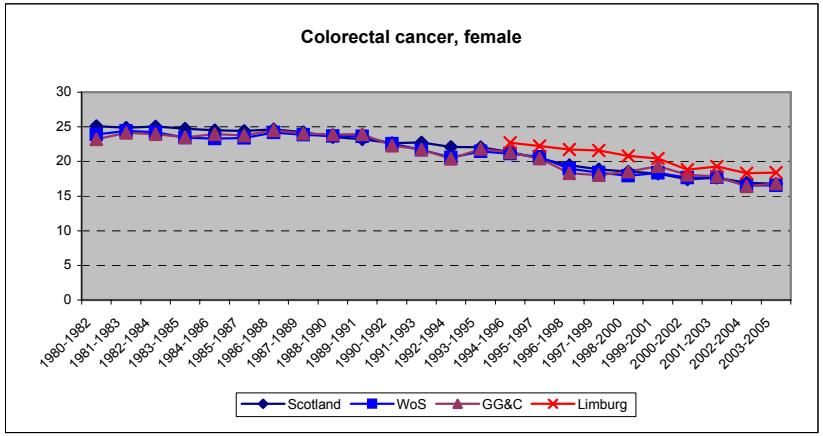
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



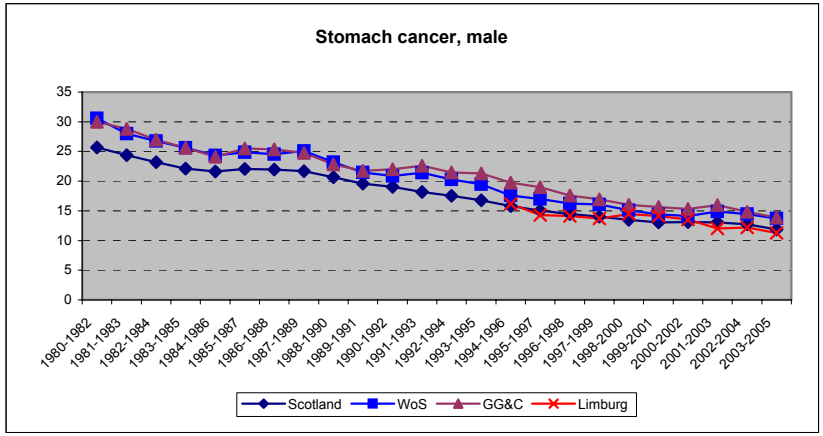


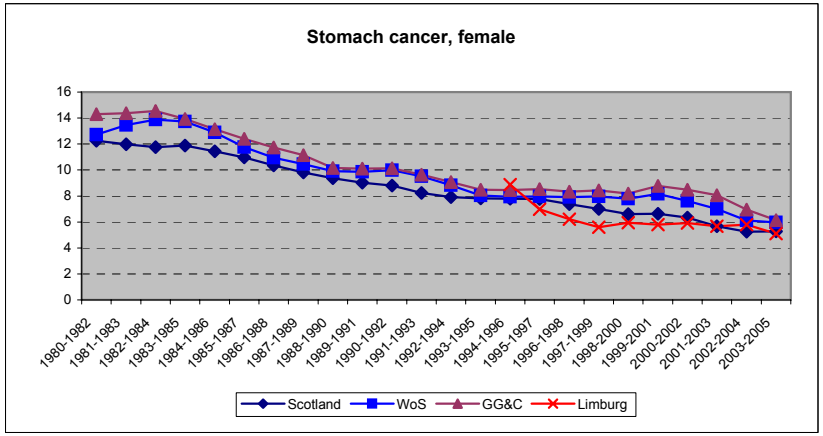


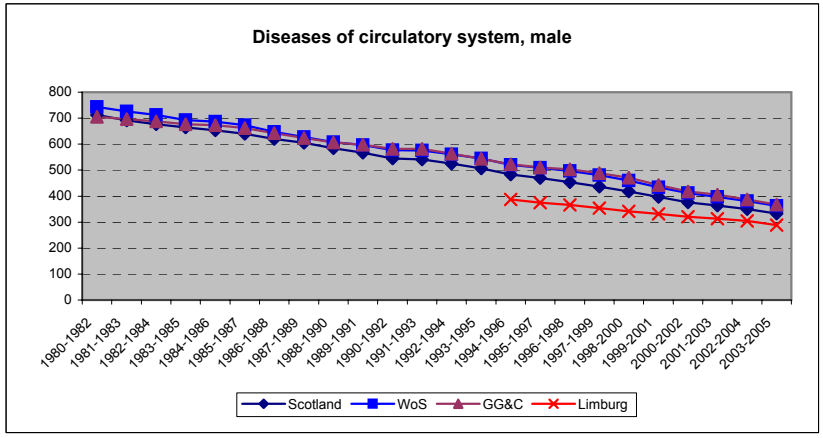


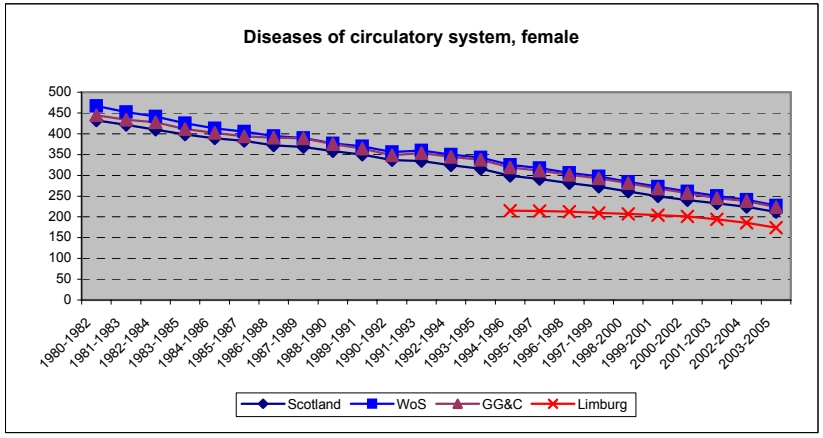
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



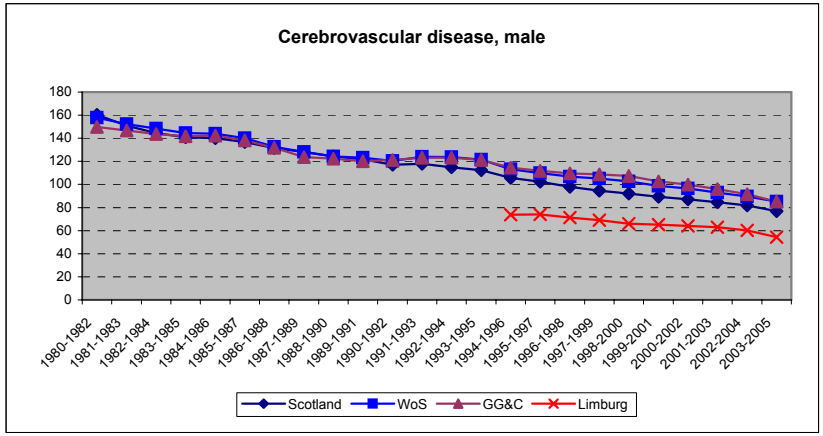


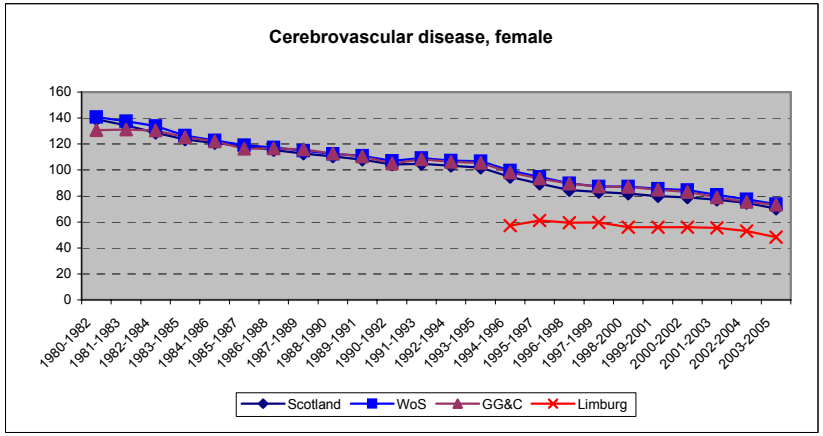


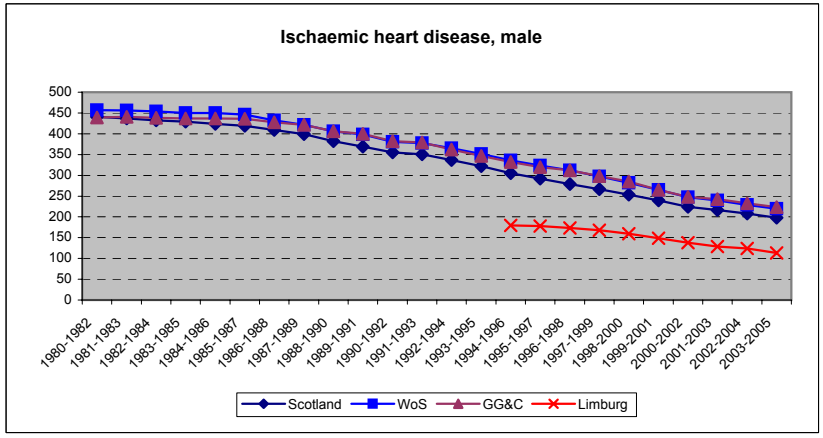


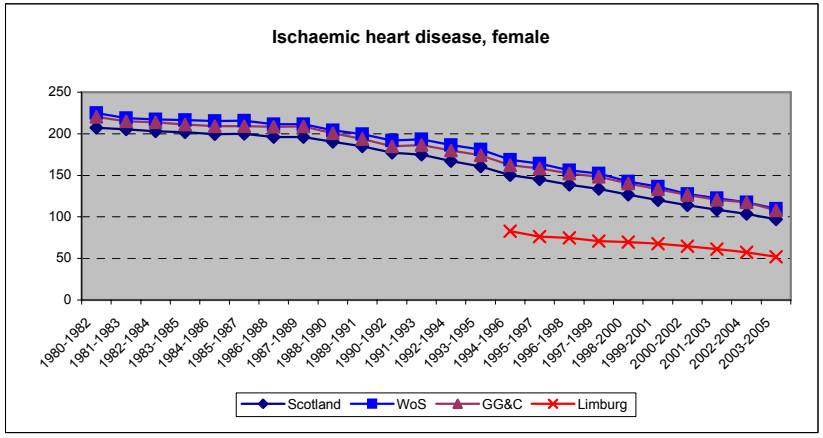
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



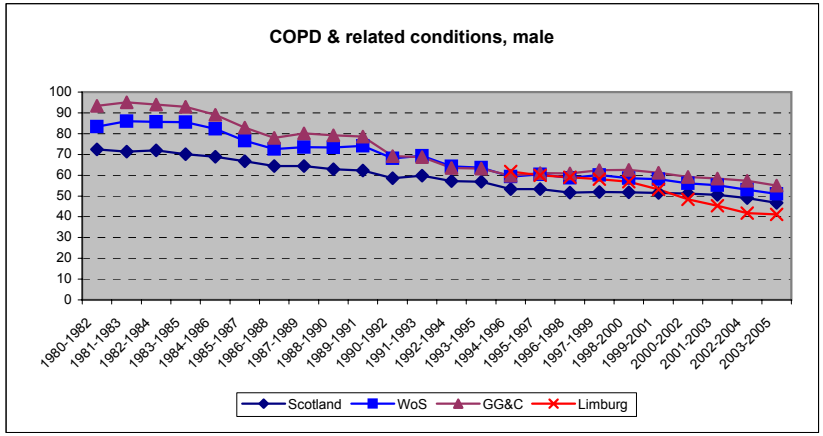


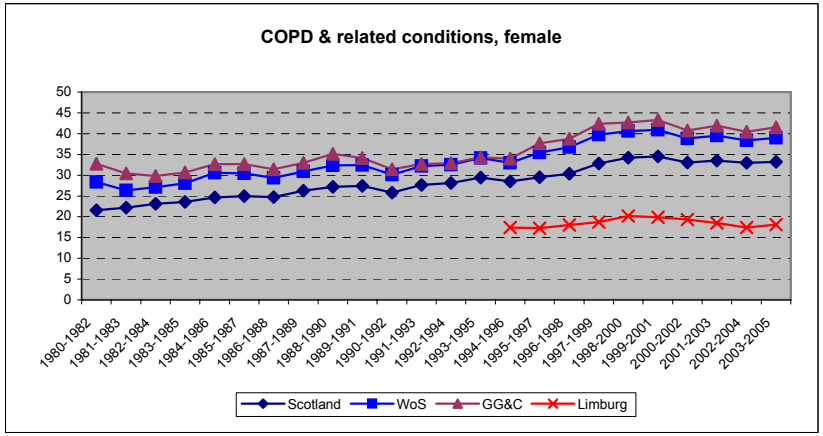


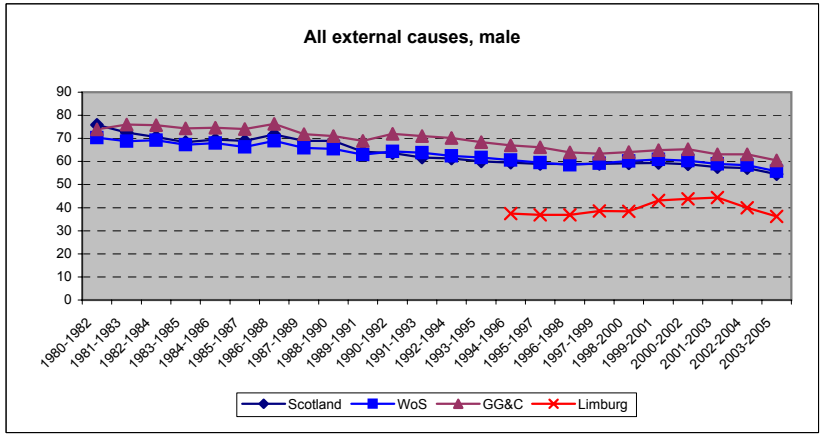


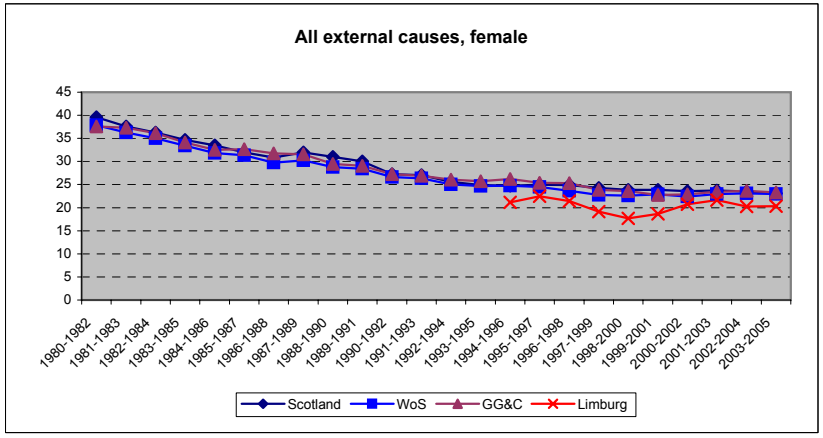
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



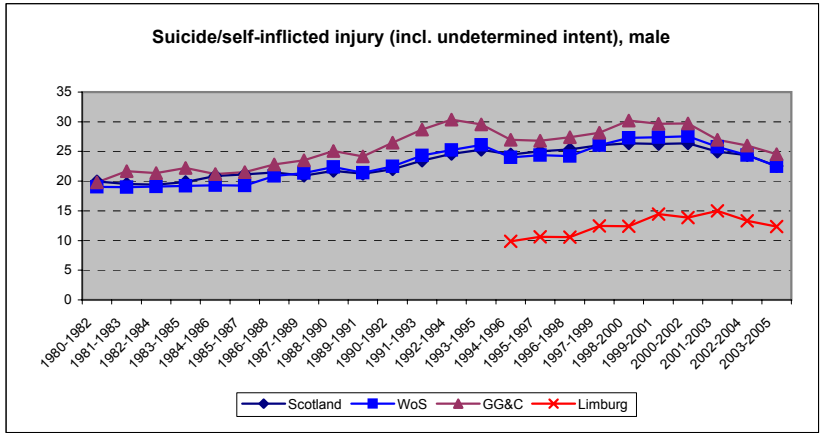


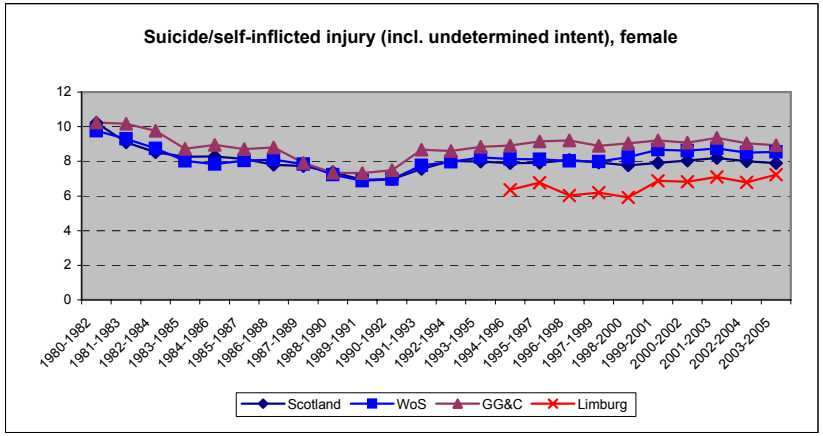


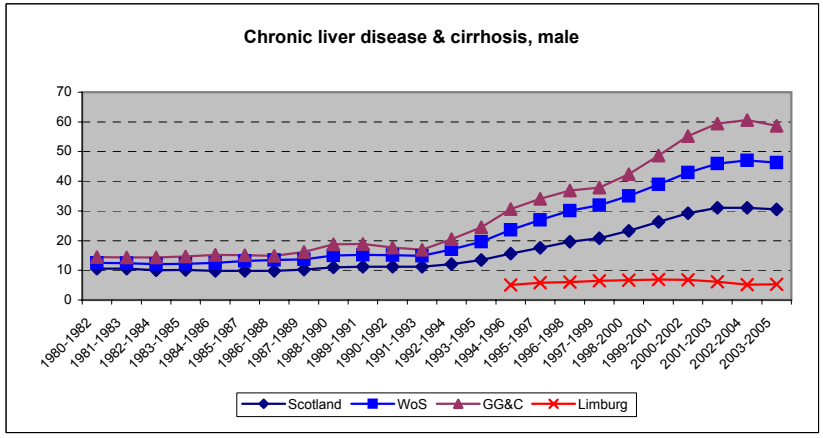


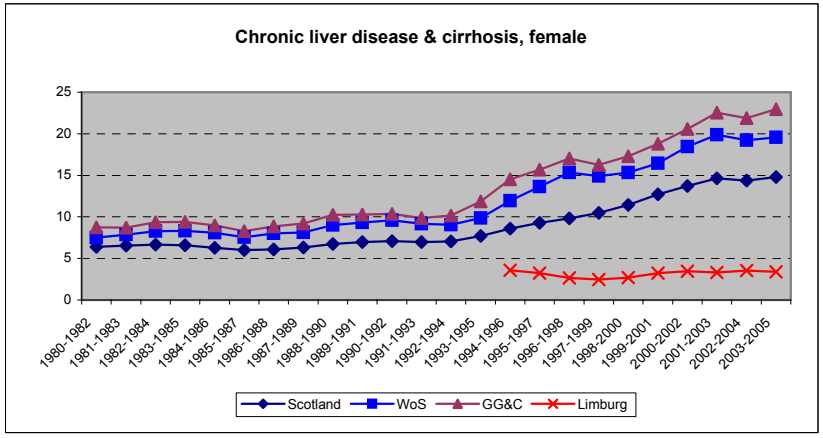
Appendix 8b. Age-standardised mortality rates: Limburg compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



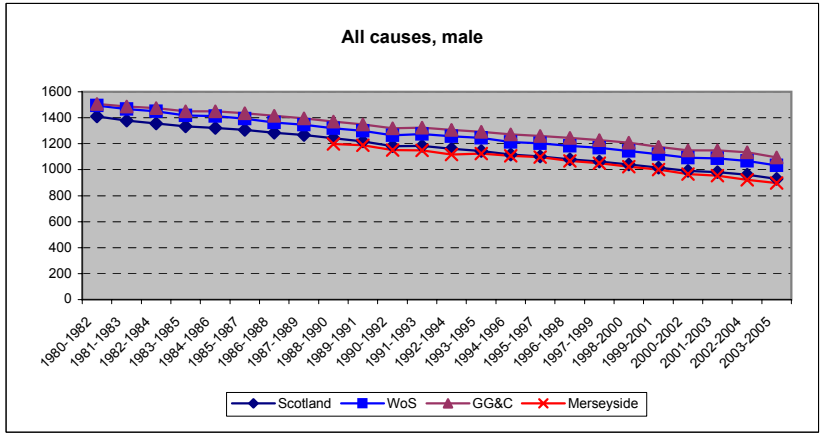


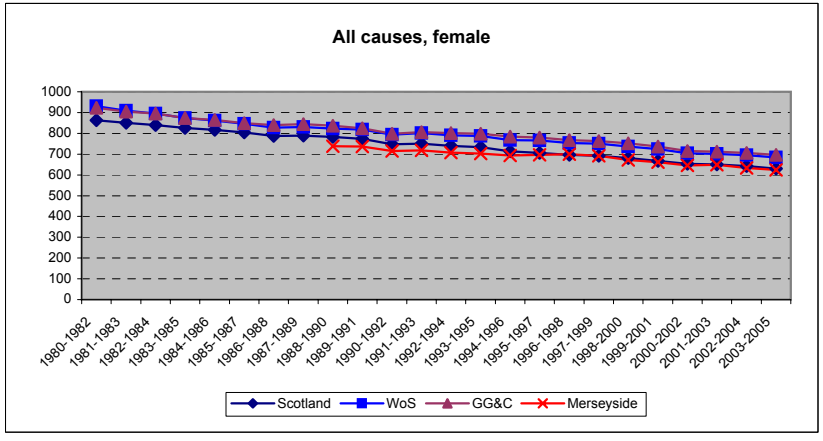


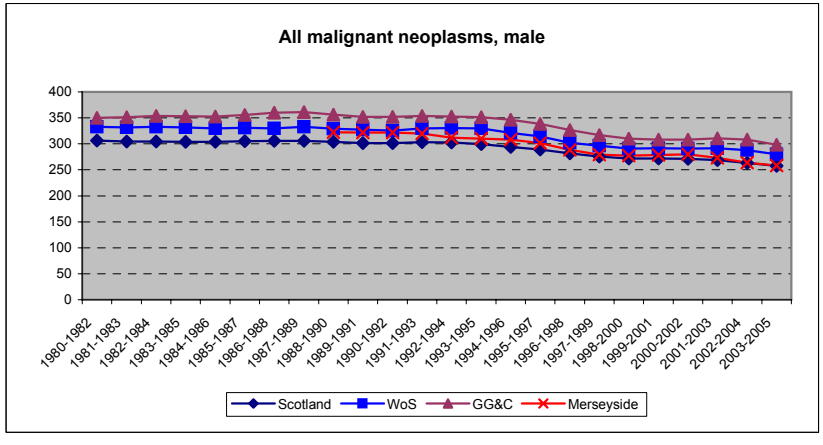


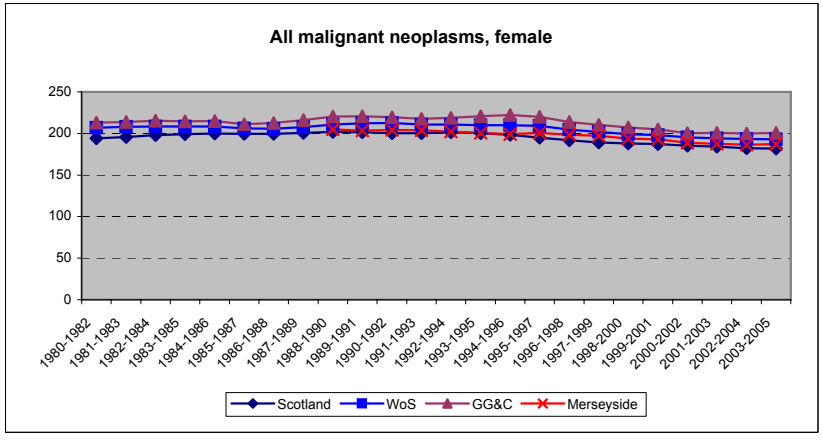
Appendix 8c. Age-standardised mortality rates: Merseyside compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



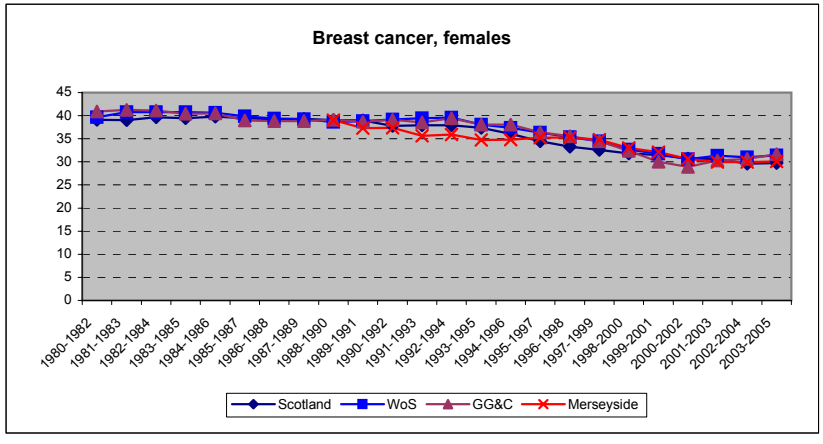


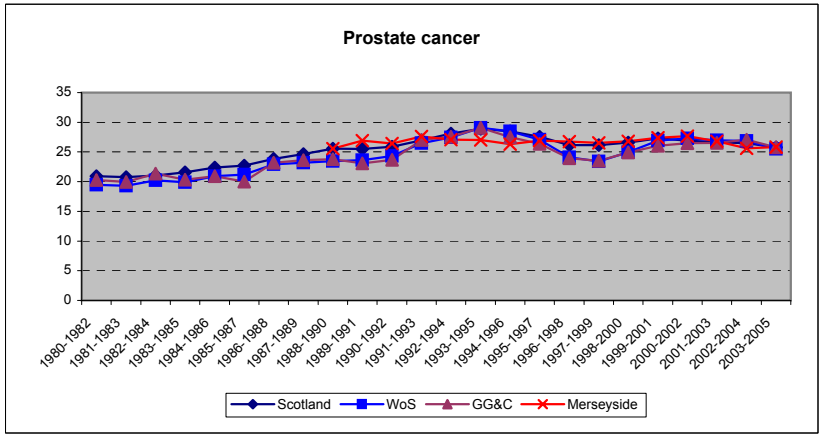


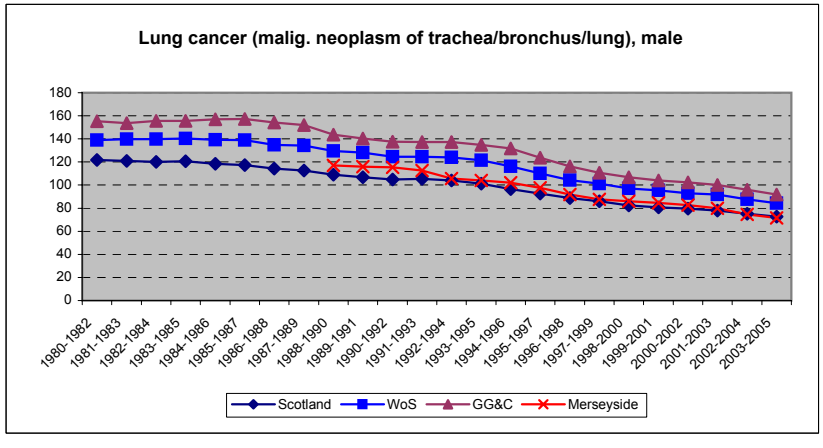


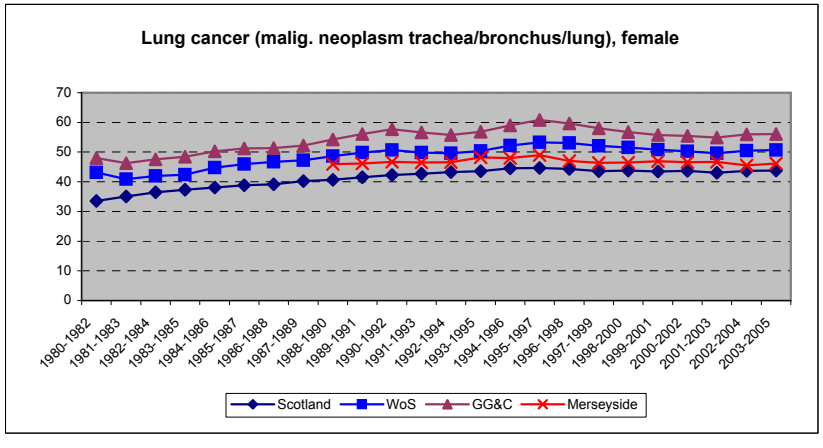
Appendix 8c. Age-standardised mortality rates: Merseyside compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



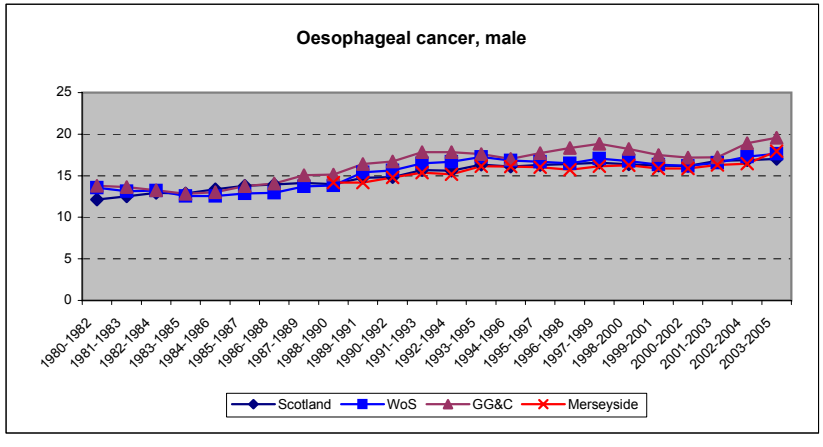


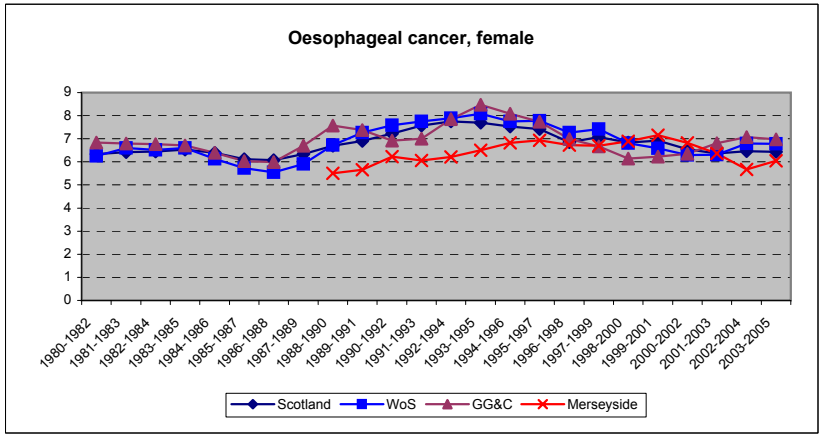


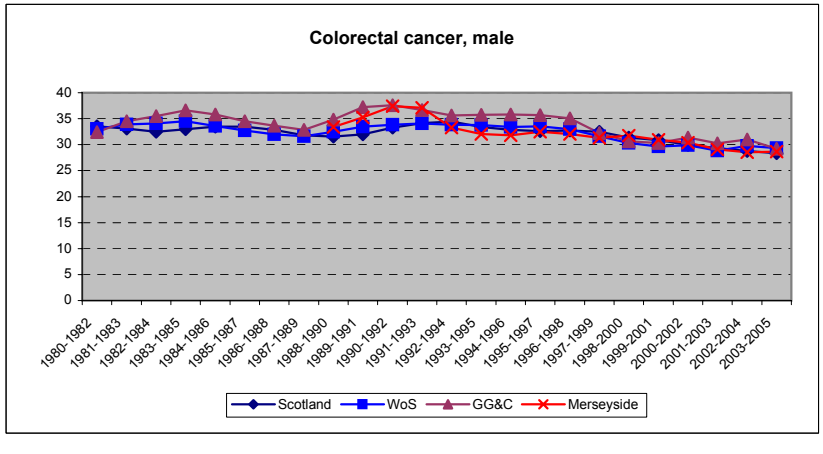


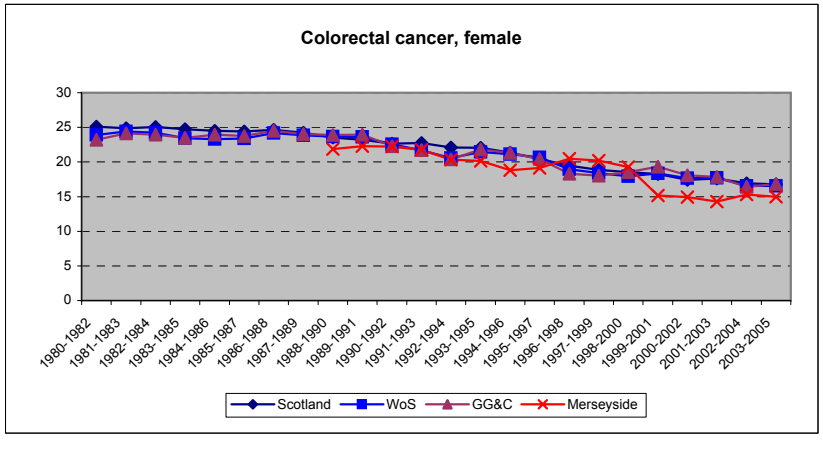
Appendix 8c. Age-standardised mortality rates: Merseyside compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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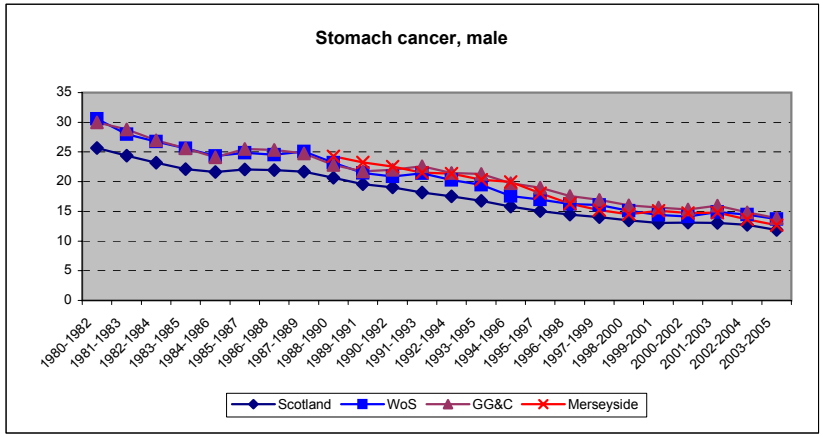

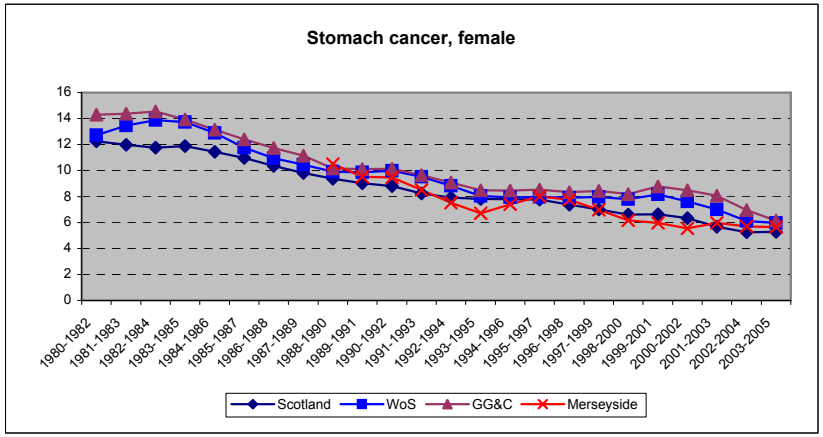

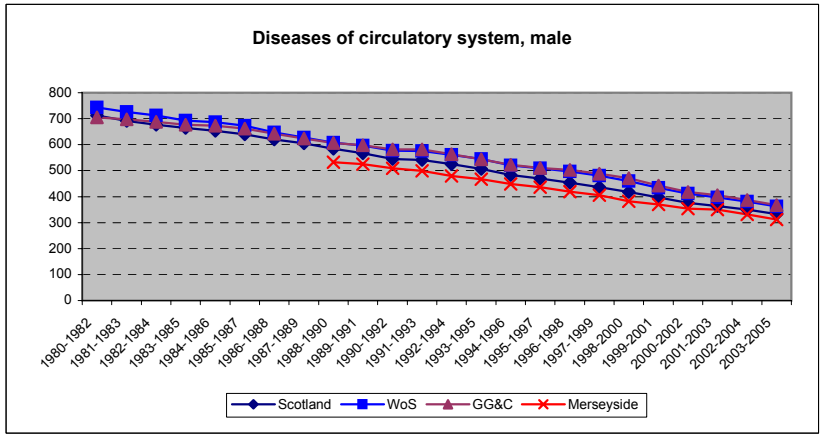

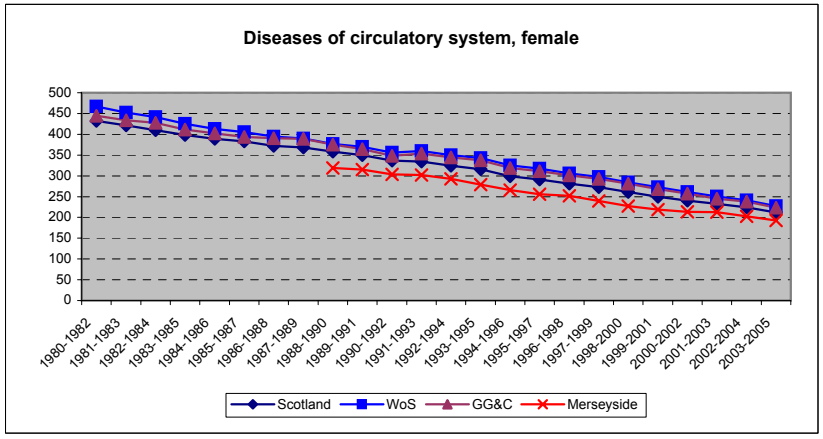

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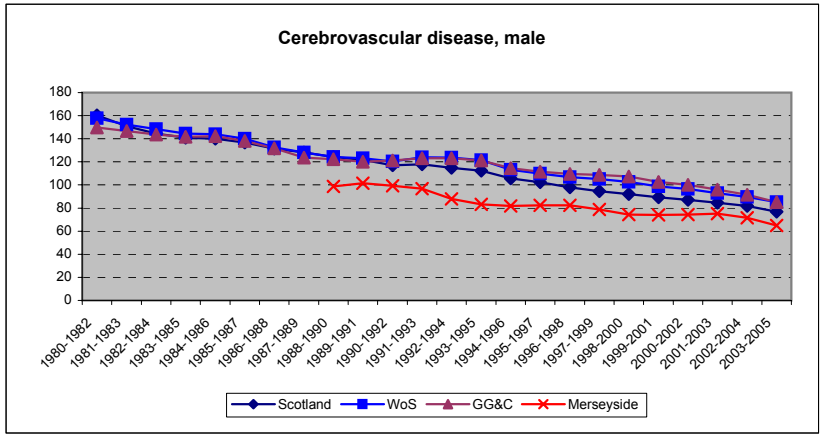

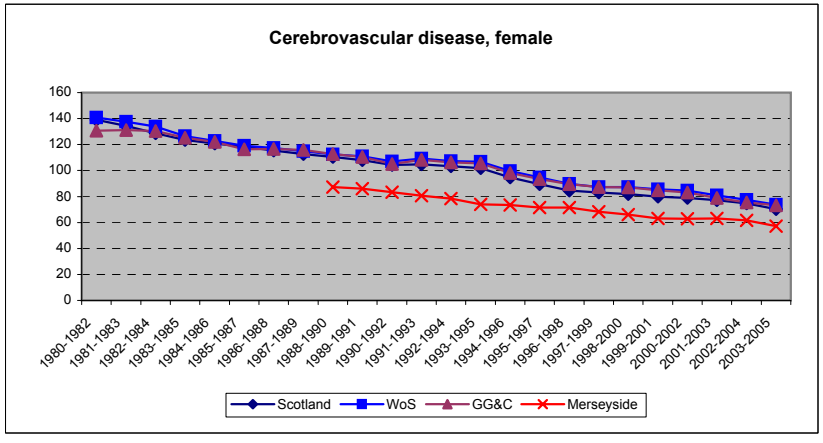

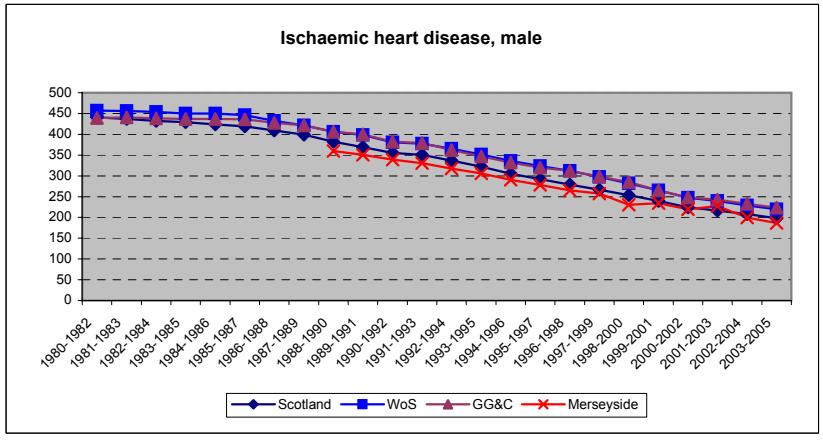

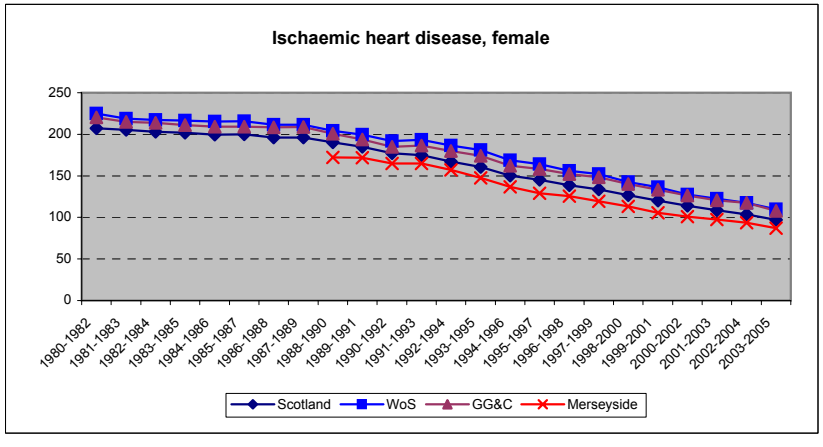

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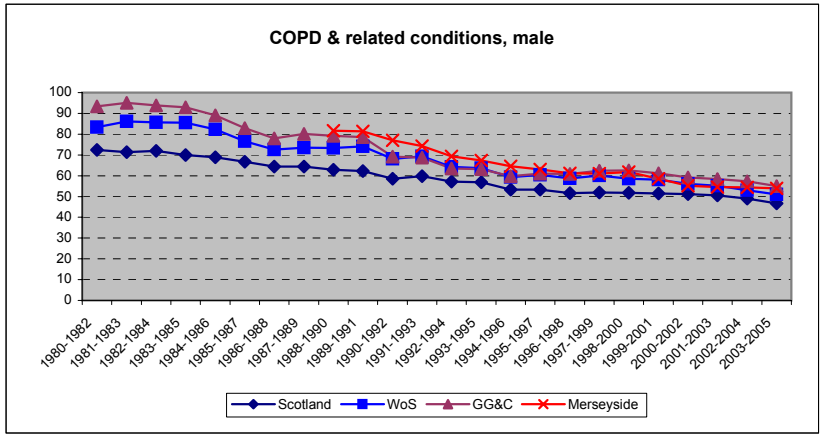

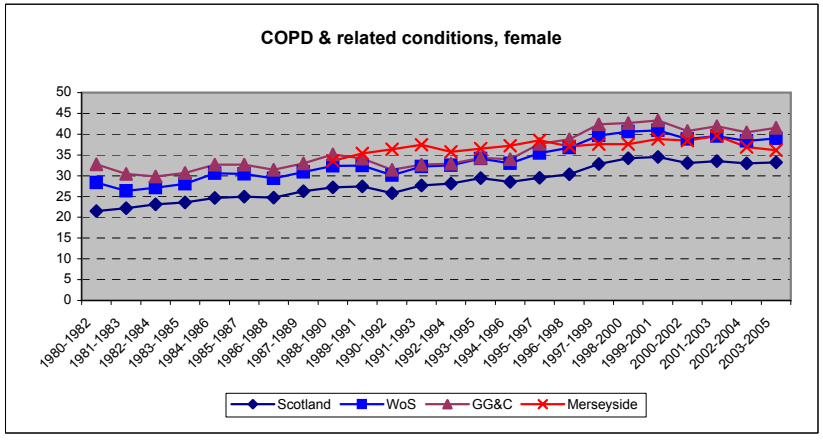

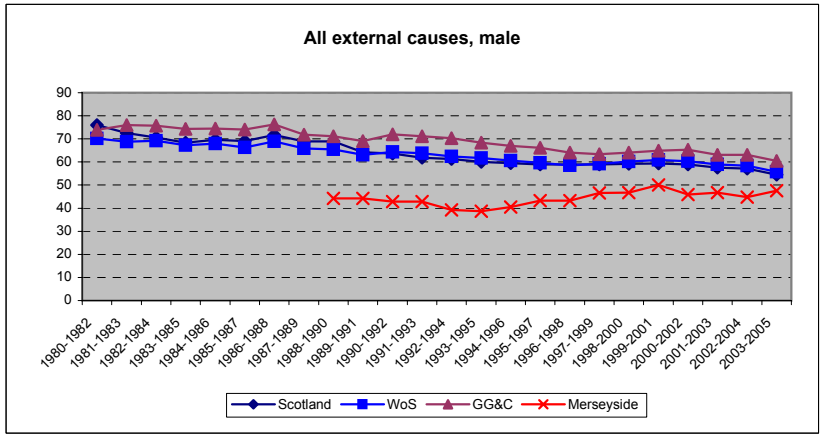

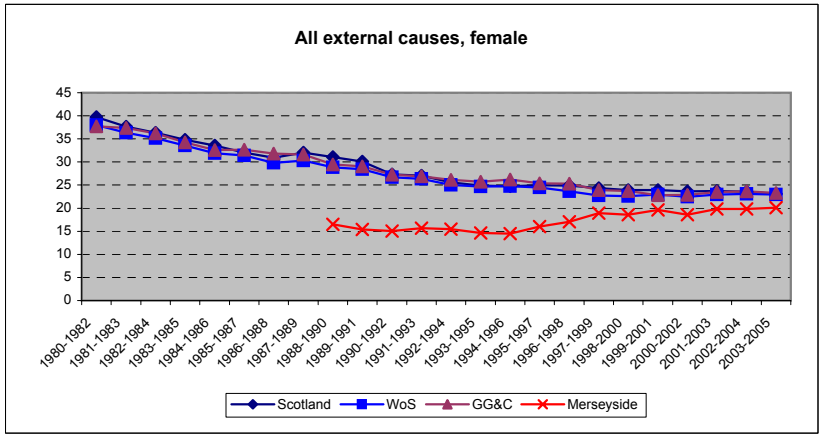

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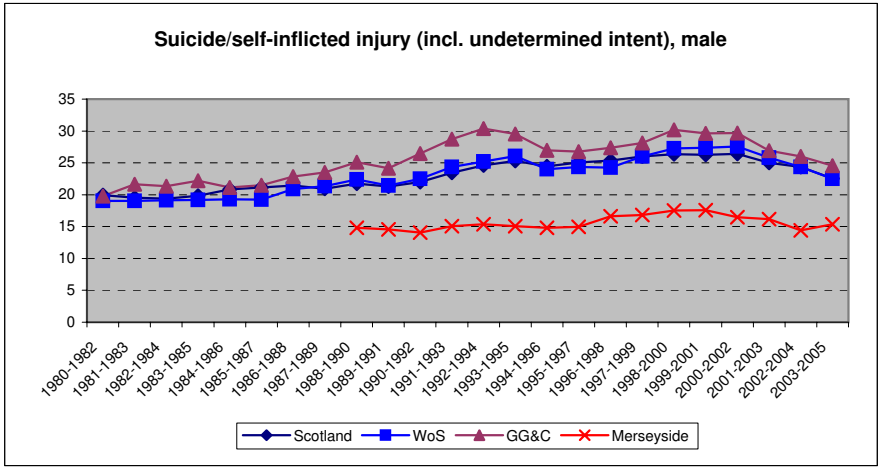

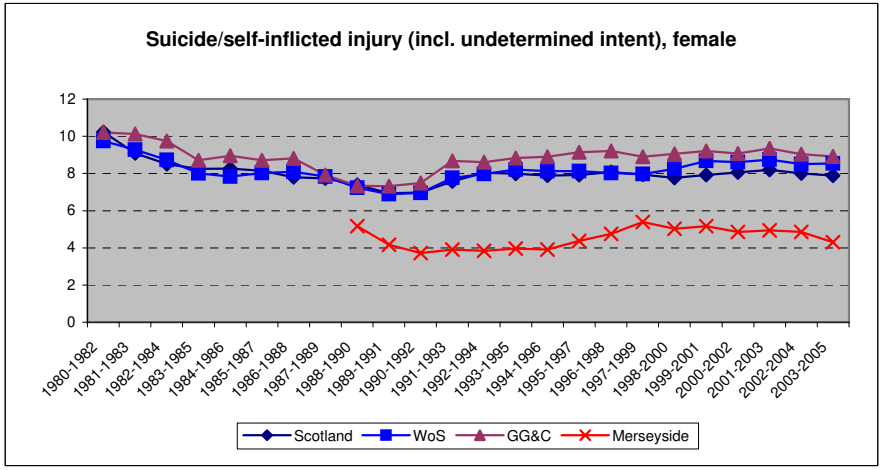

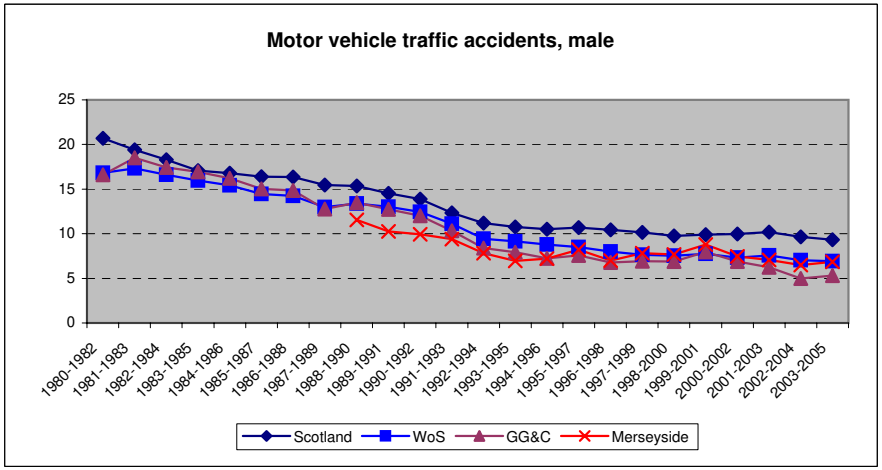

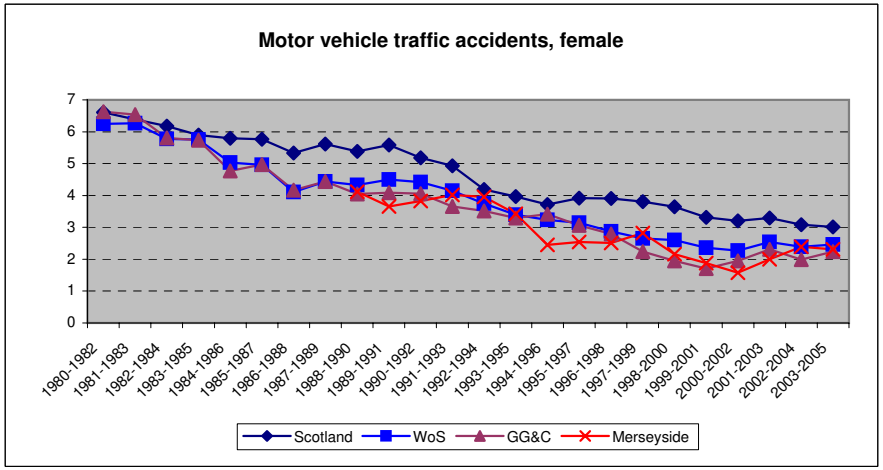

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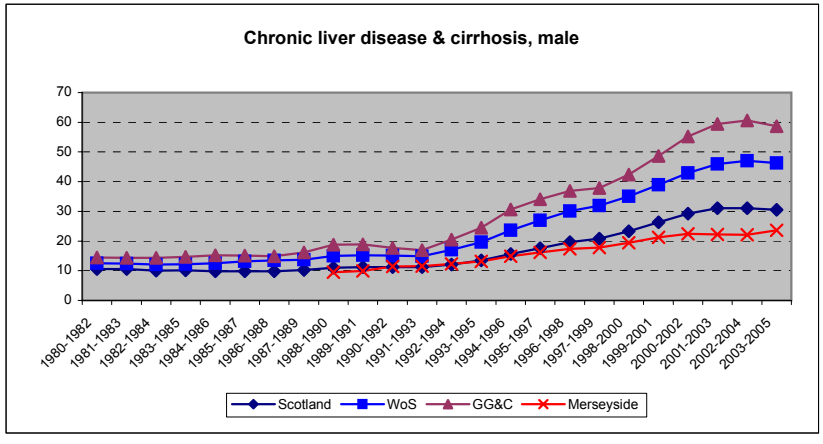

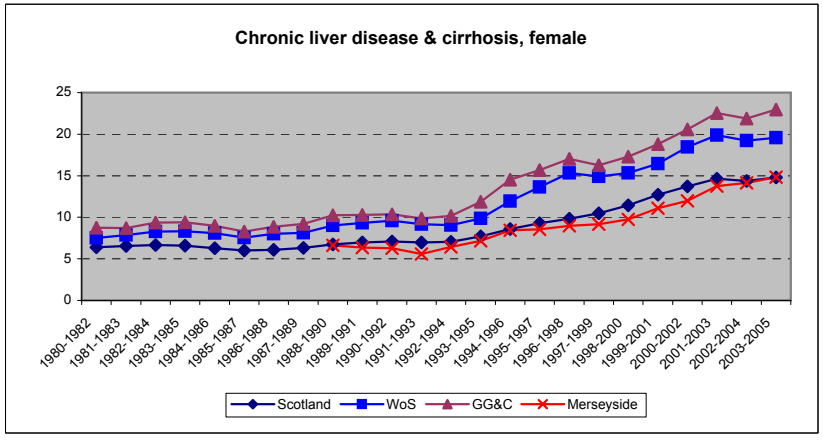

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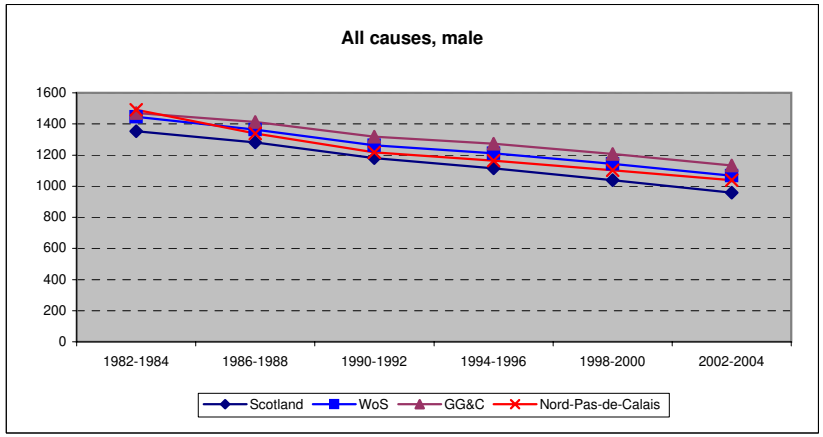

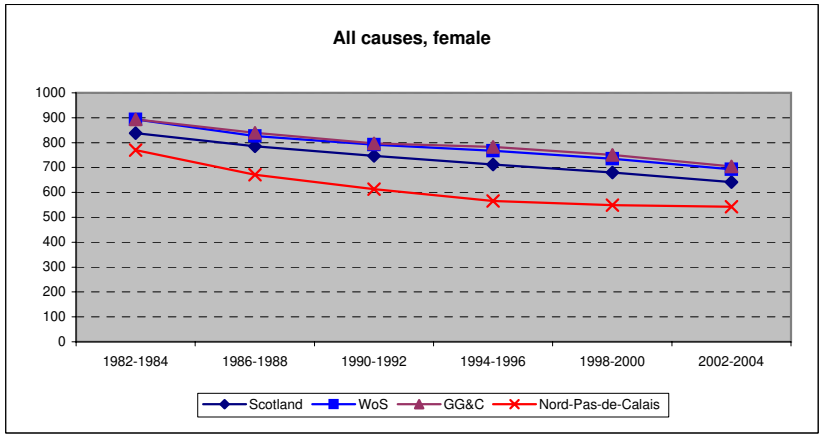

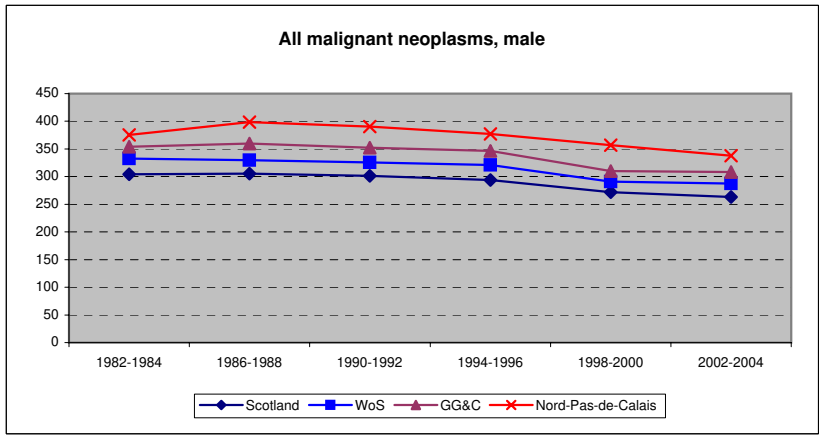

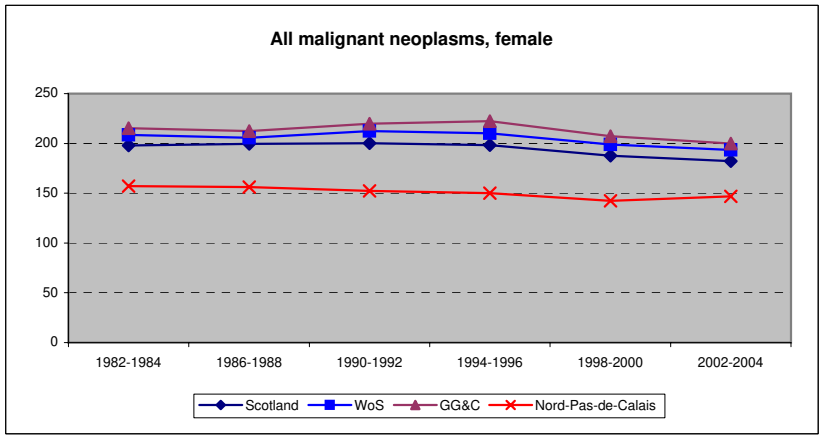

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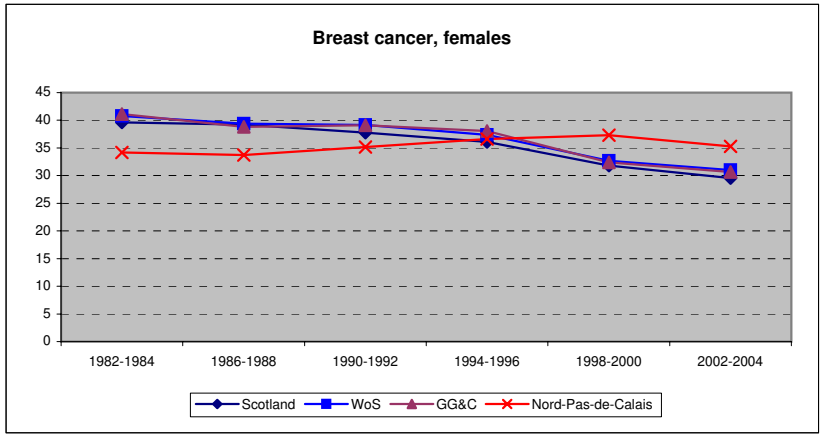

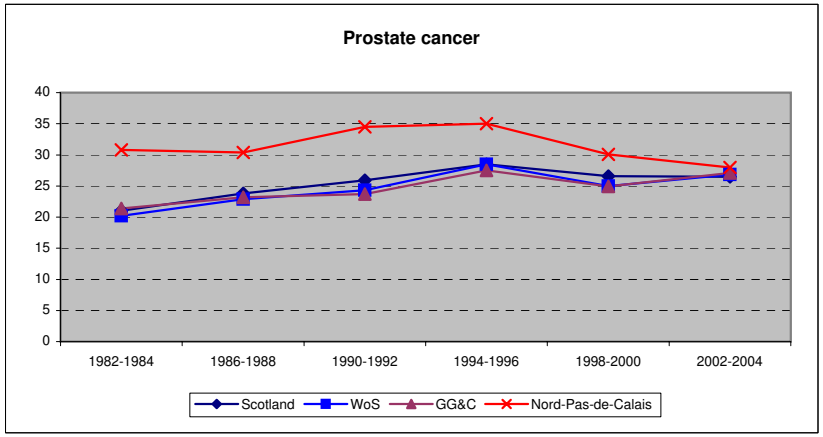

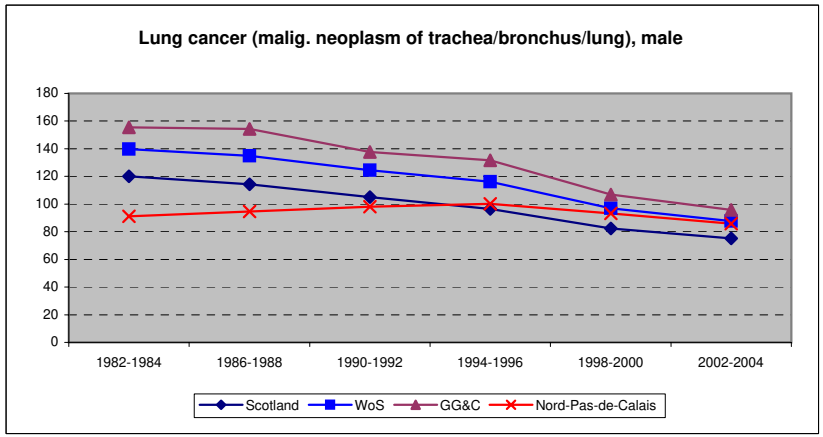

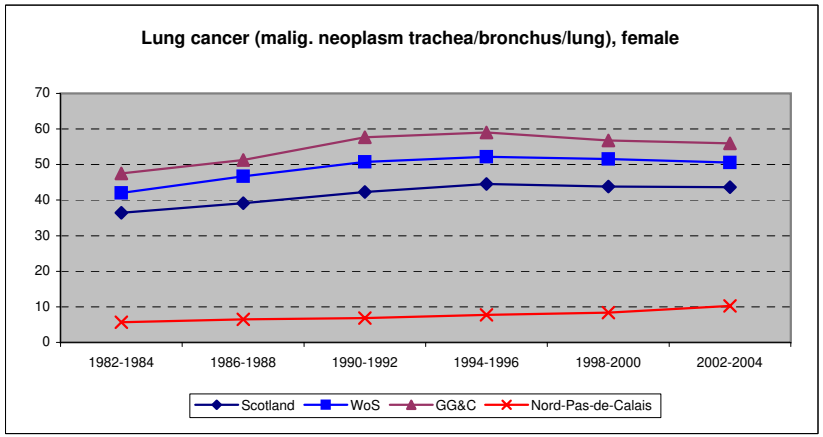

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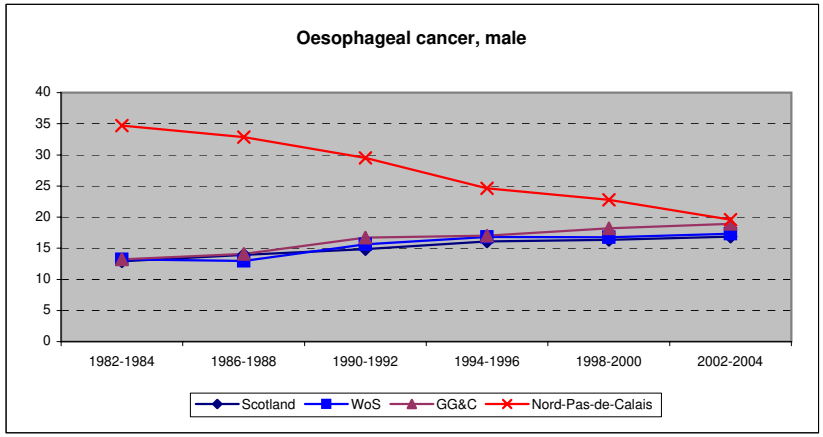

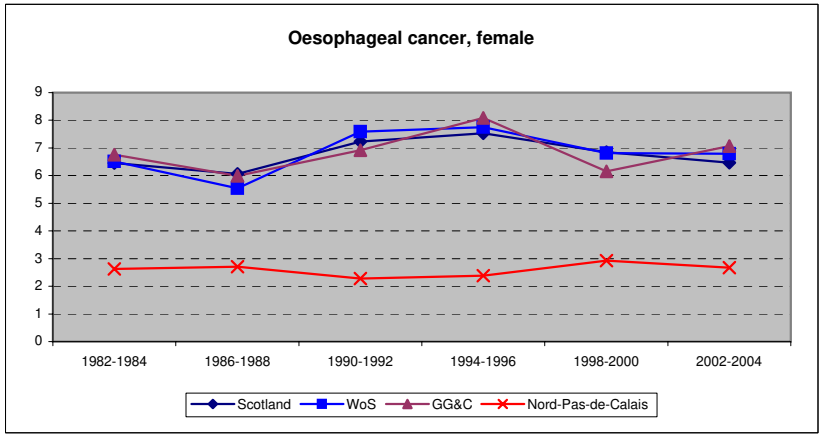

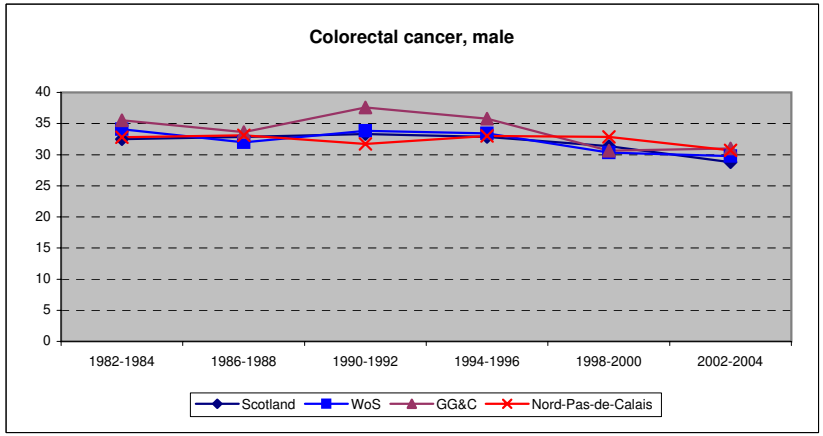

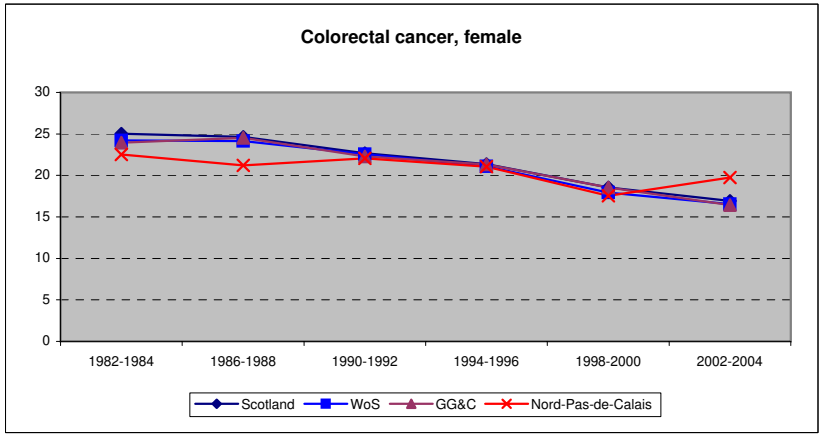

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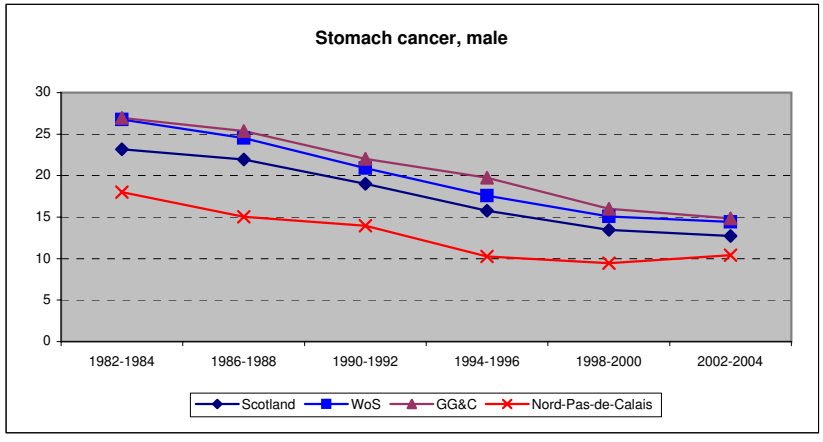

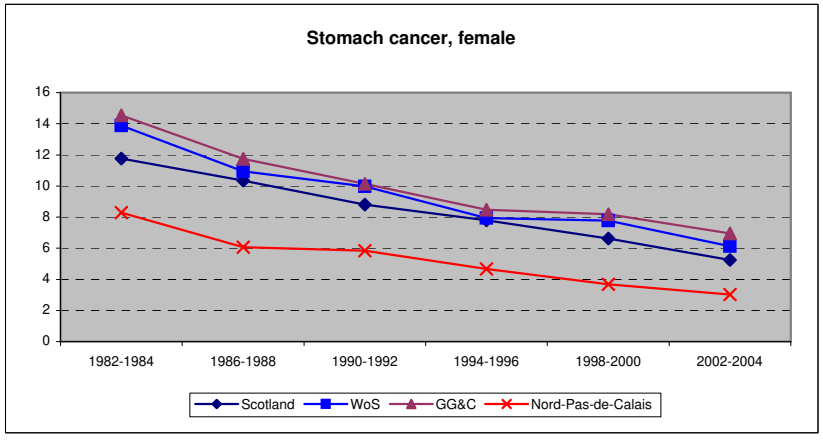

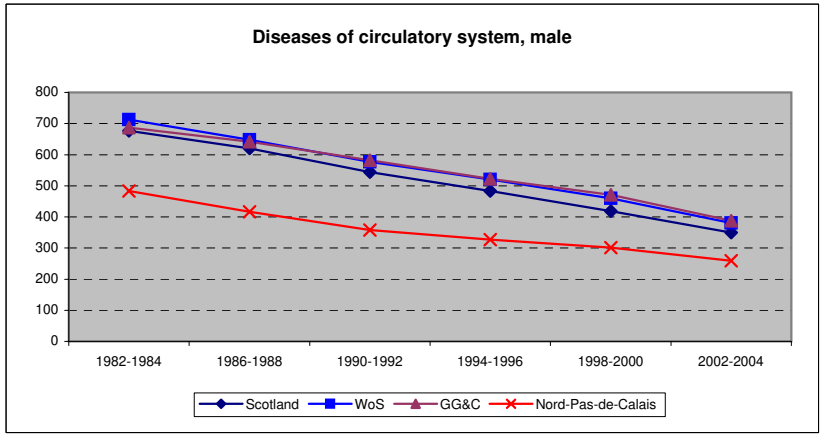

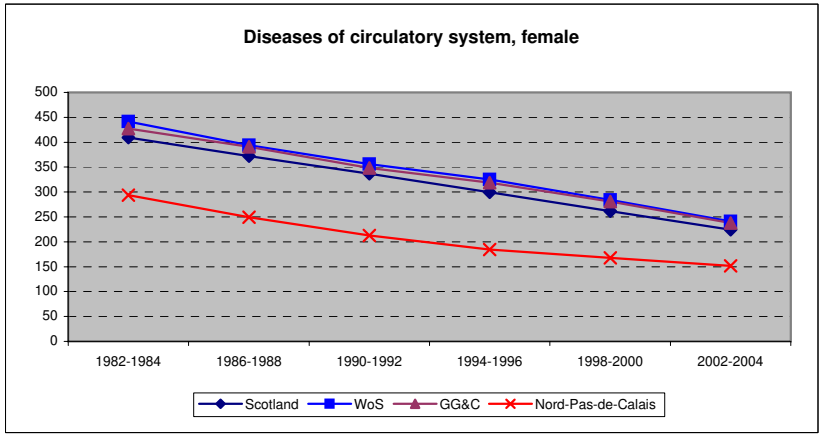

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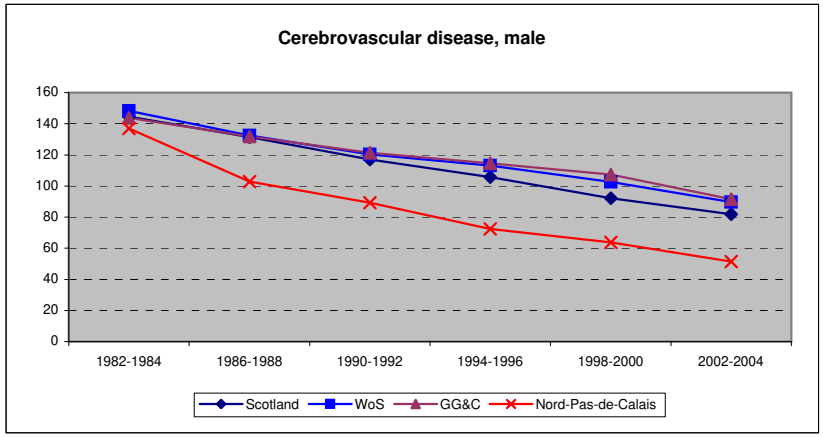

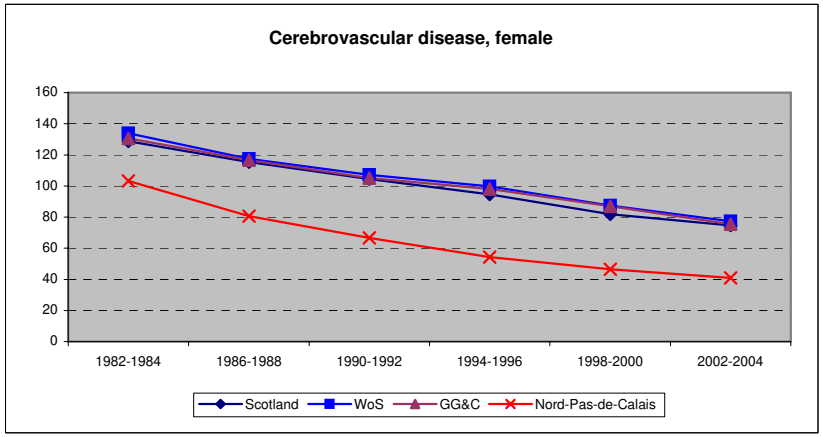

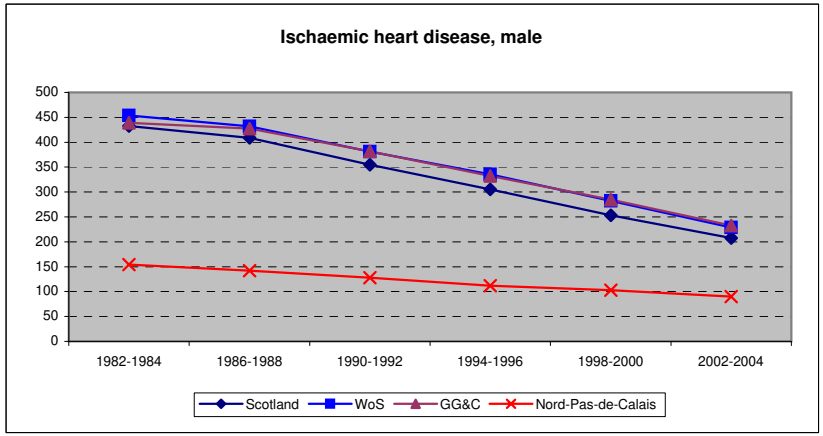

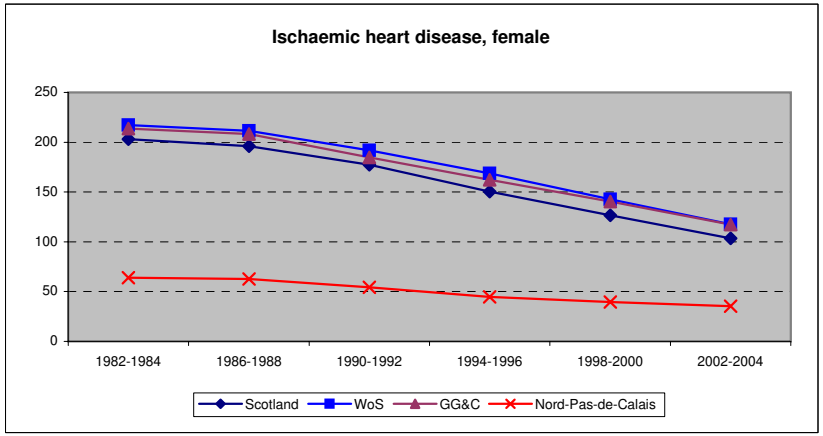

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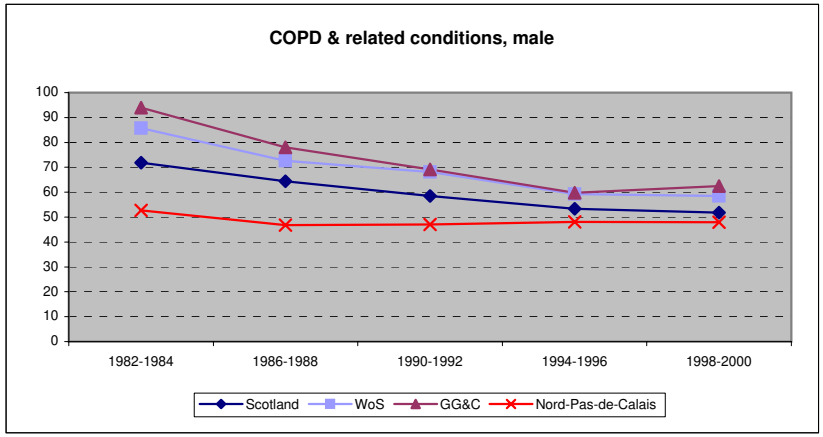

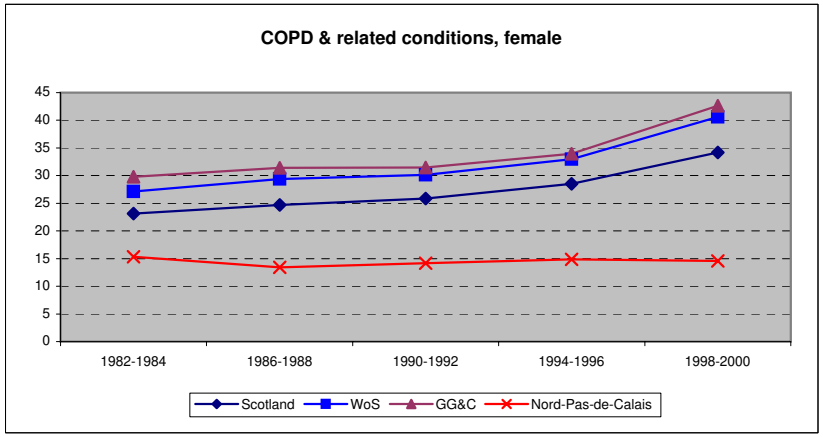

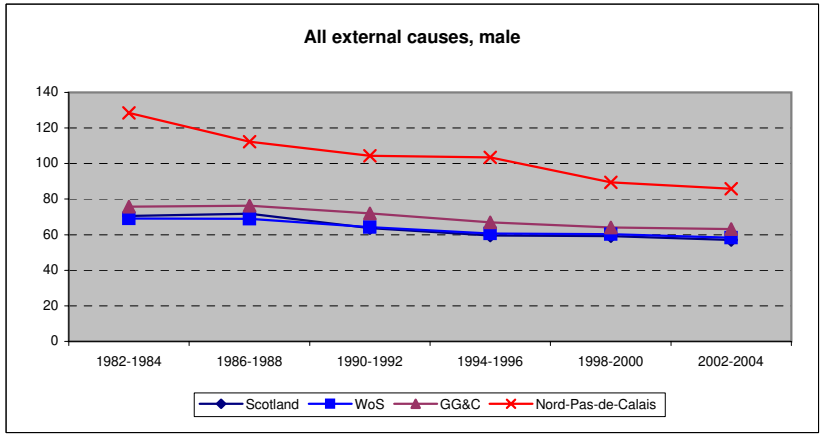

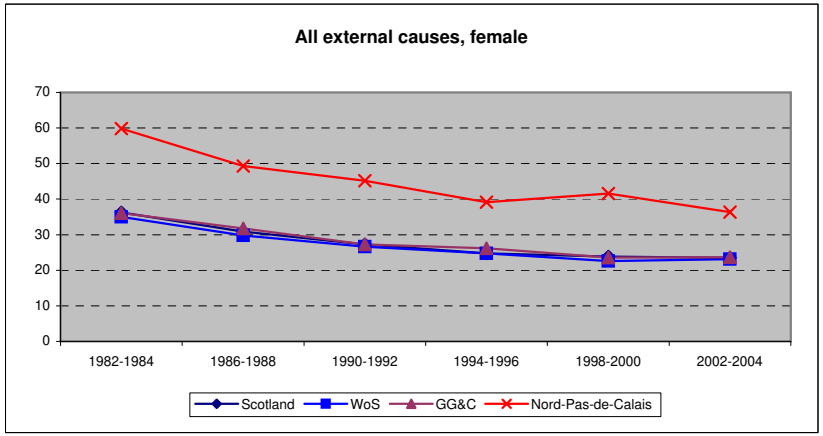

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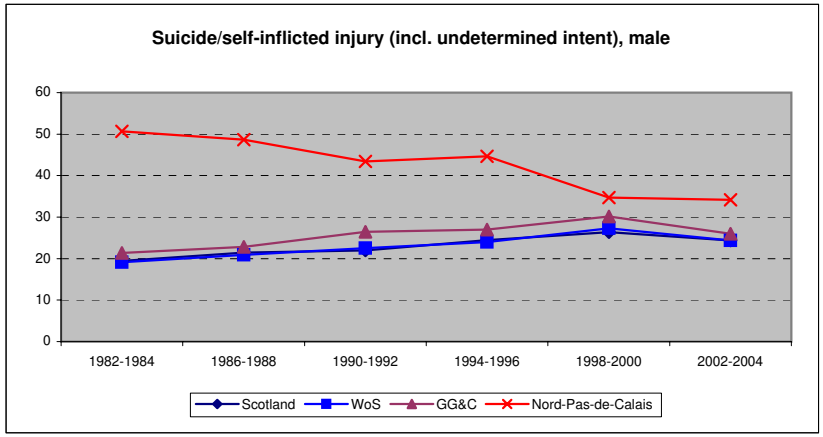

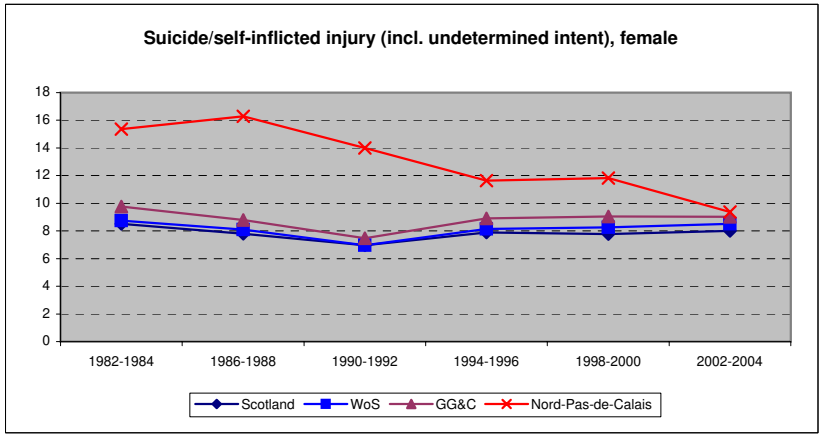

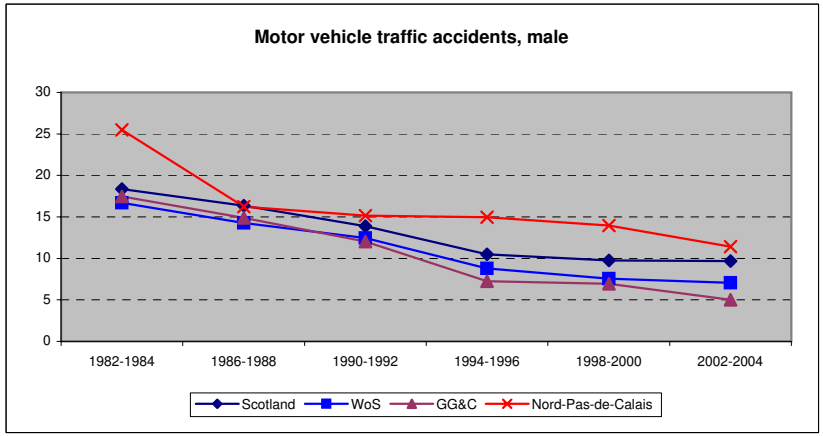

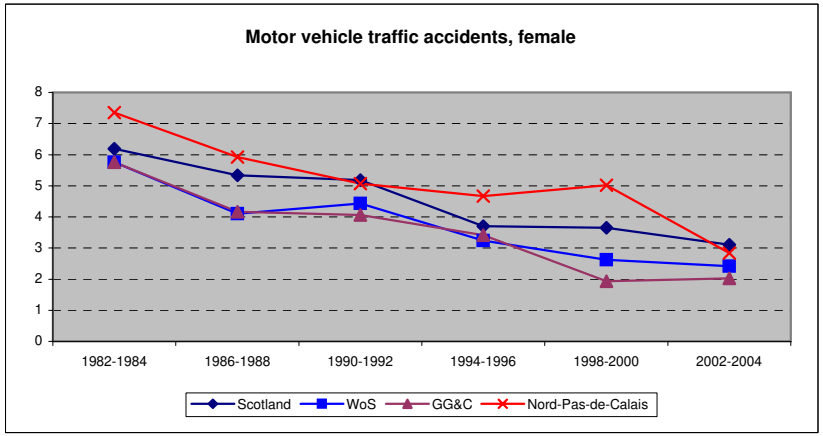

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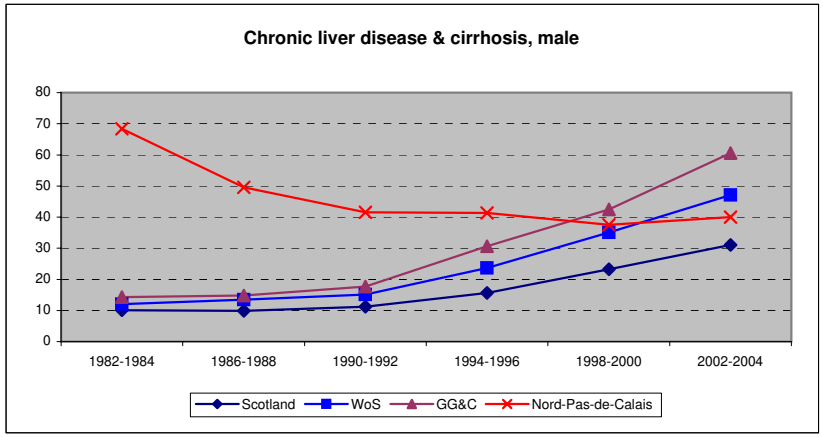
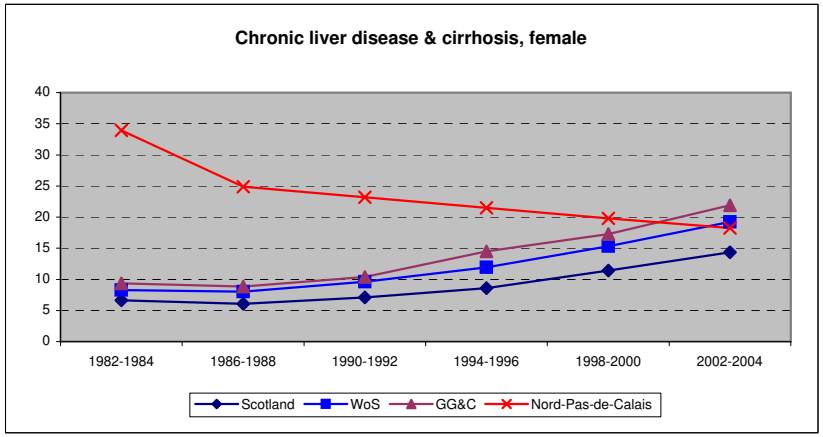
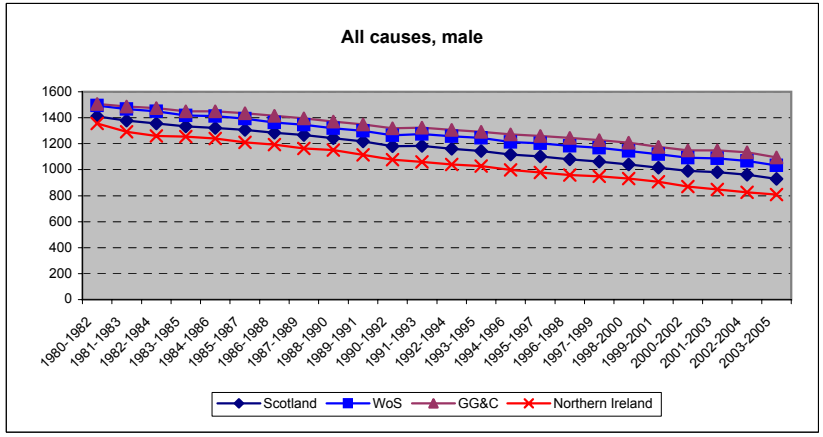
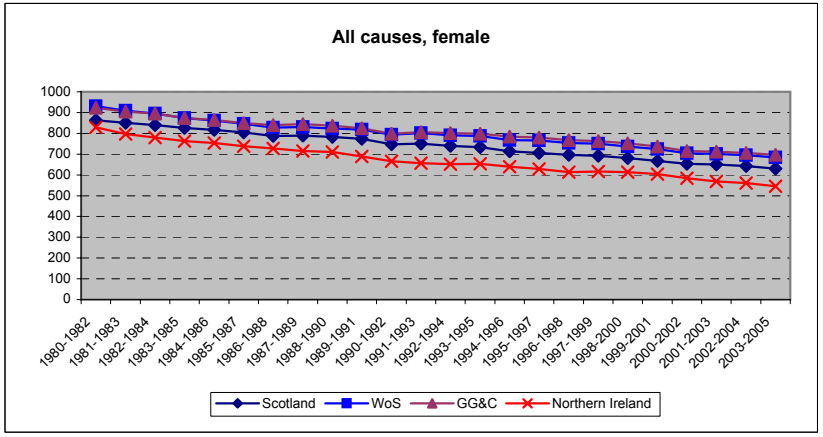


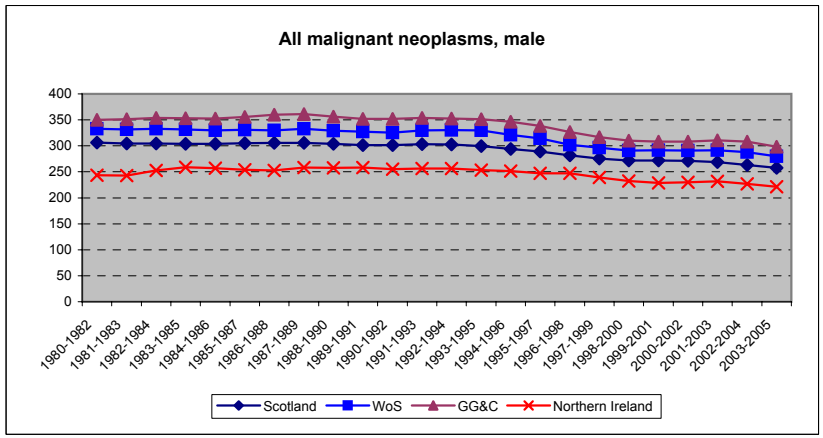


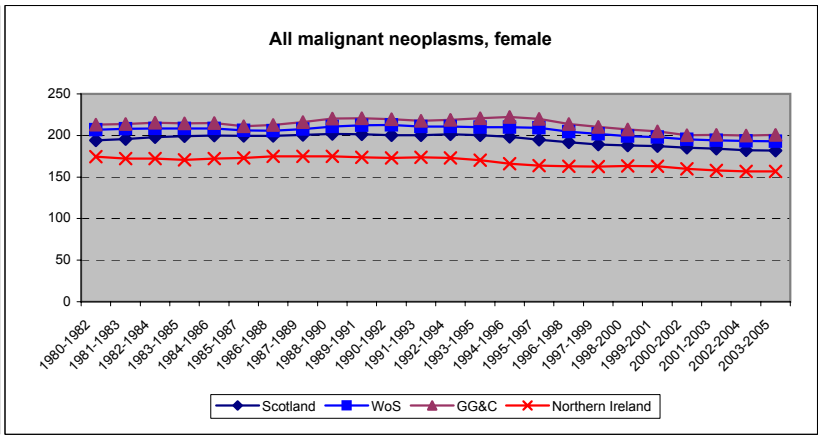
Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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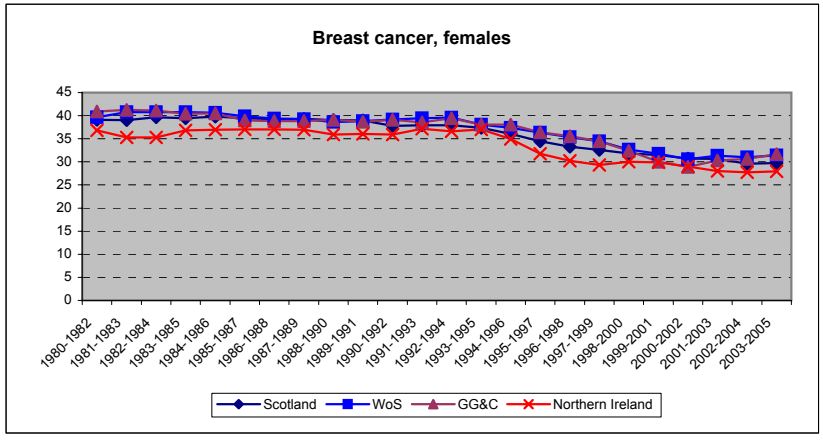
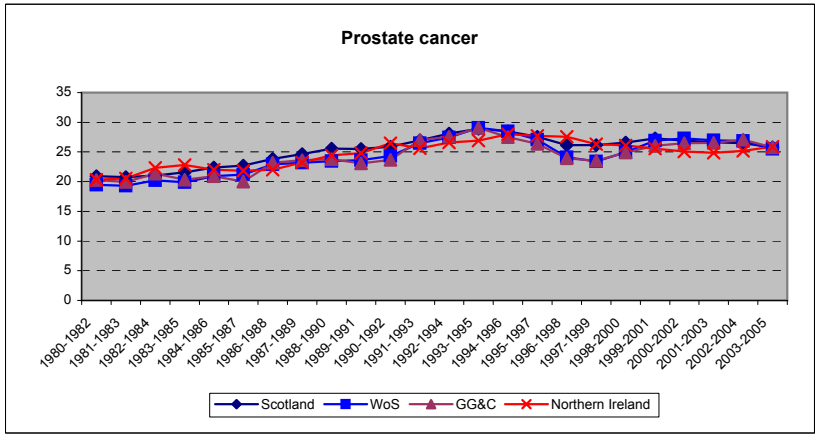
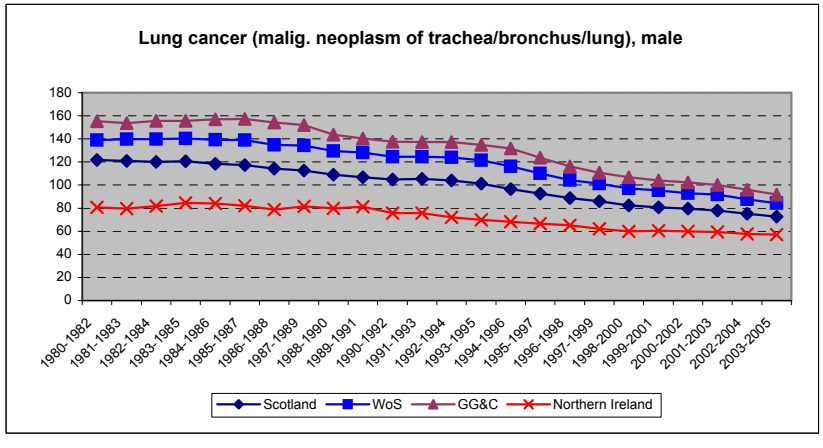
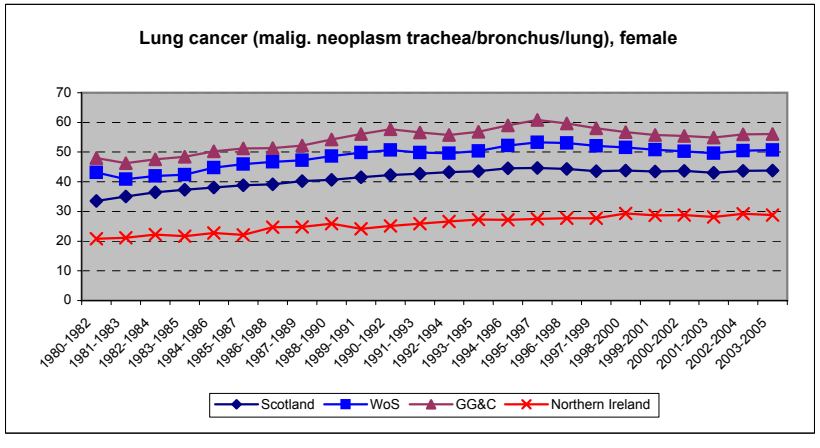
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



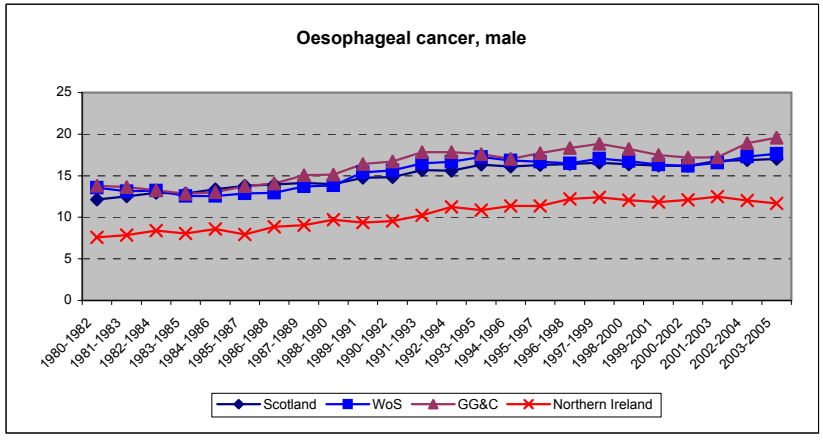


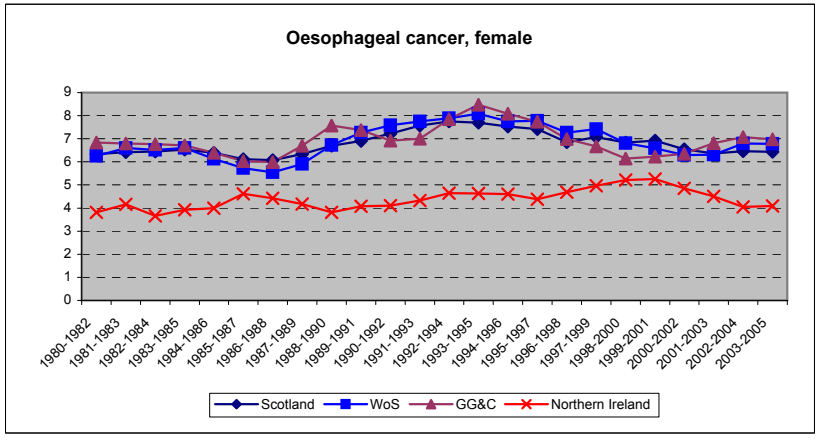


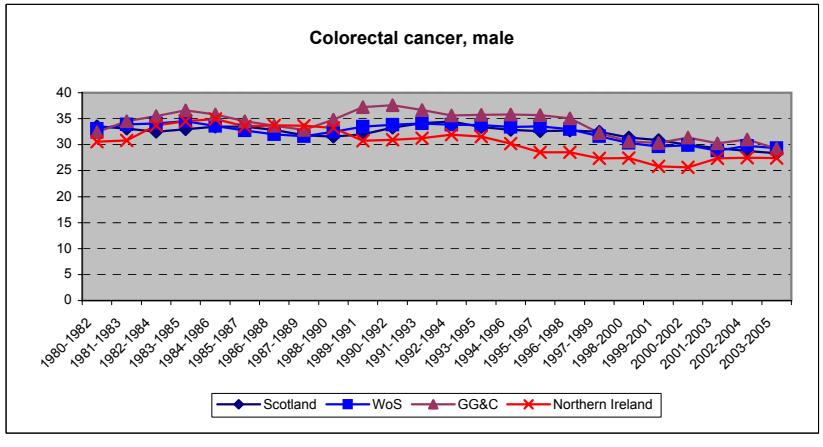


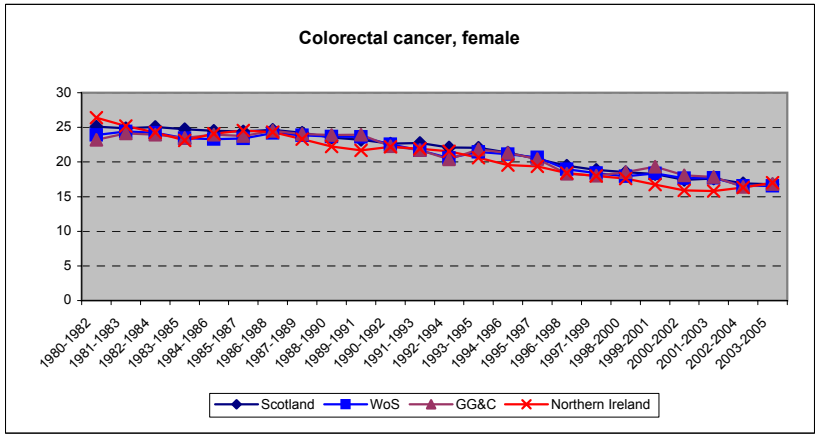
Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



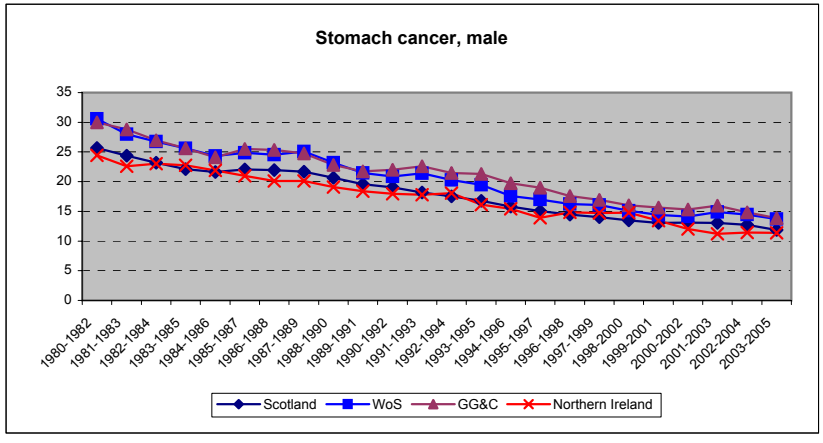


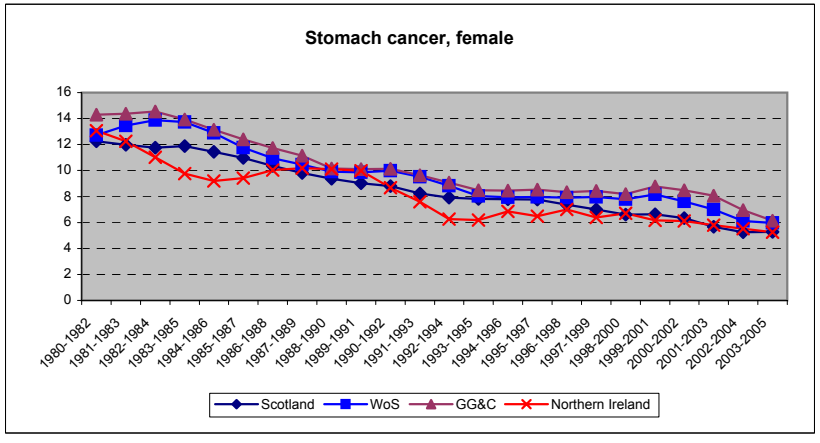


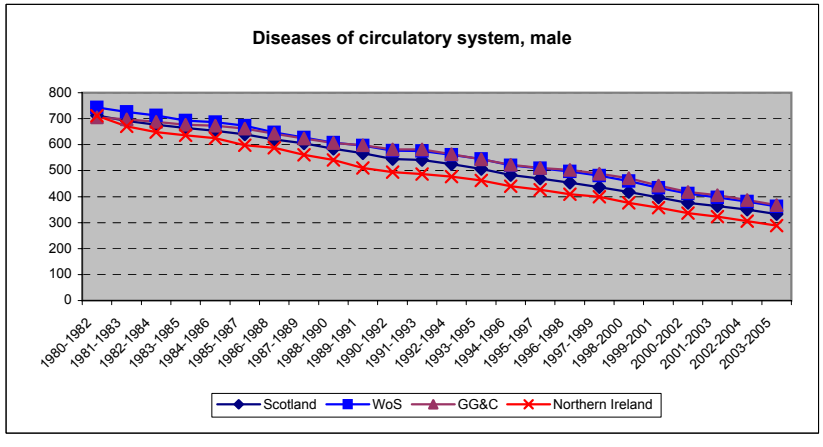


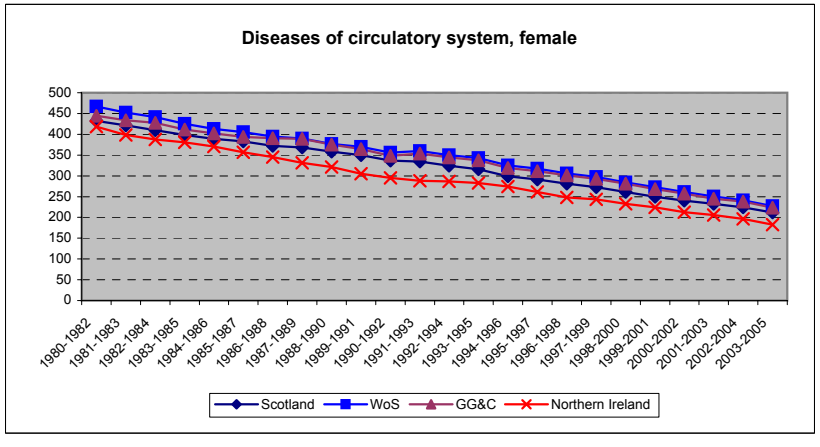
Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



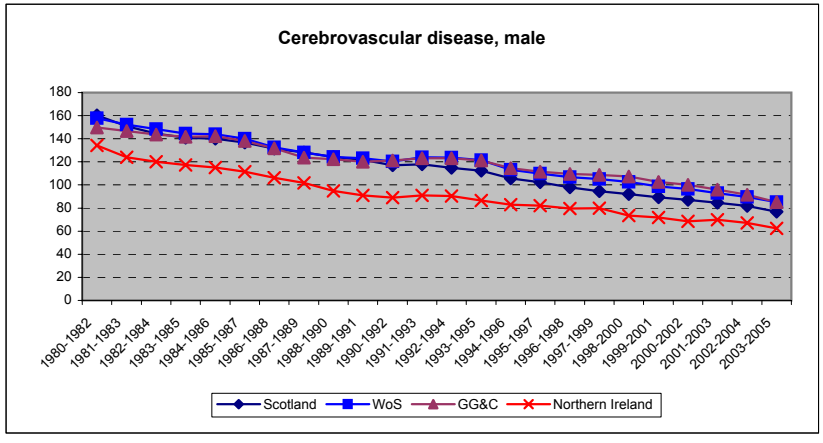


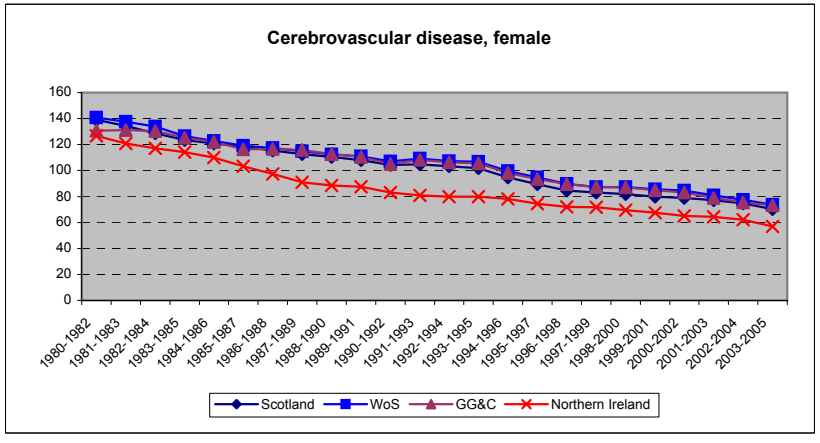


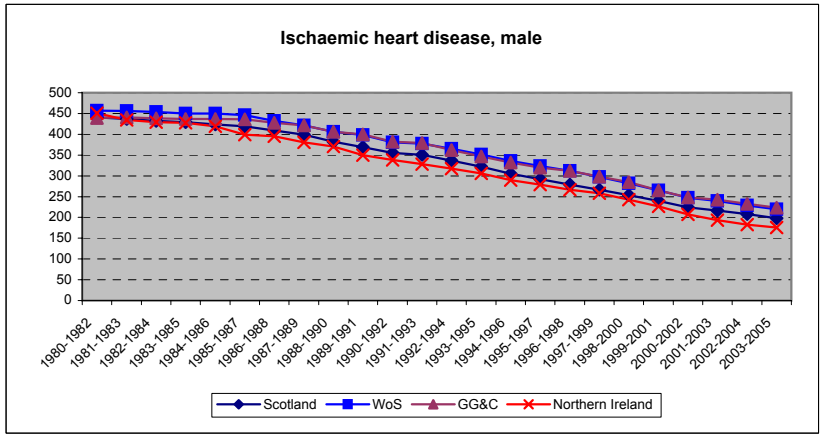


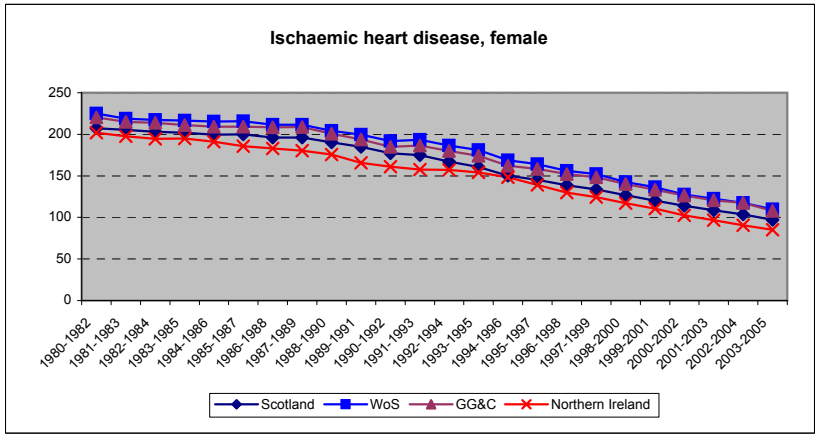
Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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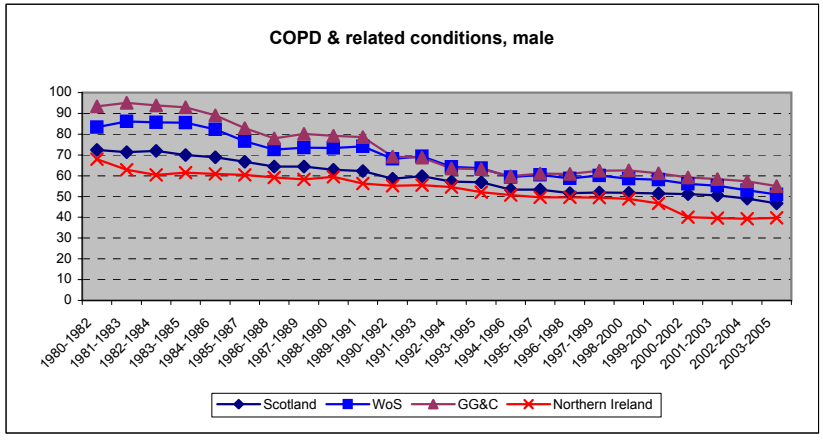
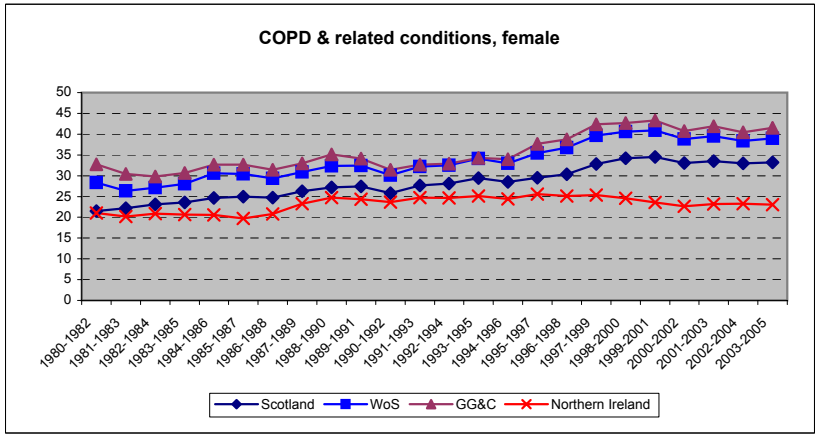
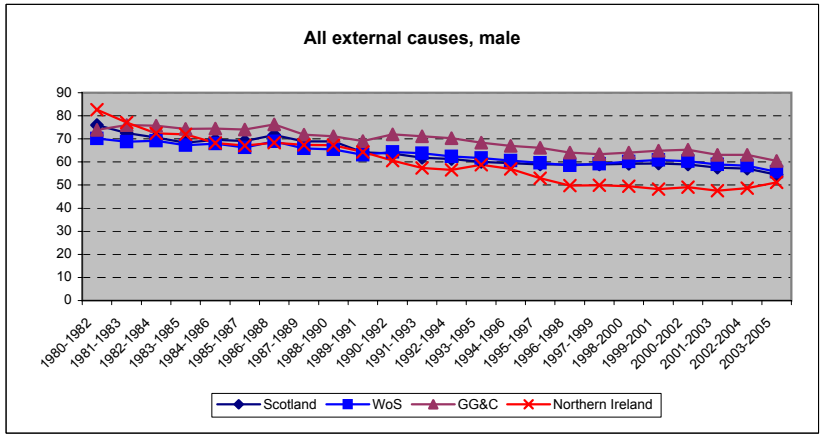
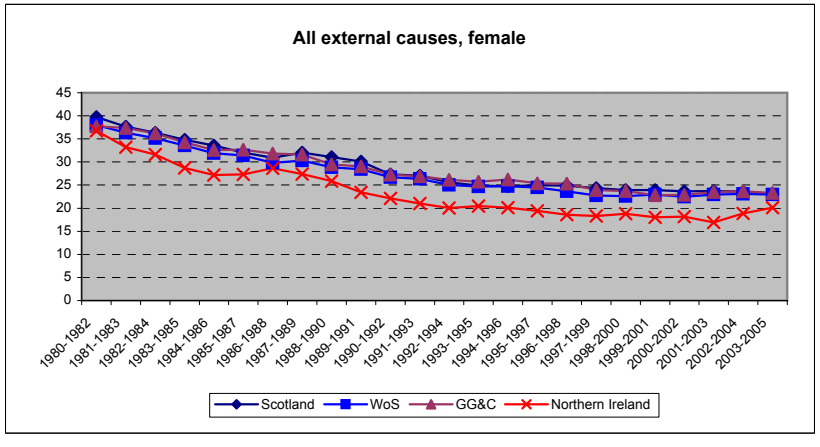
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



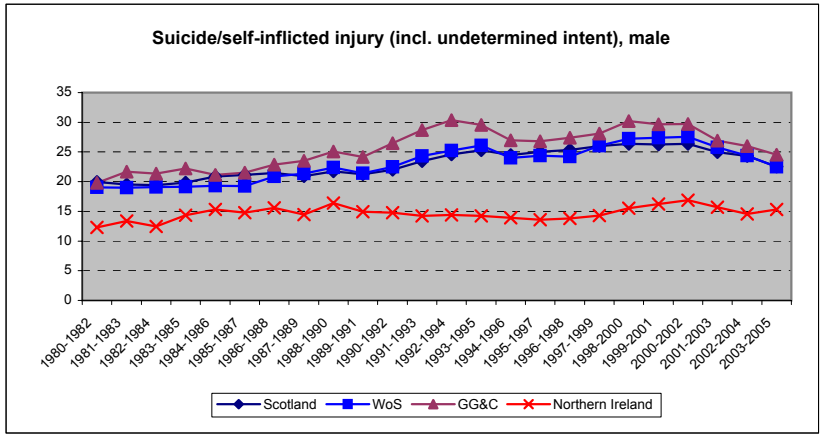


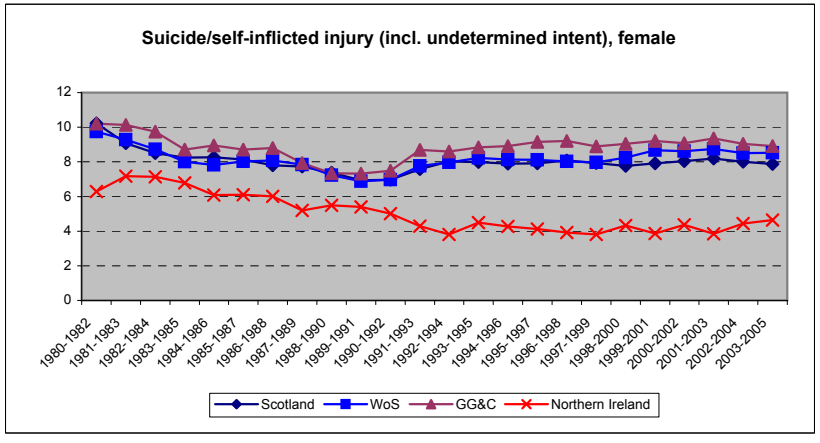


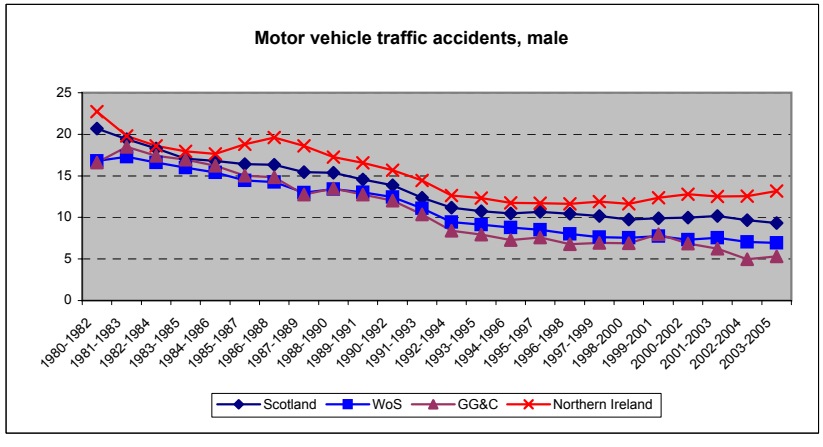


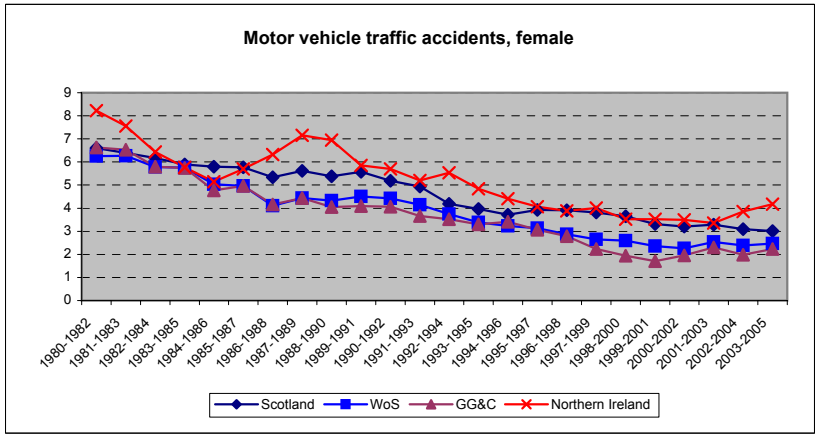
Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



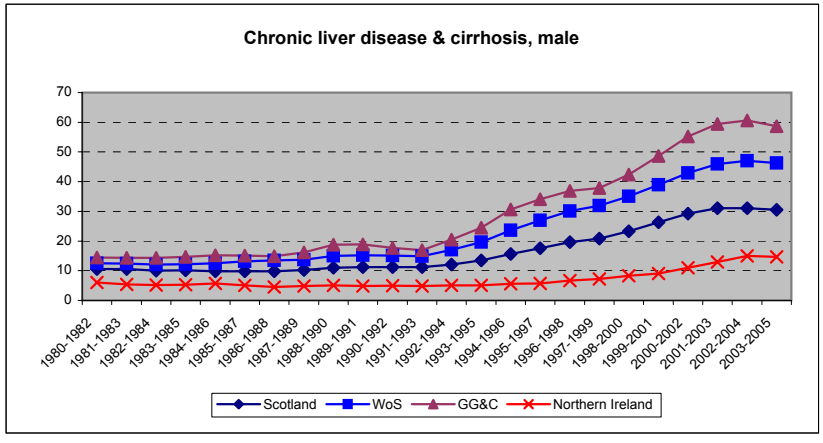


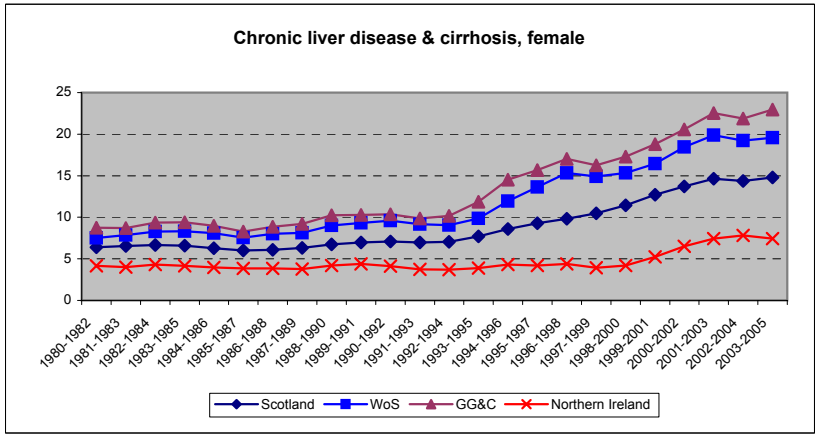




Appendix 8e. Age-standardised mortality rates: Northern Ireland compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

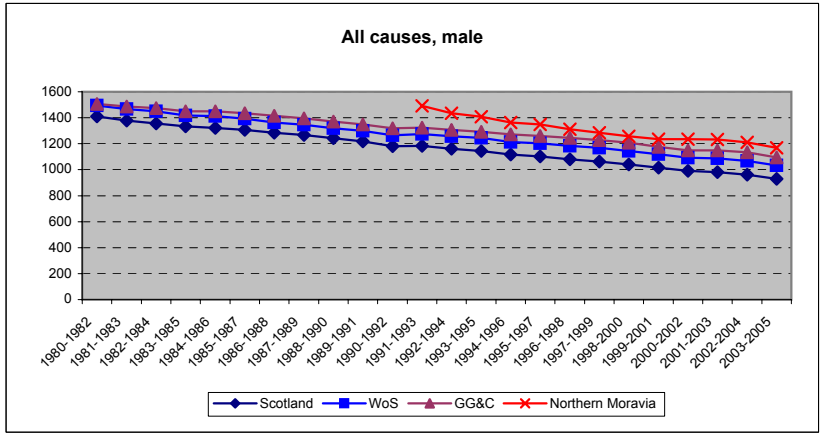
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.

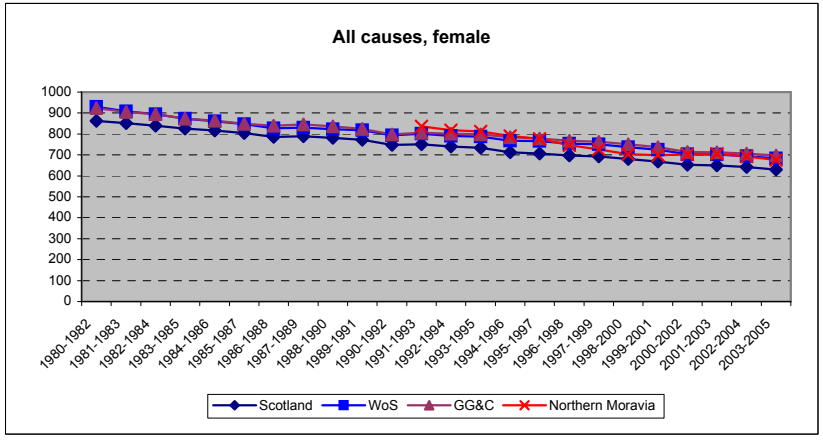


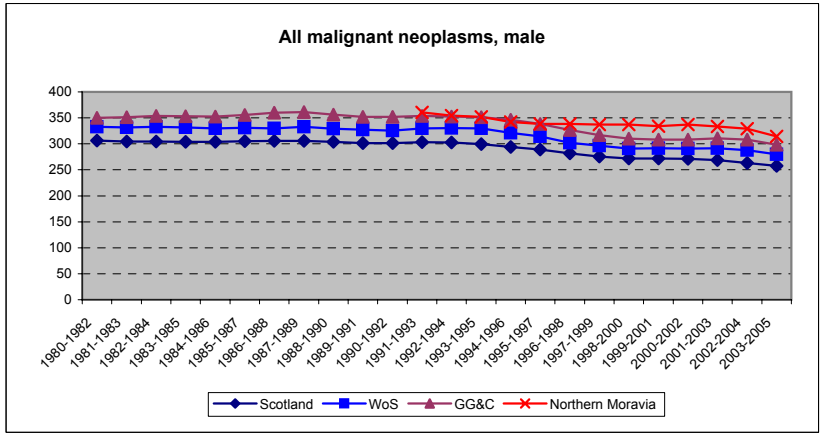


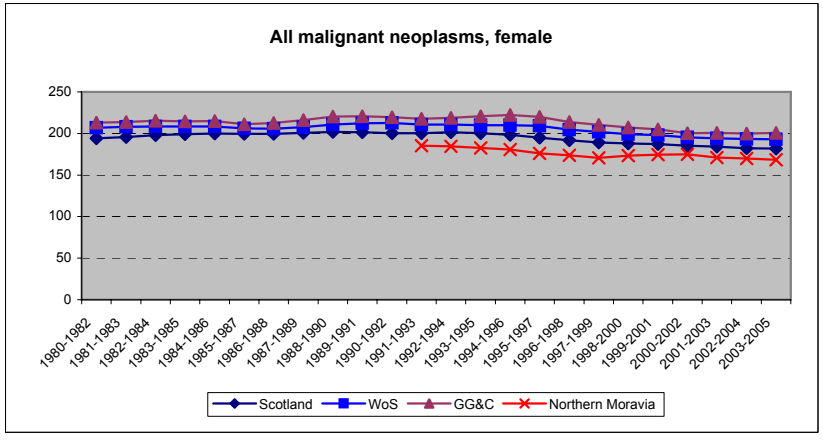
Appendix 8f. Age-standardised mortality rates: Northern Moravia compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



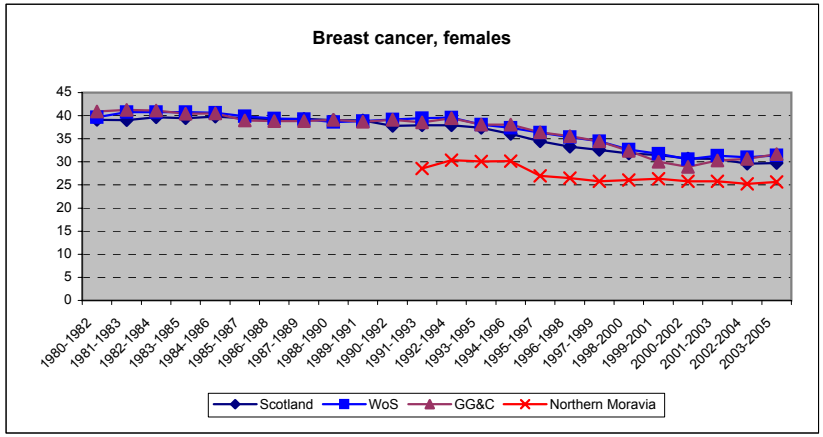


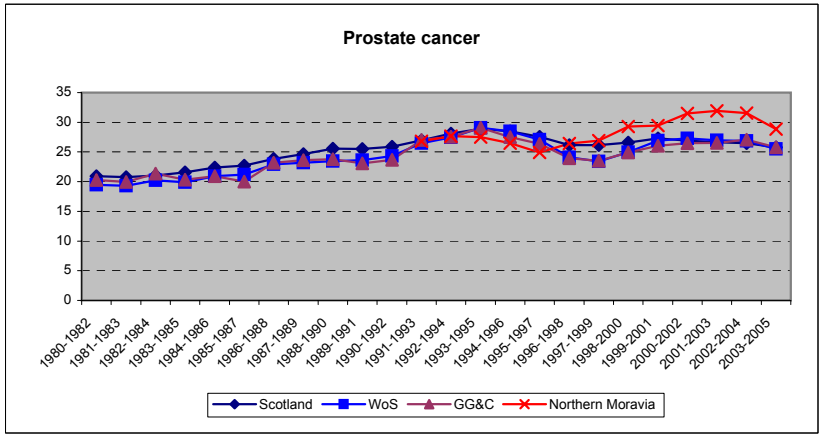


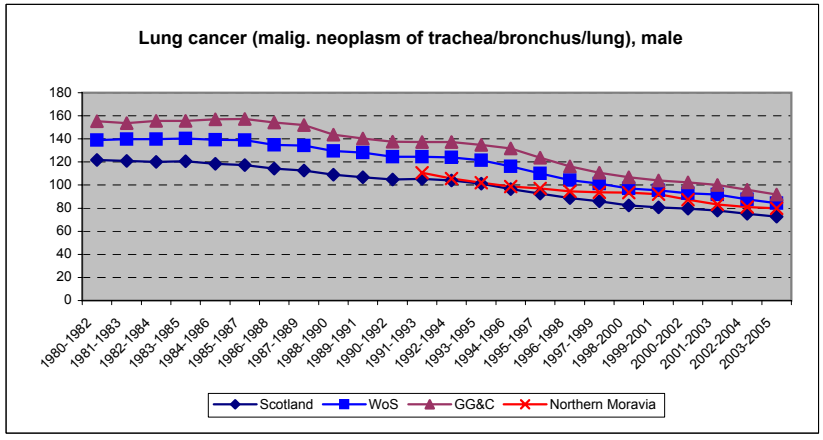


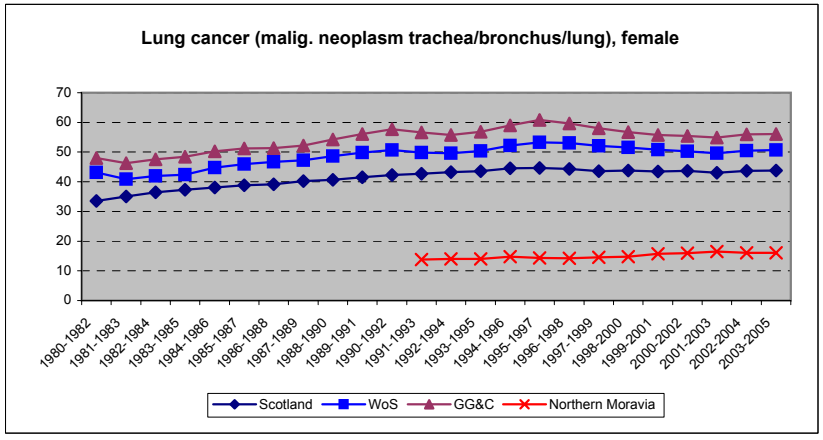
Appendix 8f. Age-standardised mortality rates: Northern Moravia compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



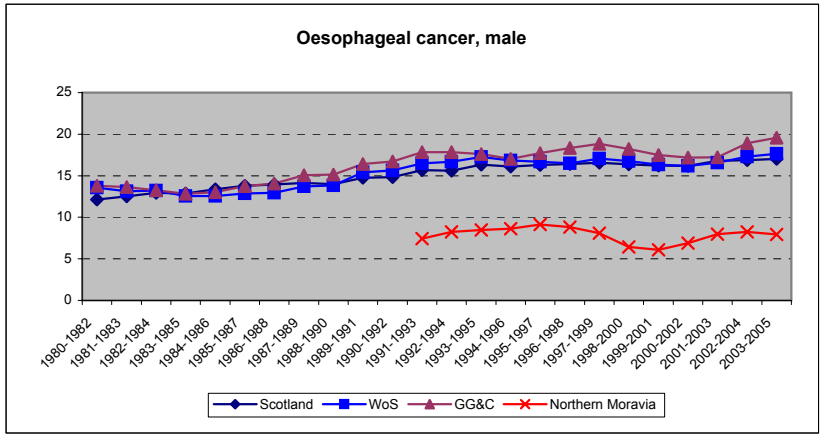


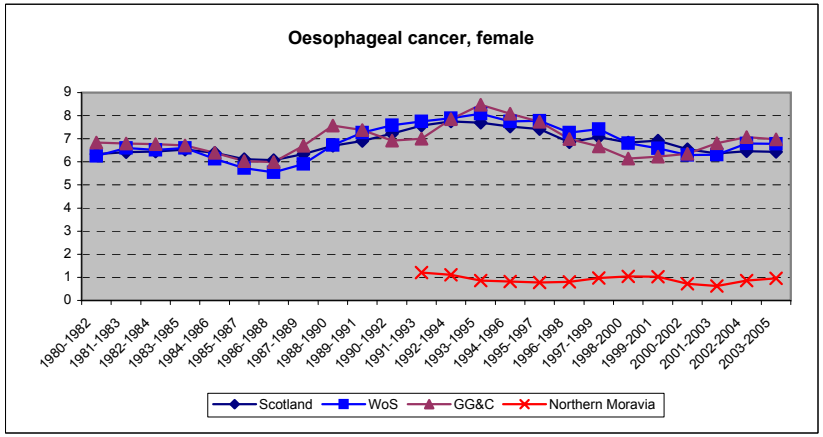


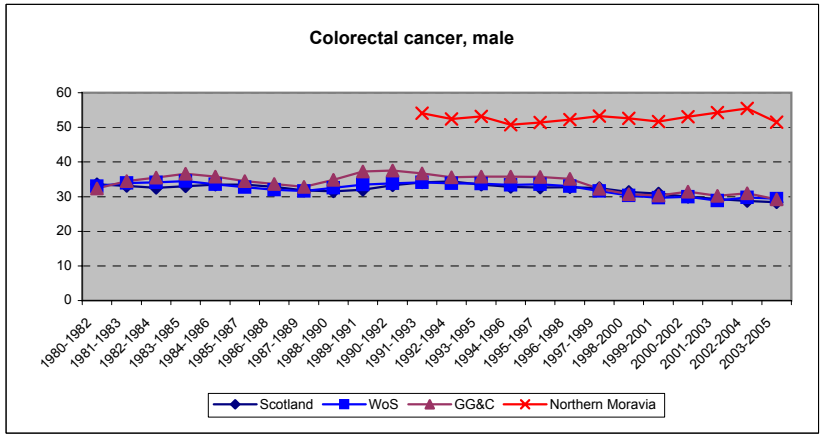


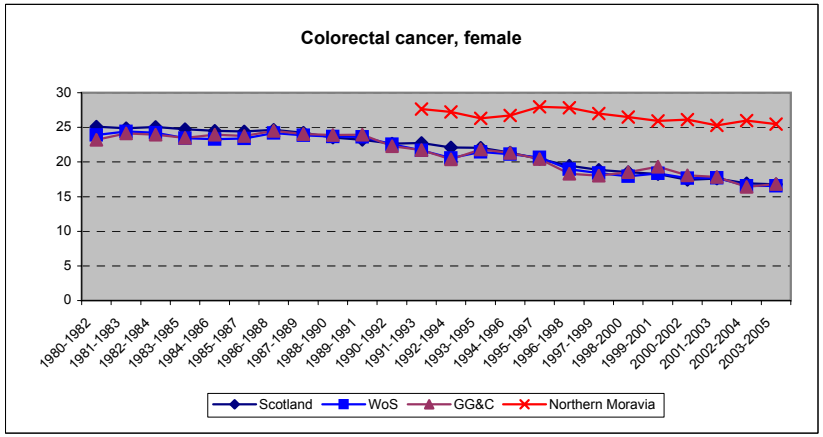
Appendix 8f. Age-standardised mortality rates: Northern Moravia compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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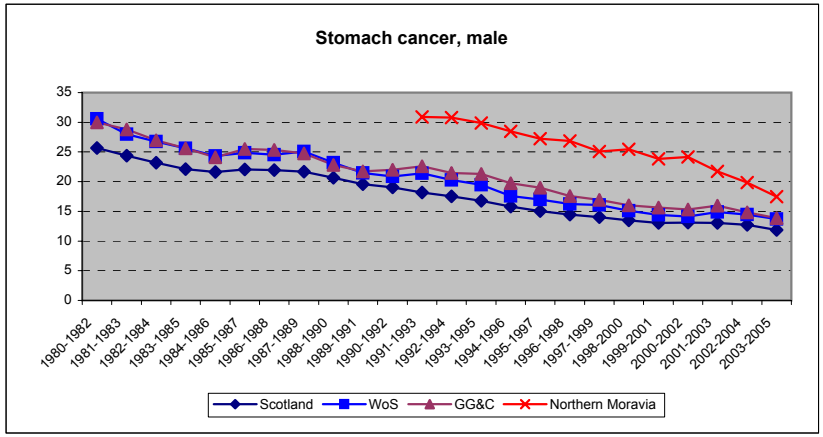

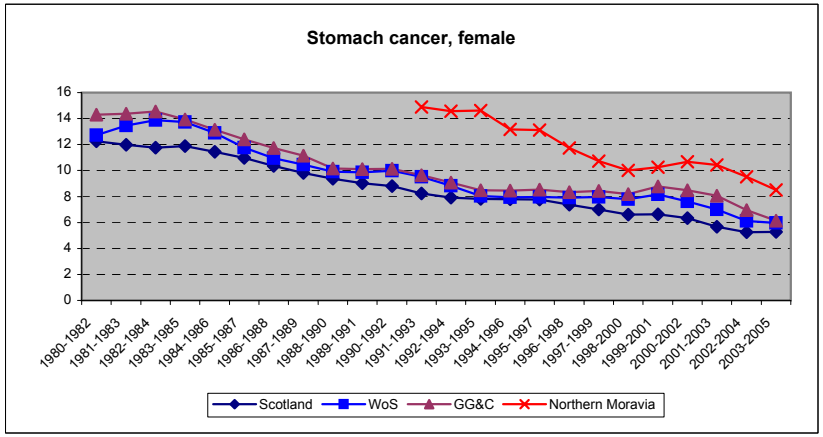

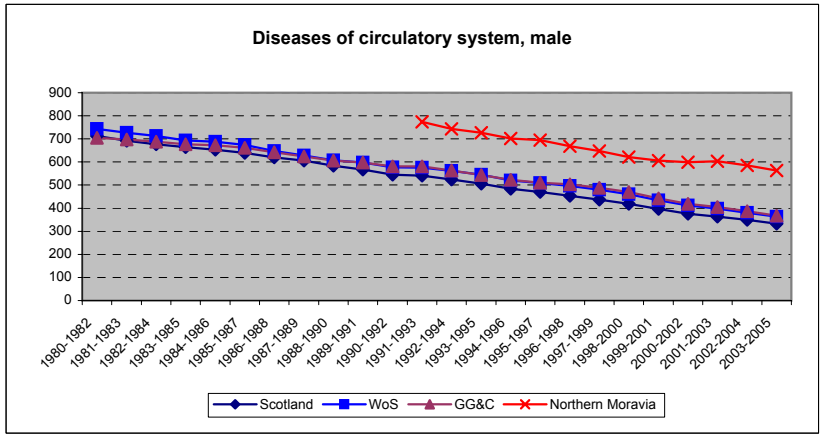

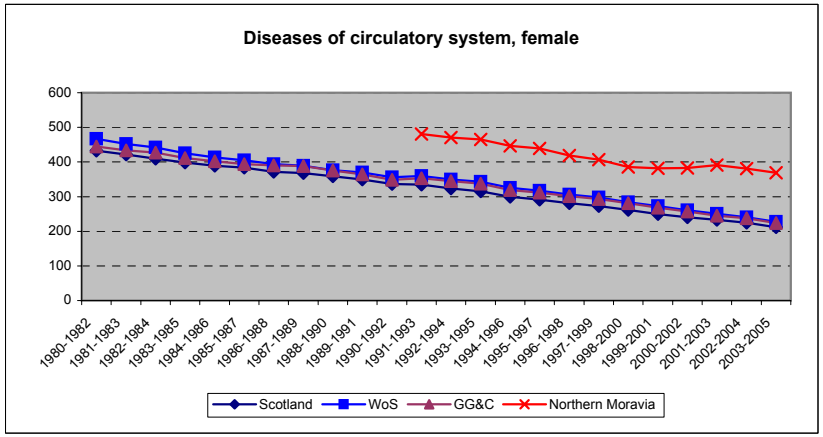

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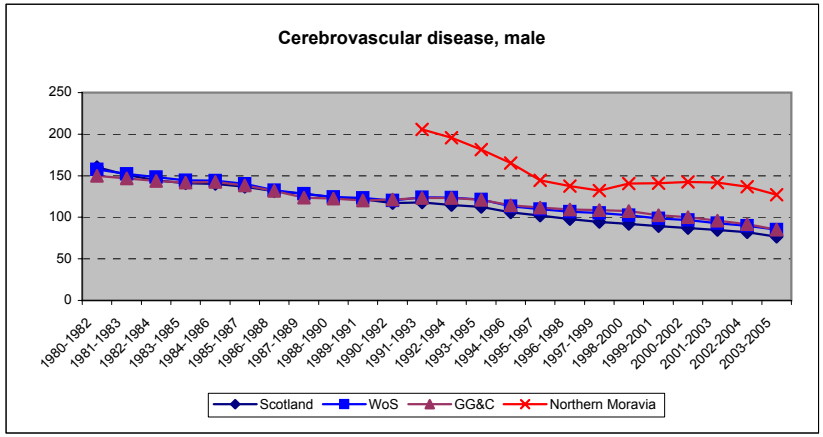

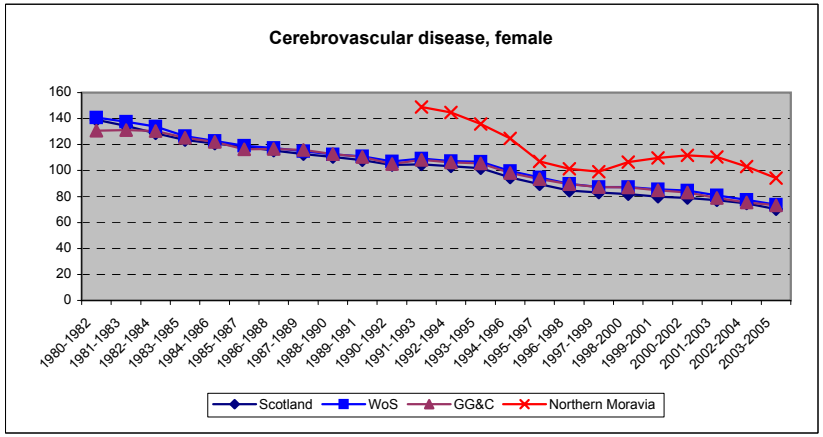

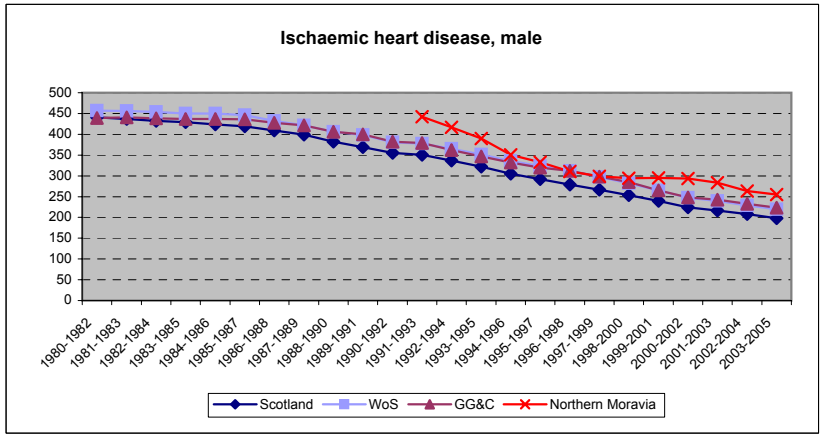

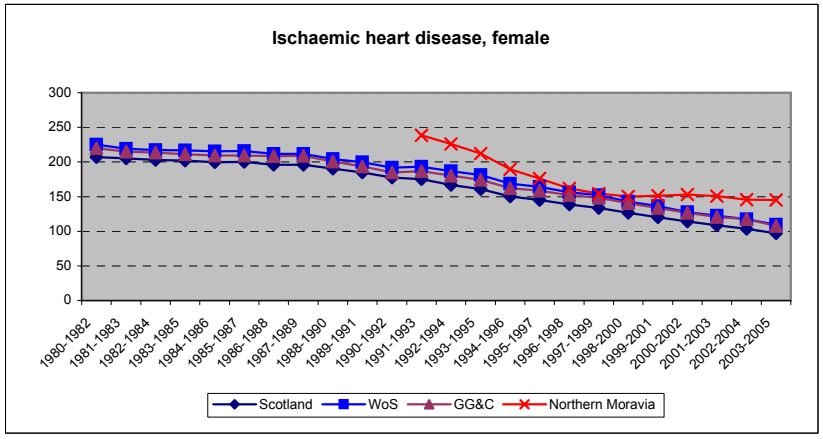

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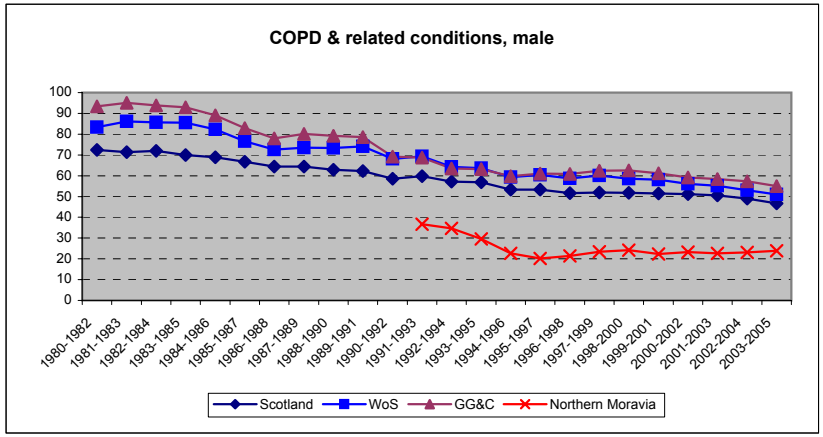
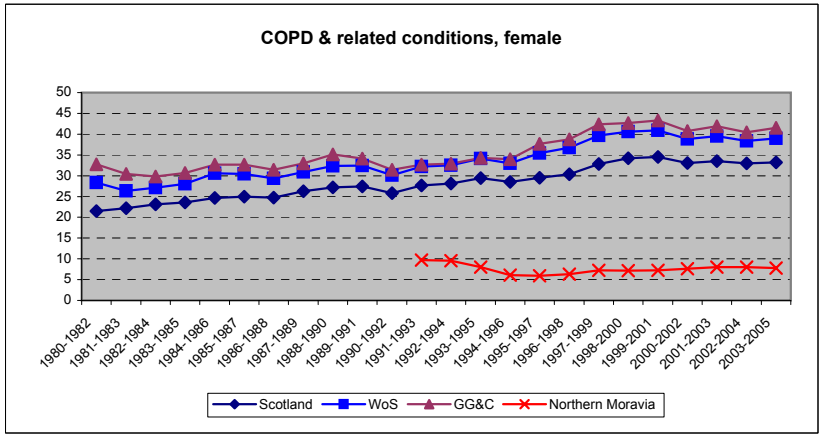
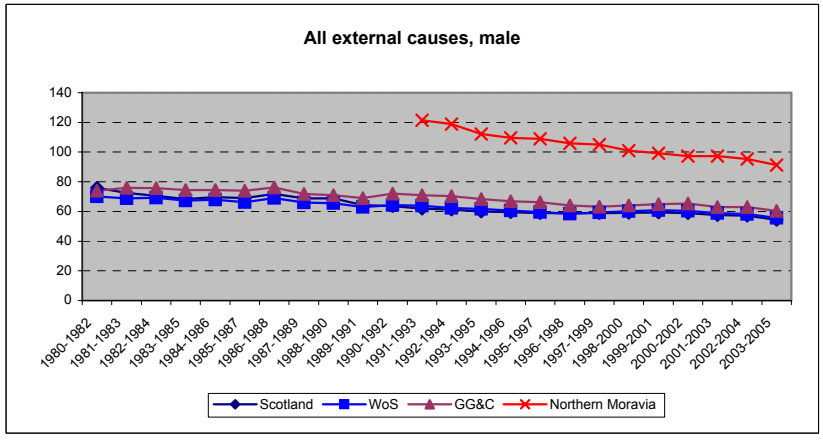
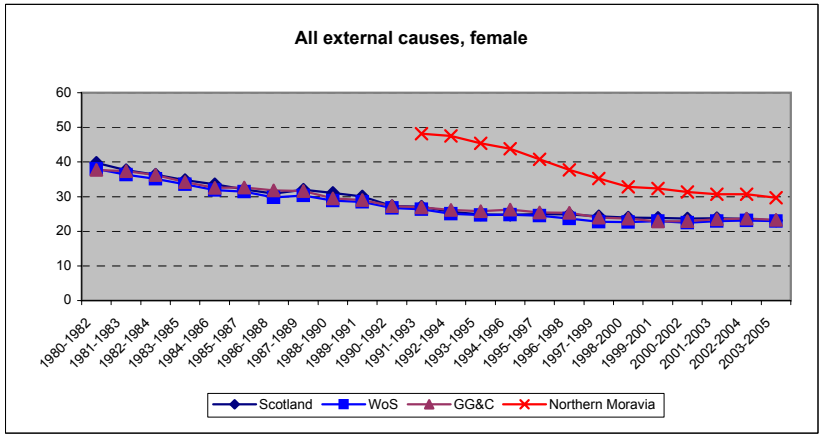


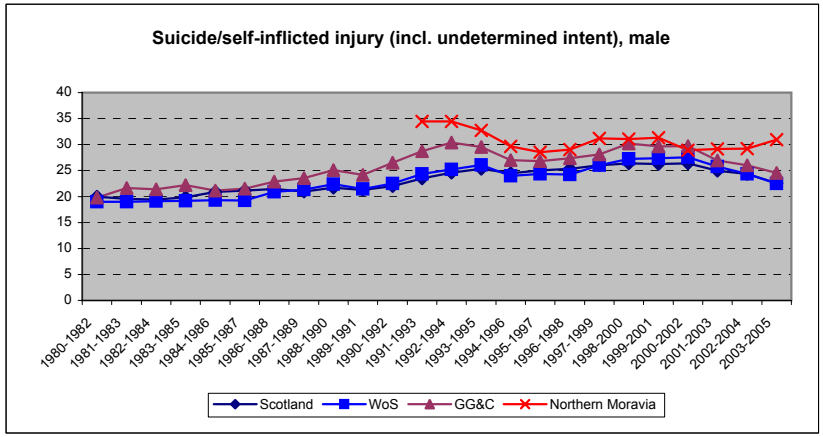


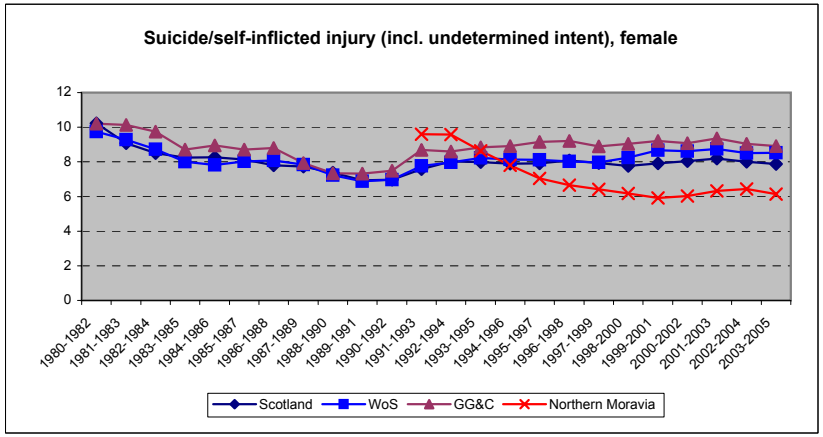


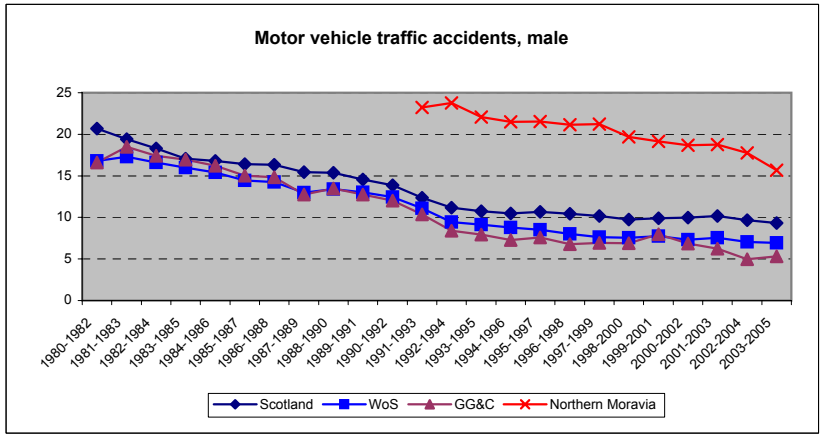


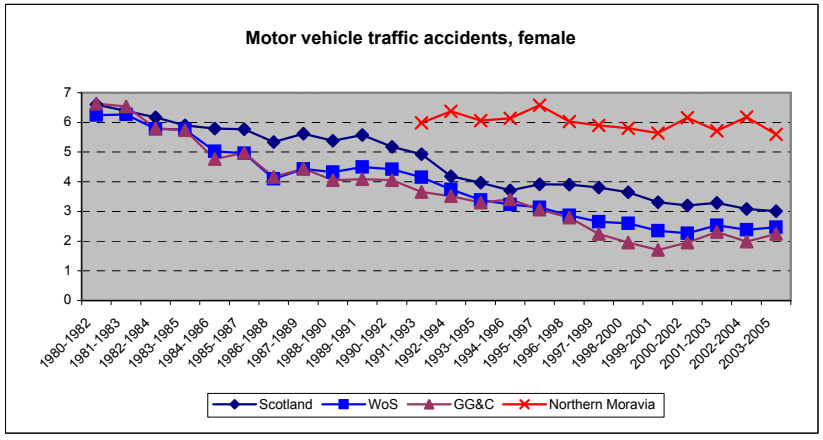
Appendix 8f. Age-standardised mortality rates: Northern Moravia compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



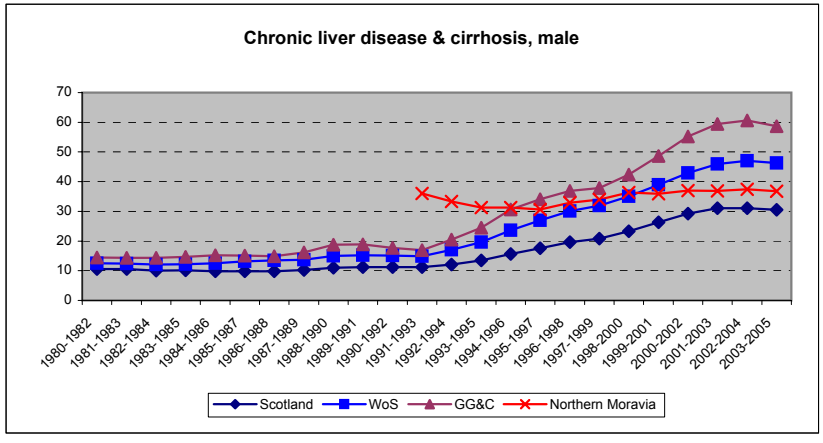


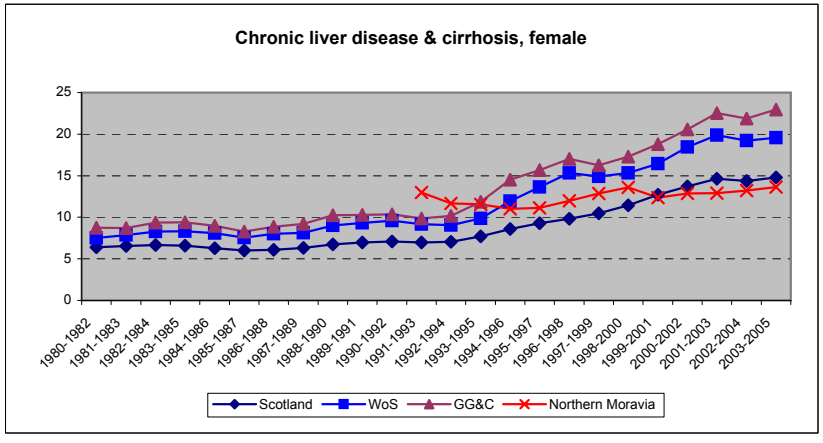




Appendix 8f. Age-standardised mortality rates: Northern Moravia compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

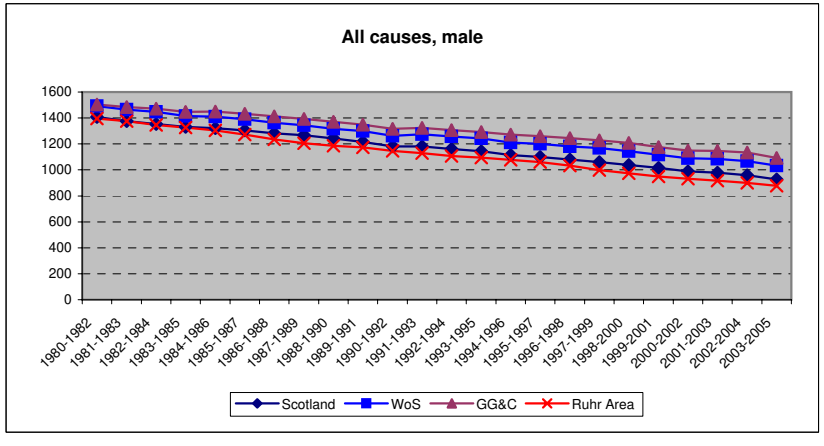
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.

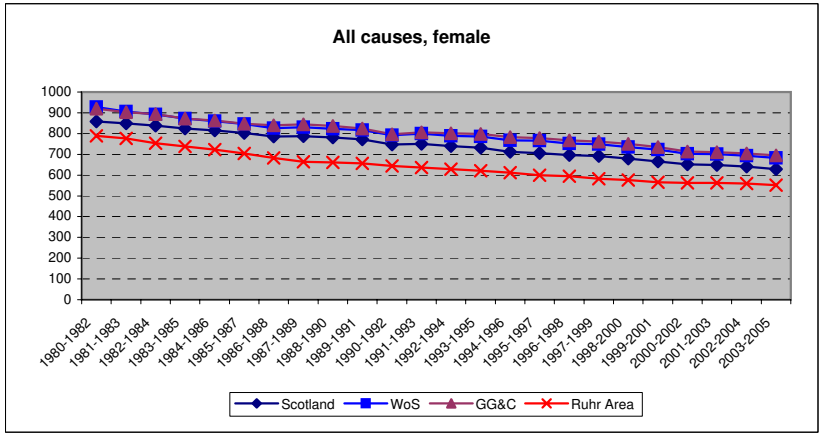


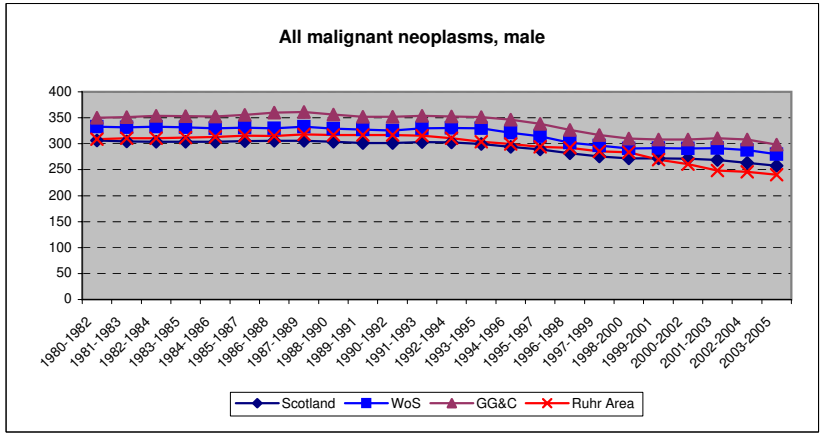


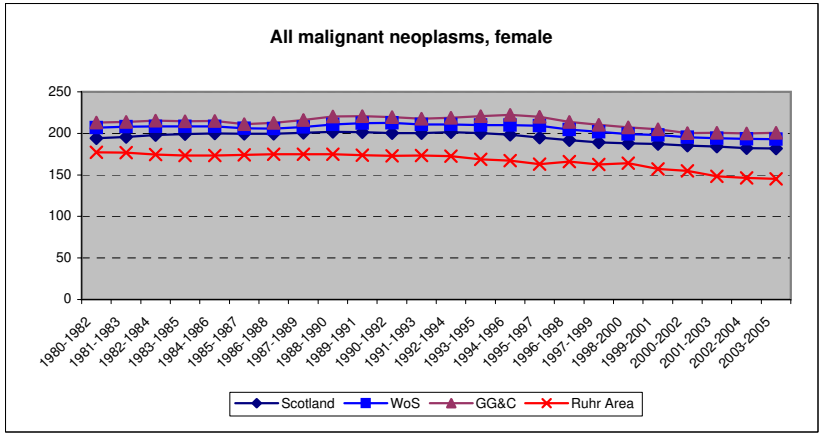
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



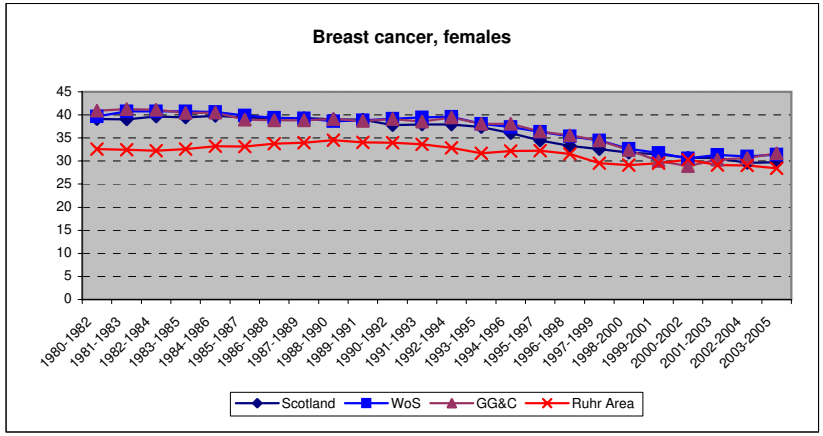


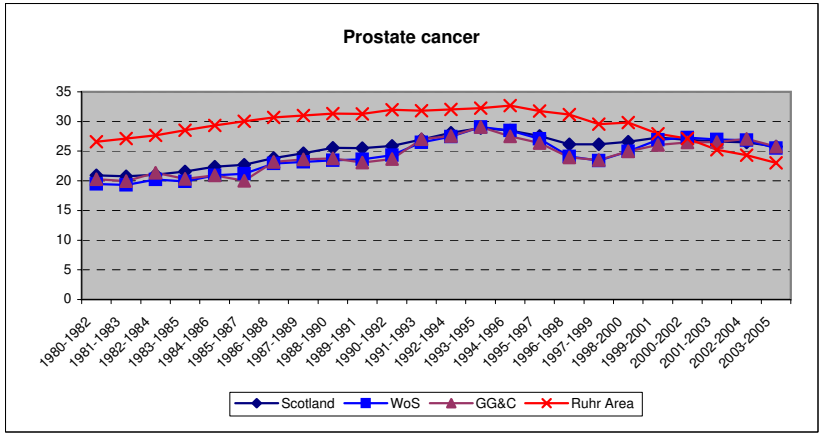


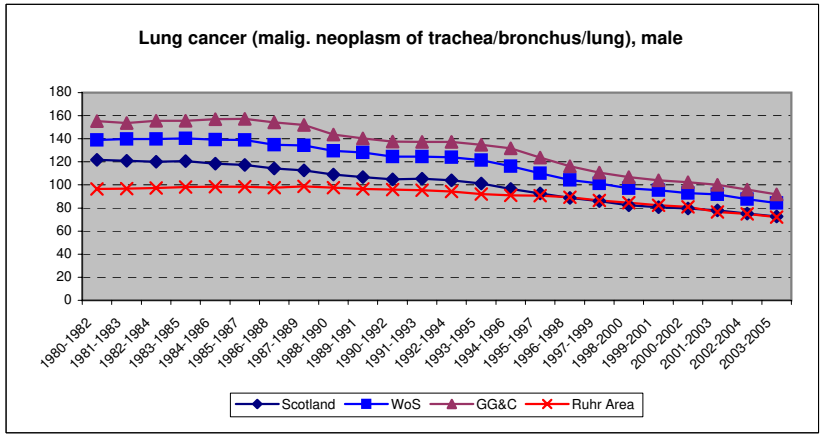


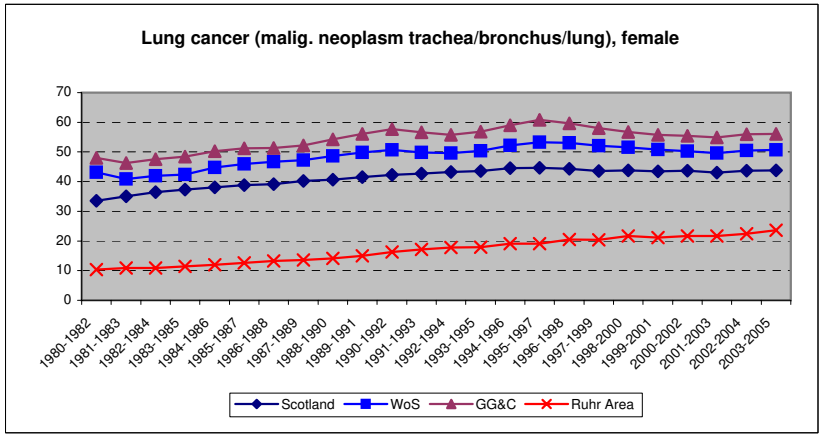
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



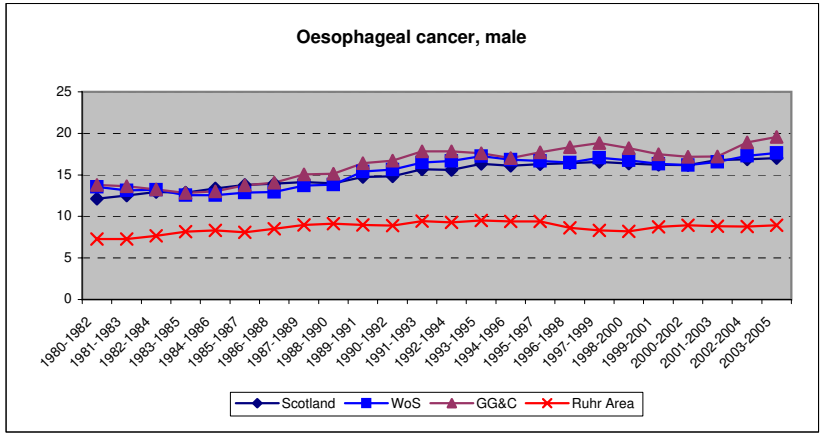


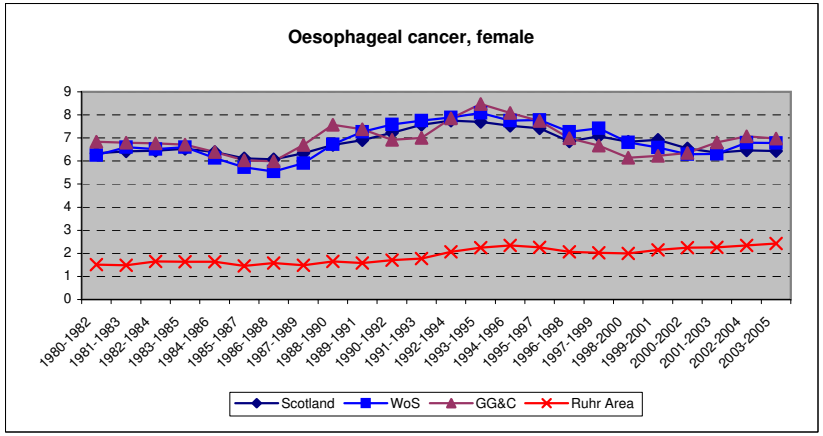


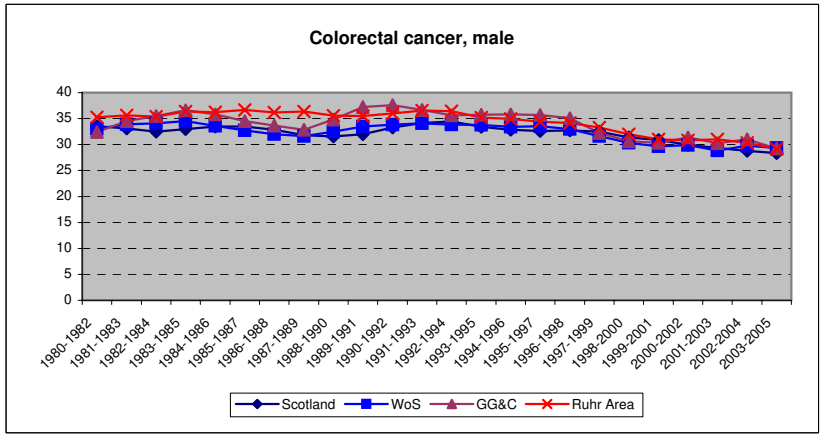


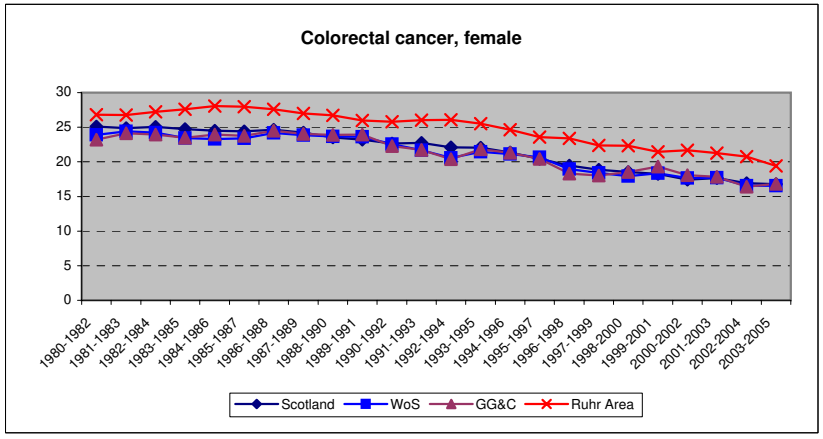
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



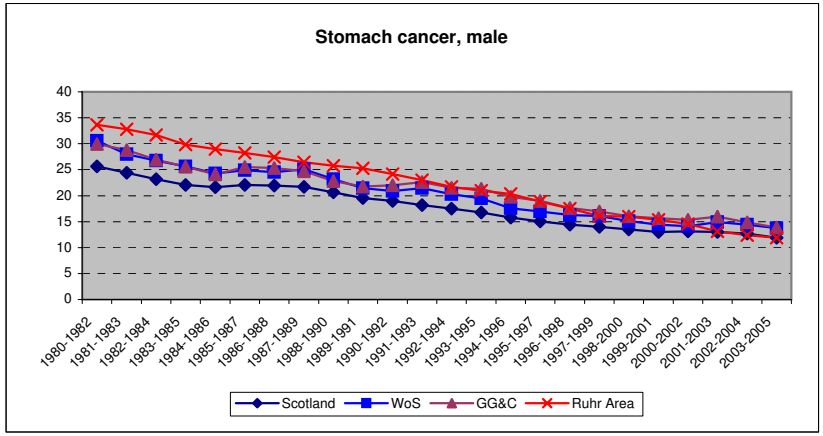


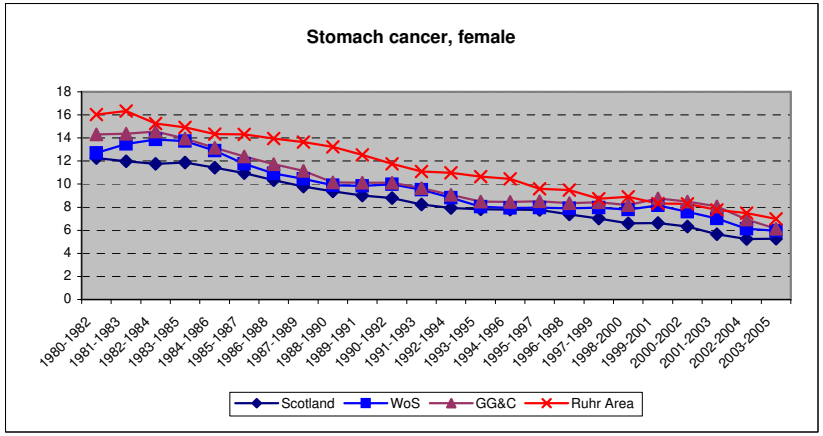


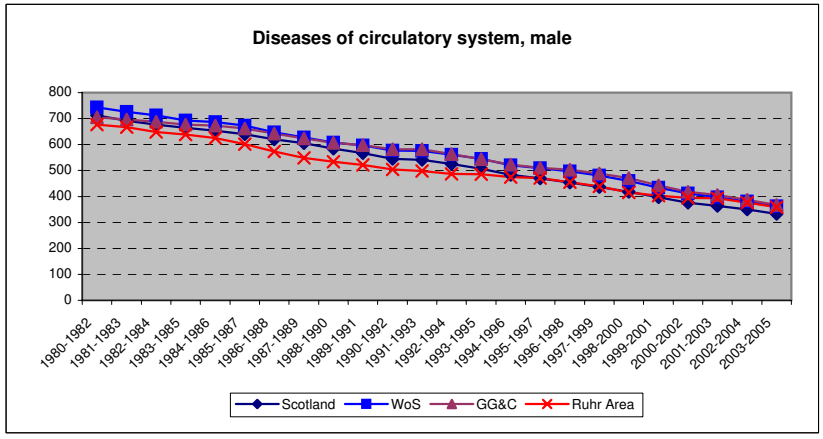


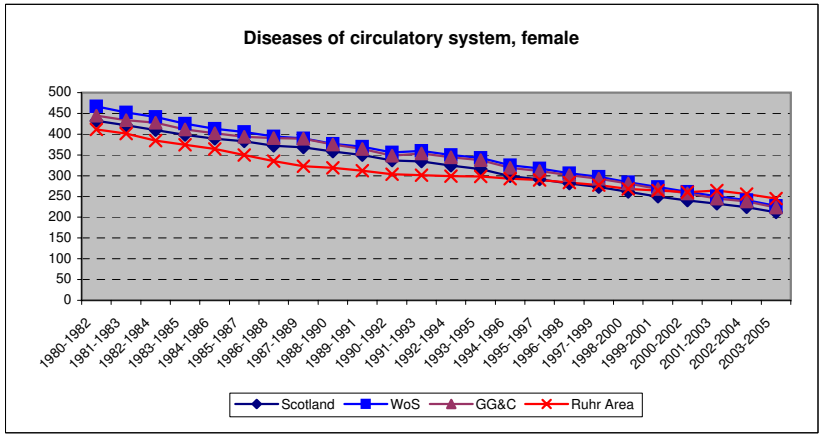
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



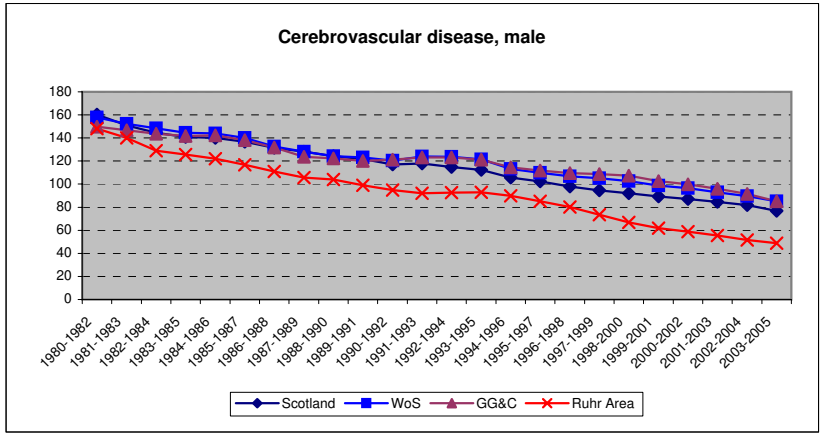


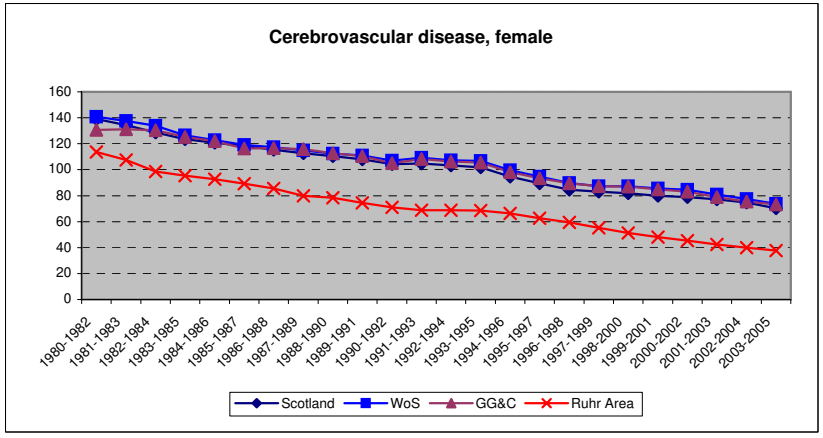


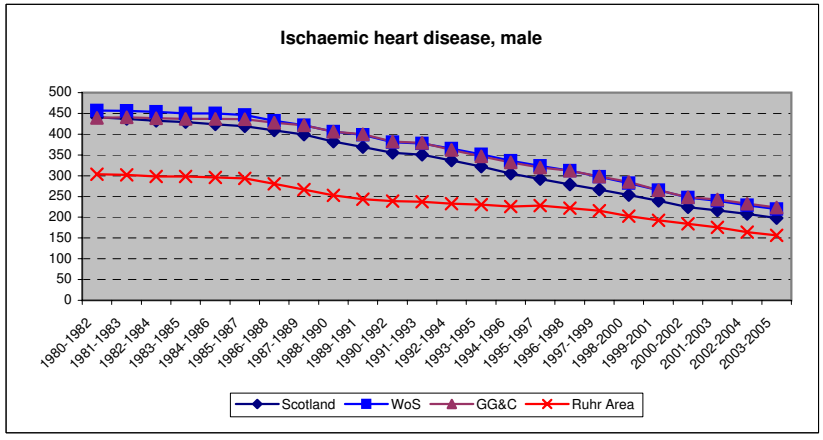


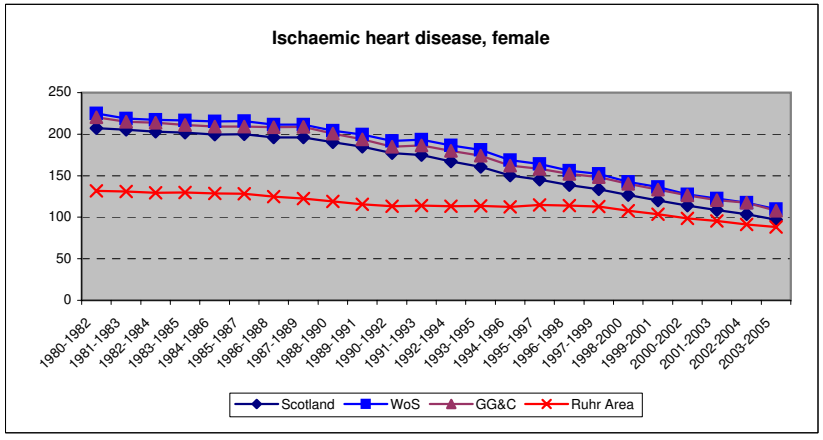
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



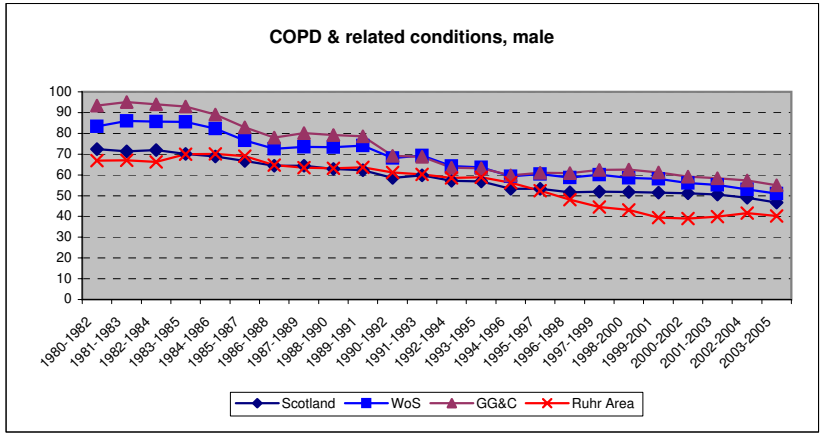


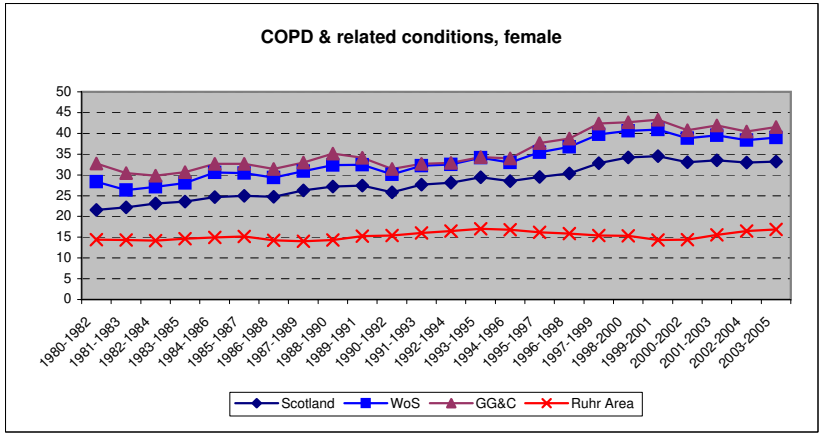


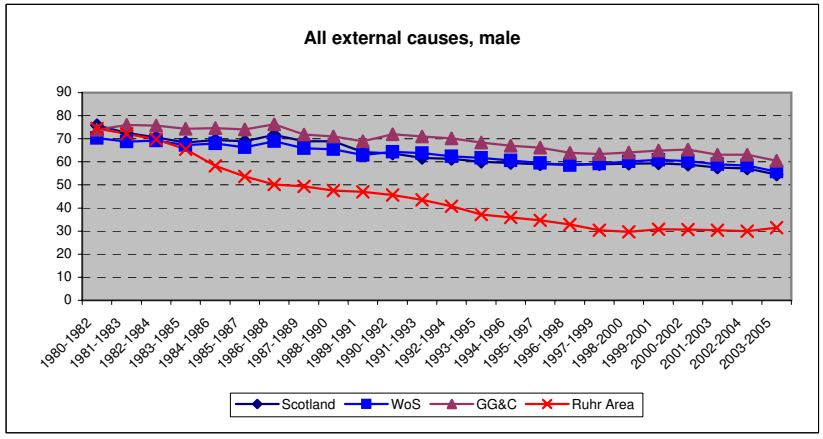


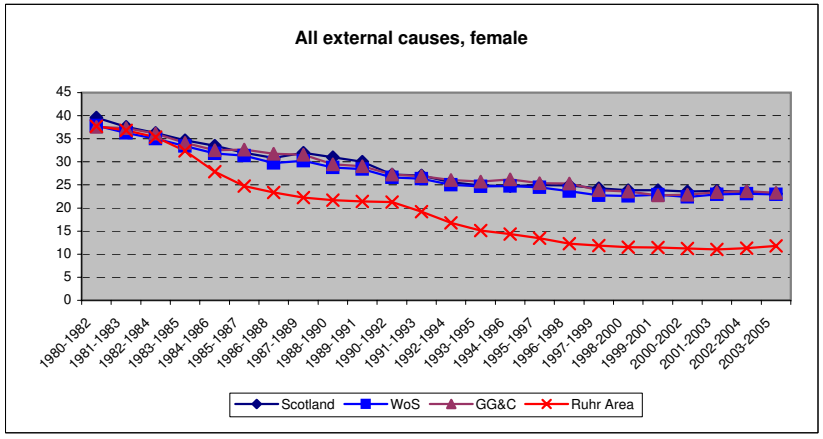
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



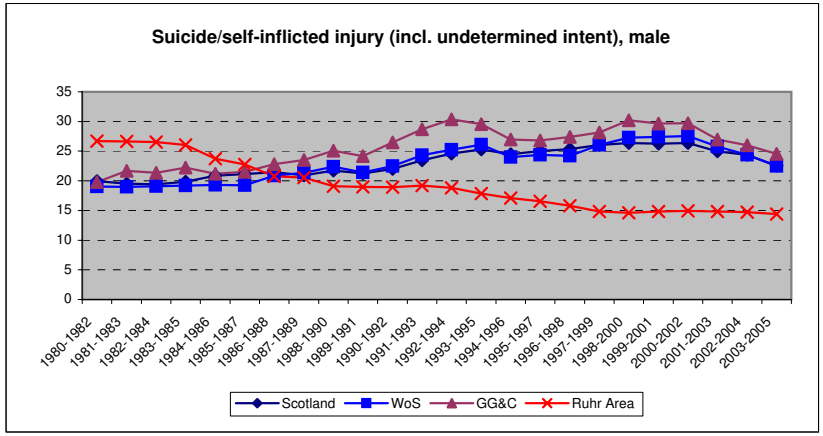


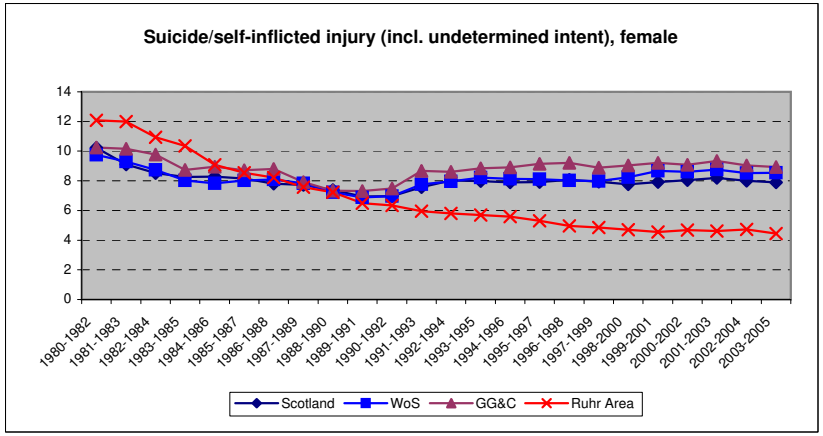


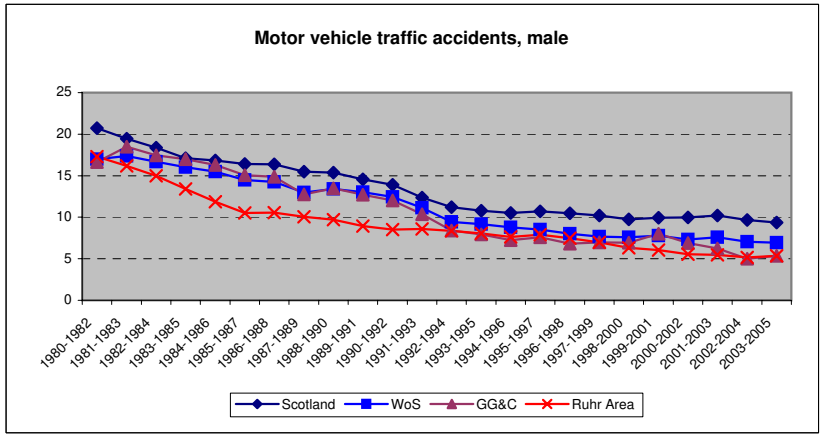


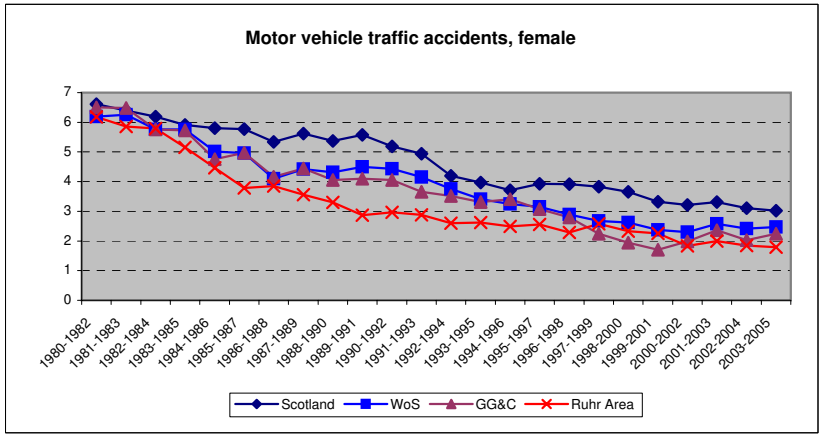
Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



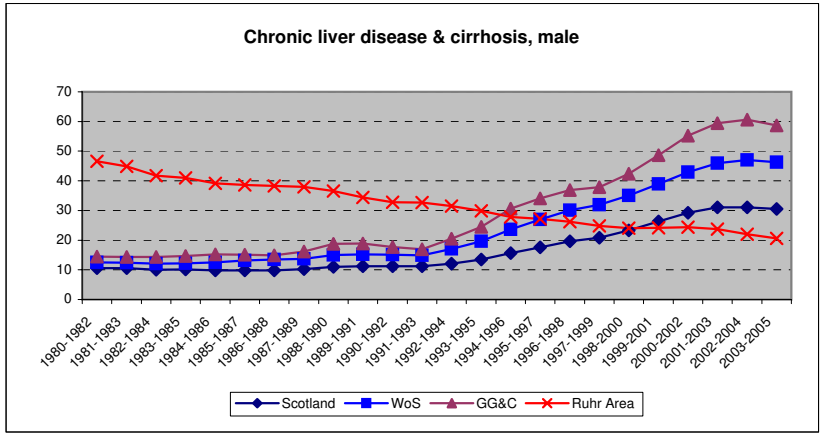


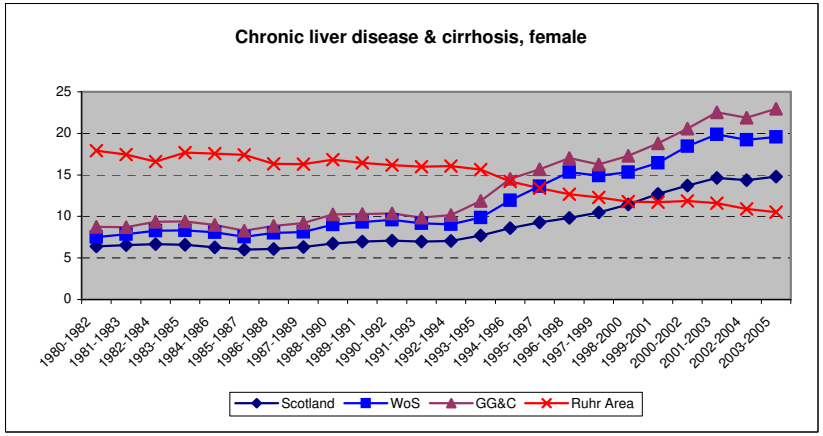




Appendix 8g. Age-standardised mortality rates: Ruhr area compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

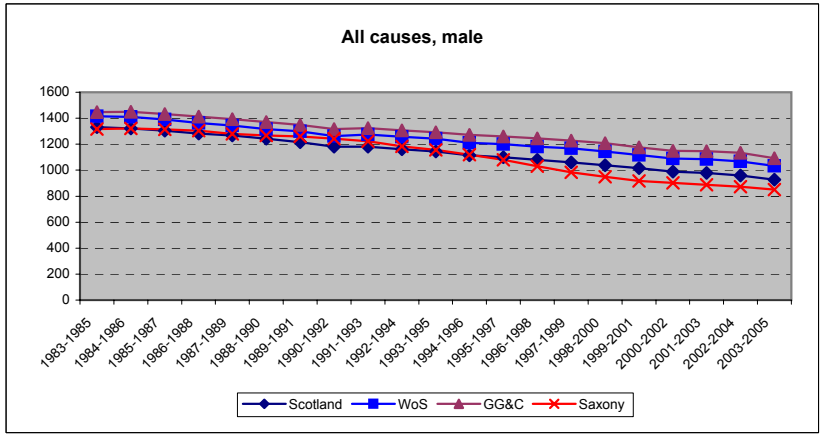
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.

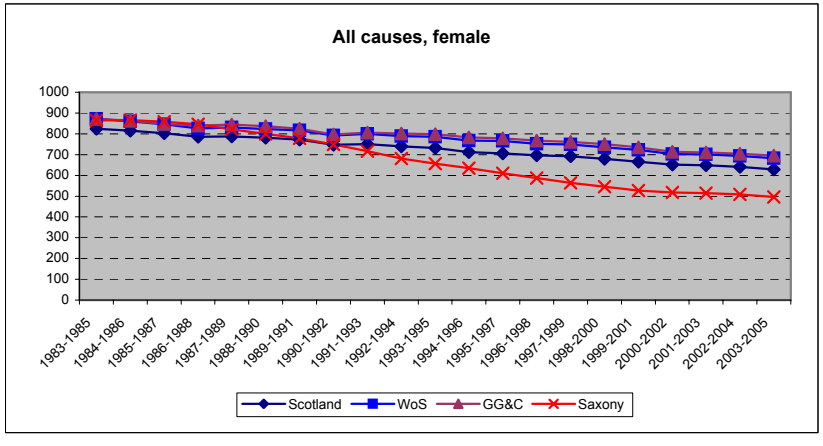


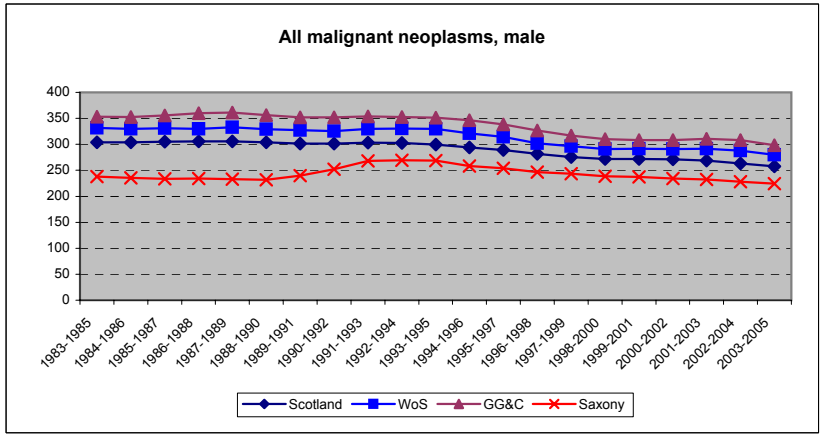


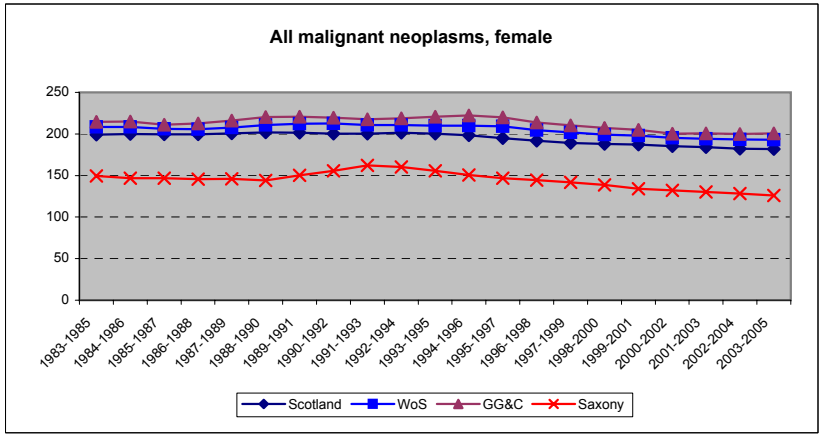
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



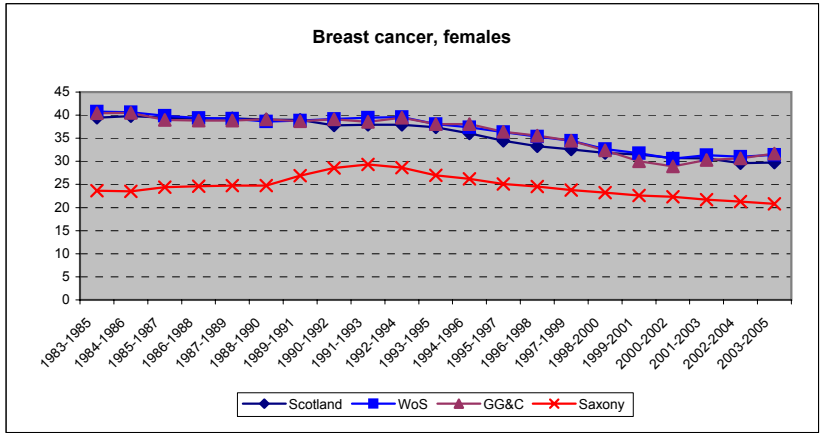


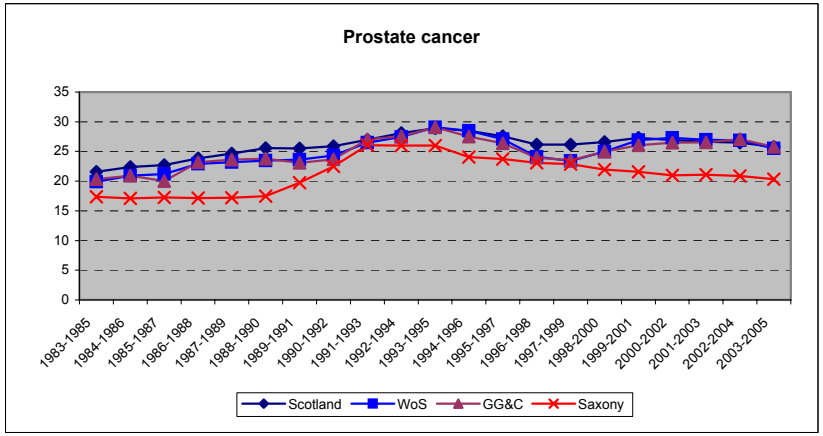


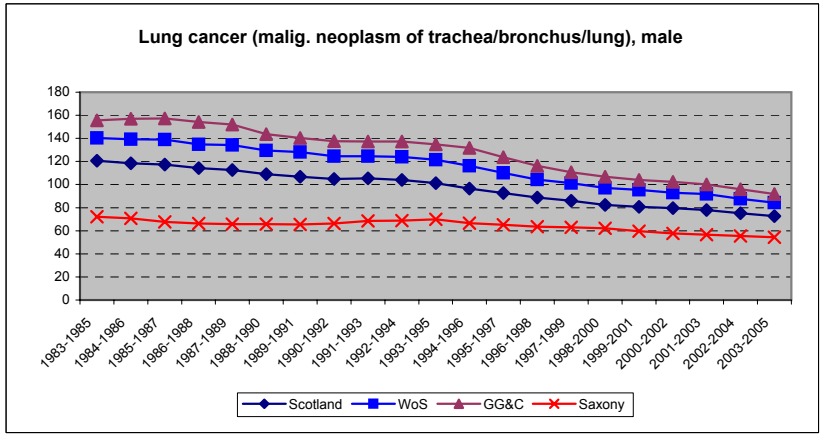


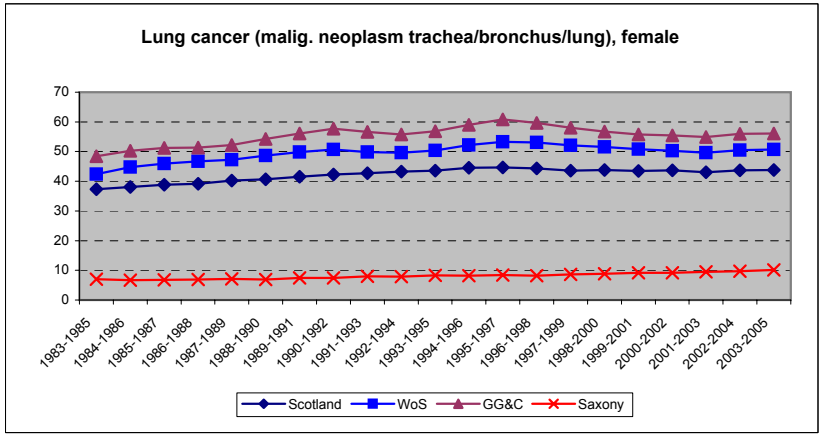
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



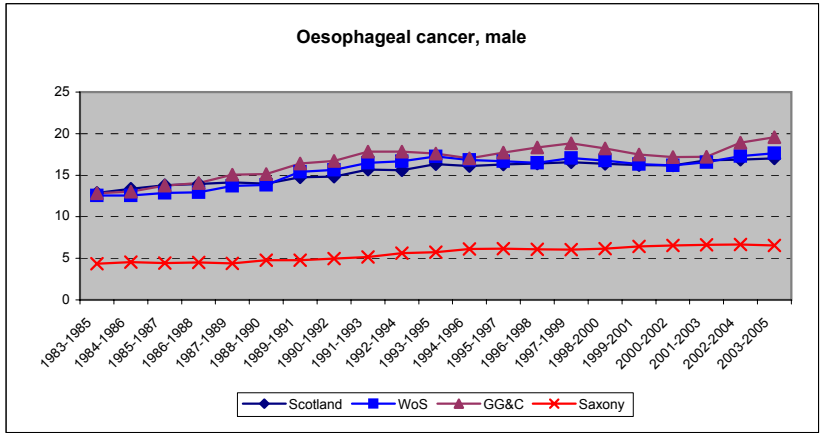


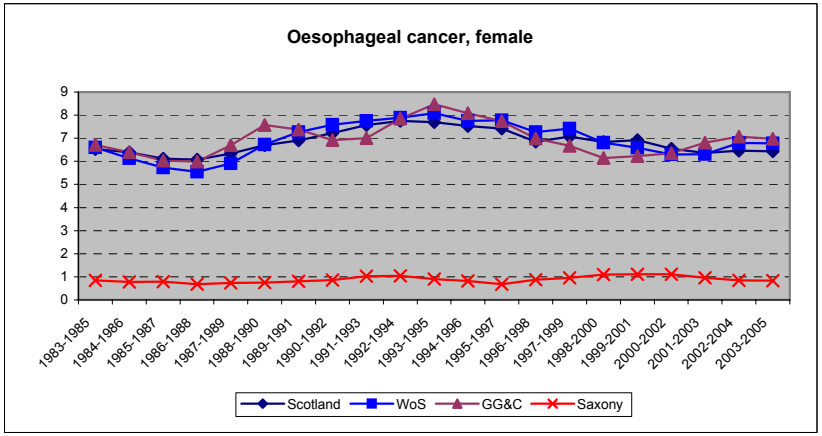


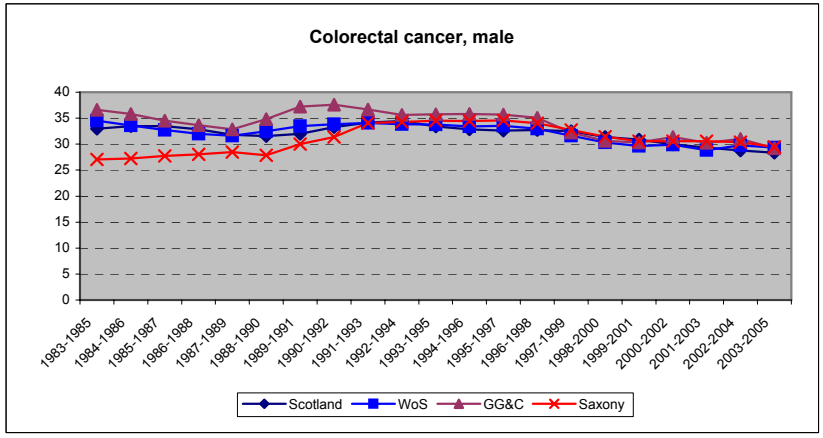


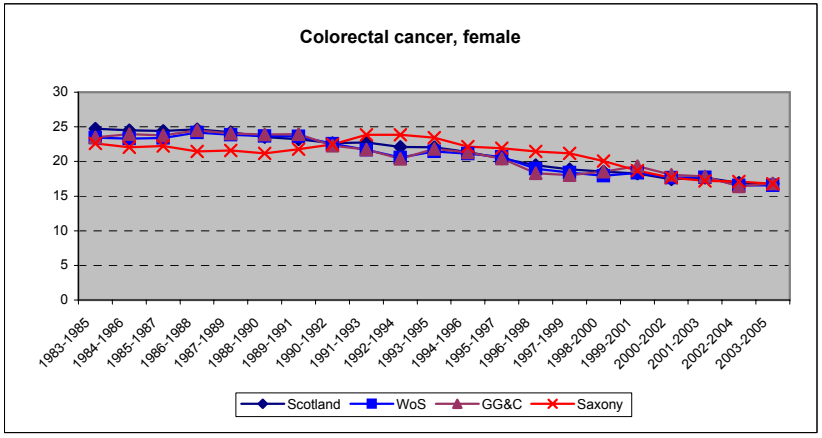
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



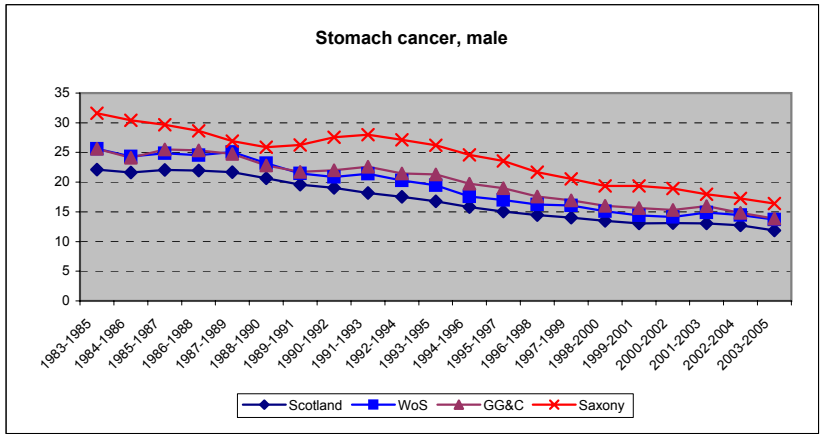


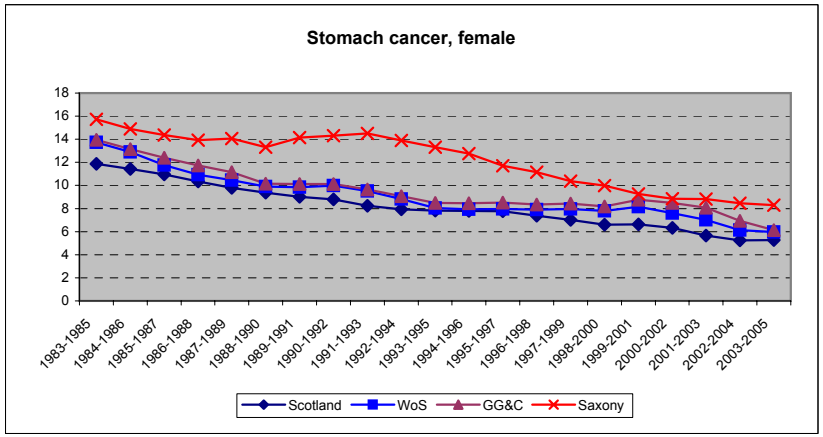


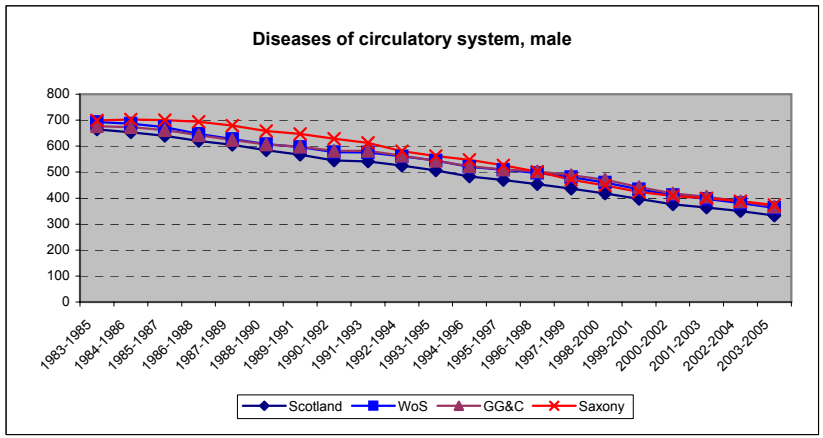


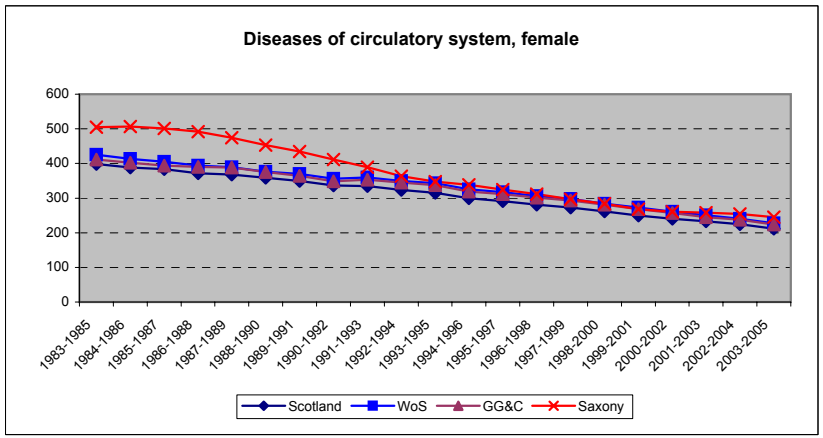
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



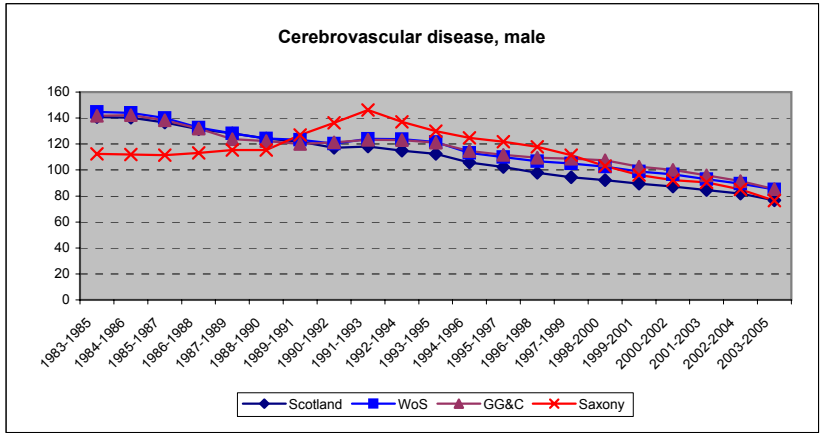


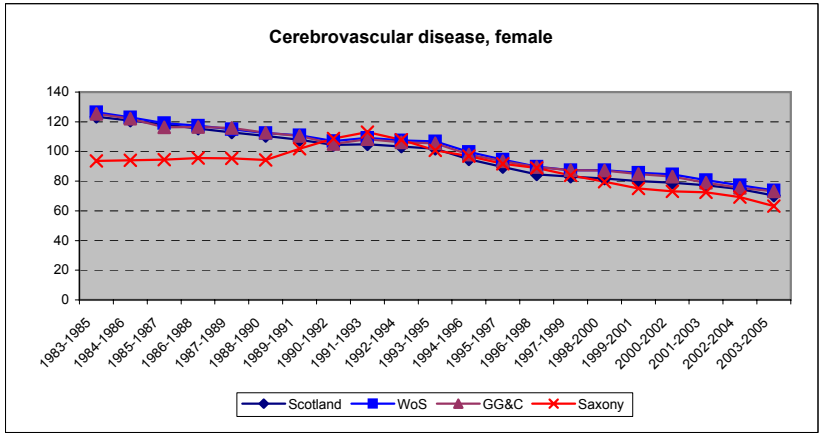


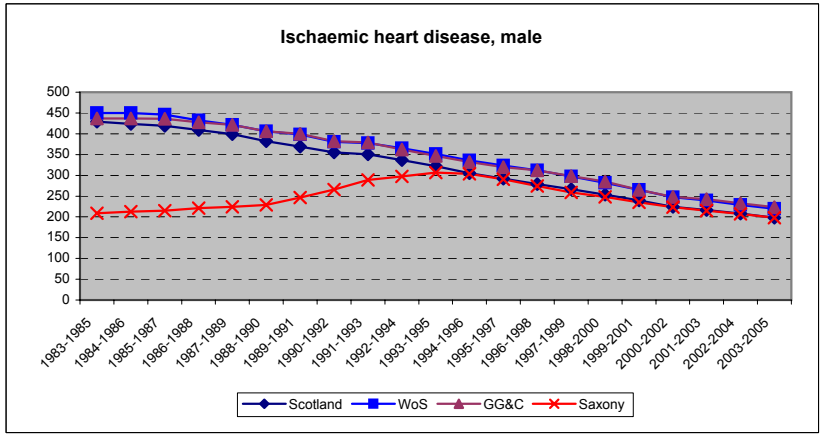


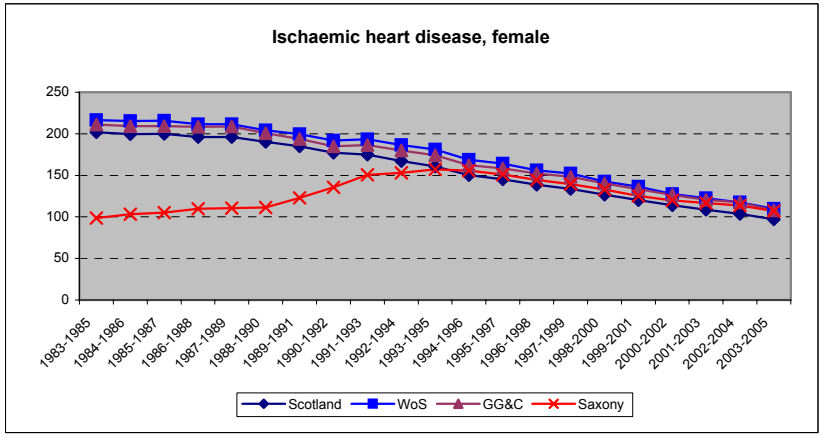
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



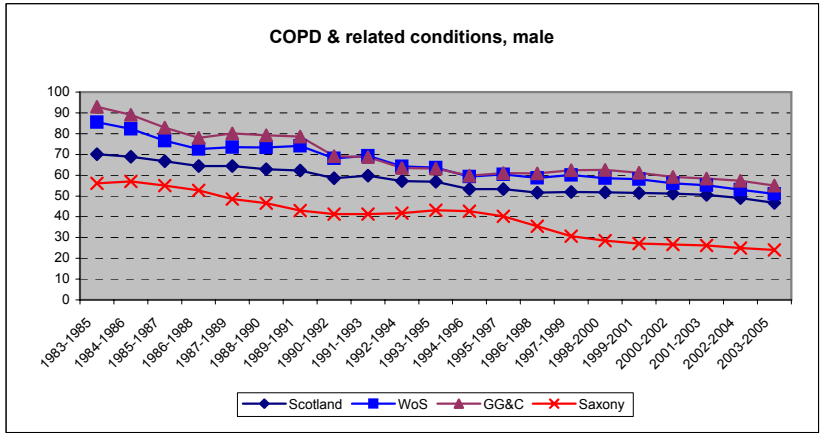


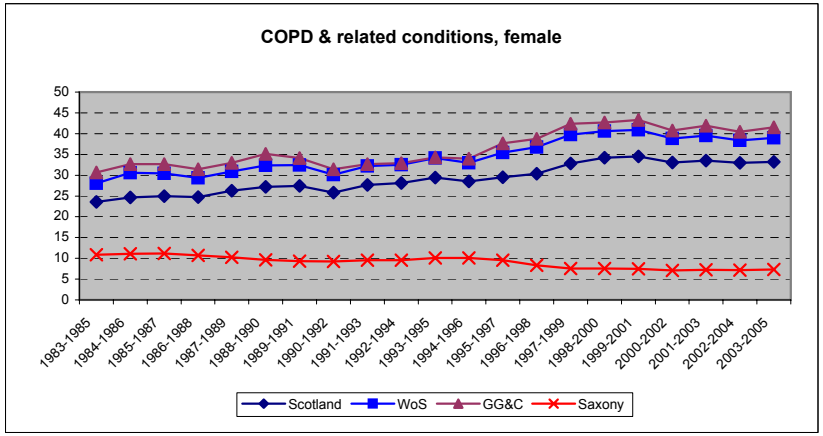


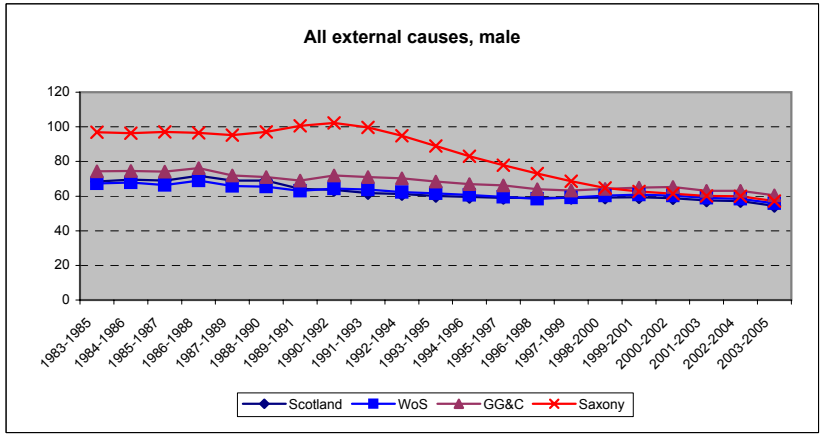


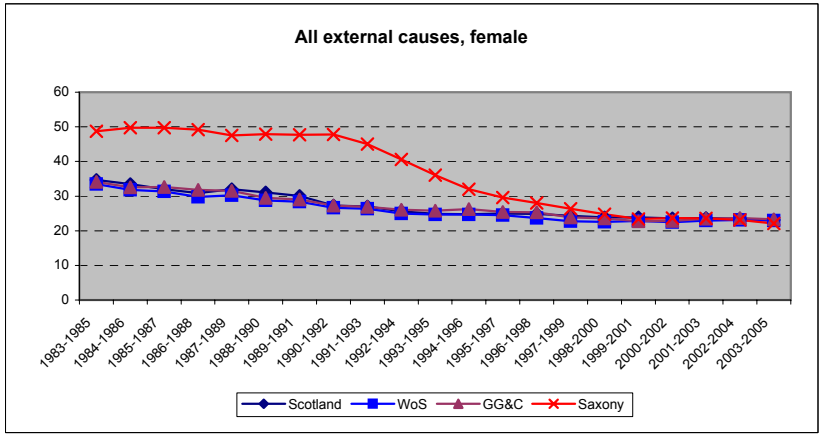
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



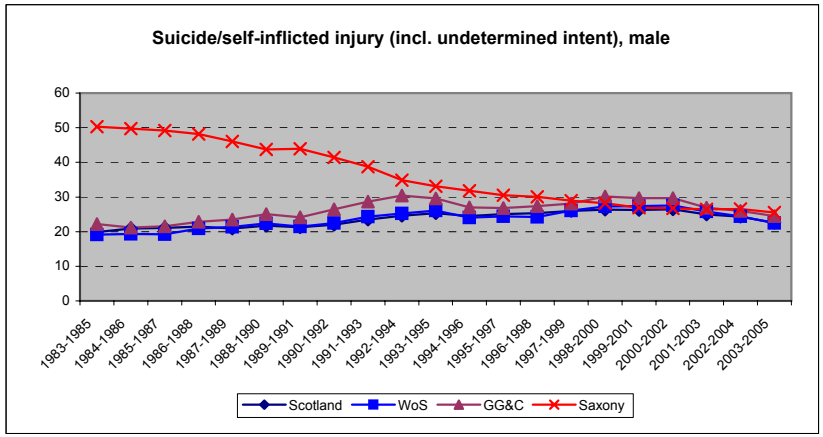


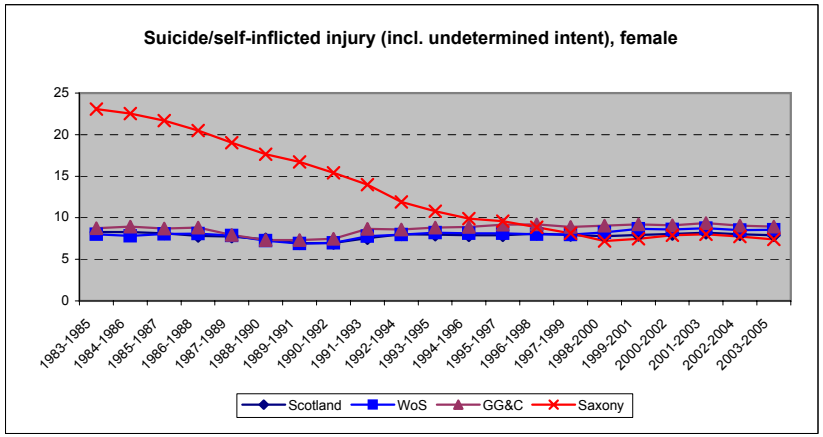


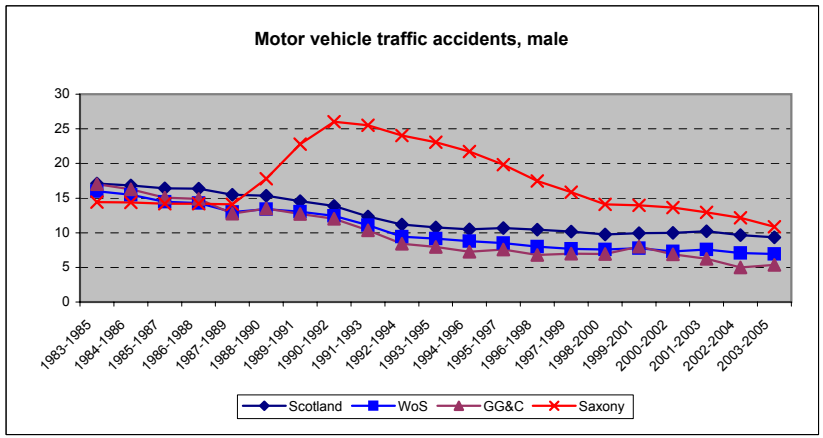


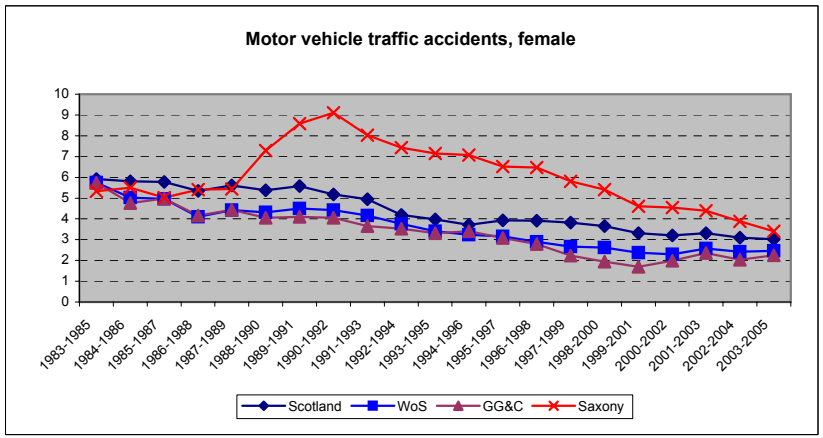
Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



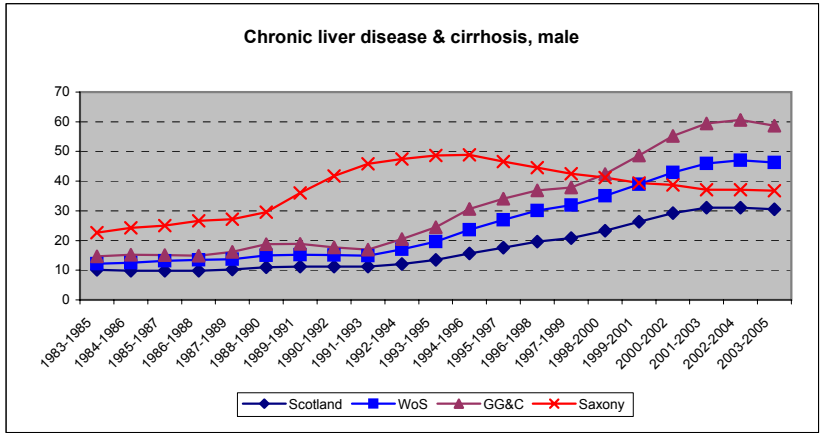


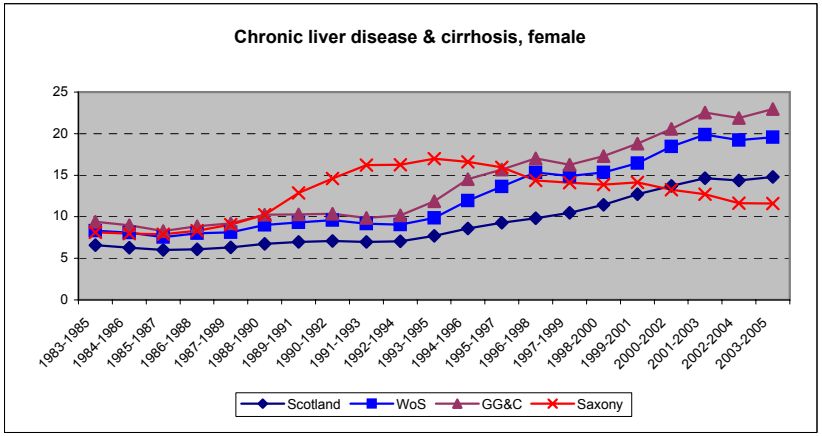




Appendix 8h. Age-standardised mortality rates: Saxony compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

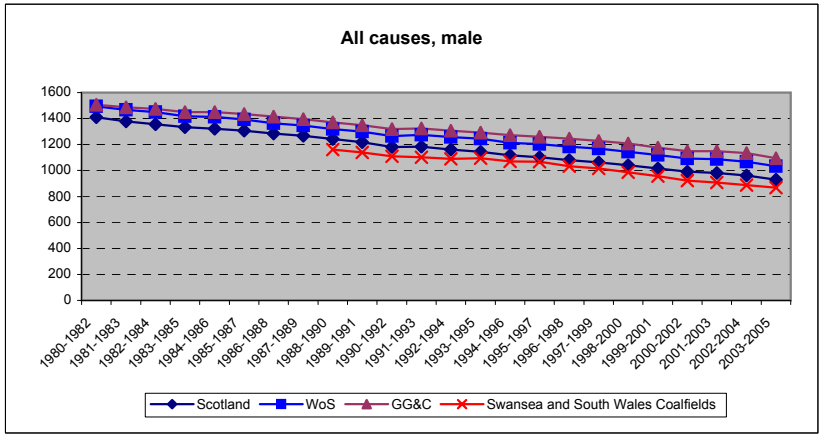
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.

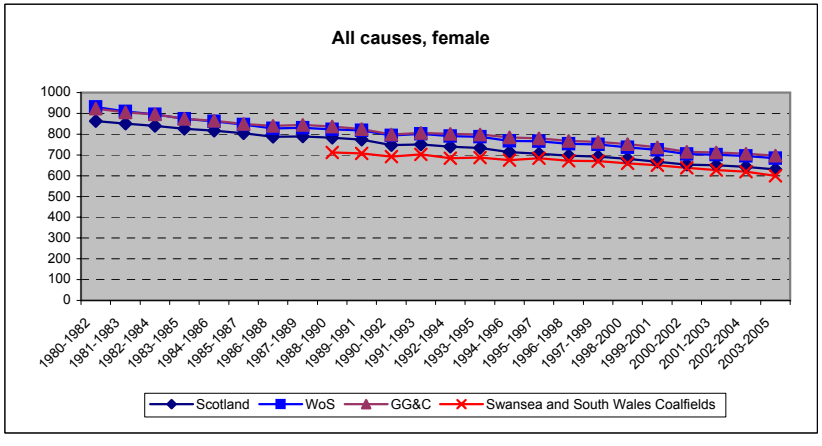


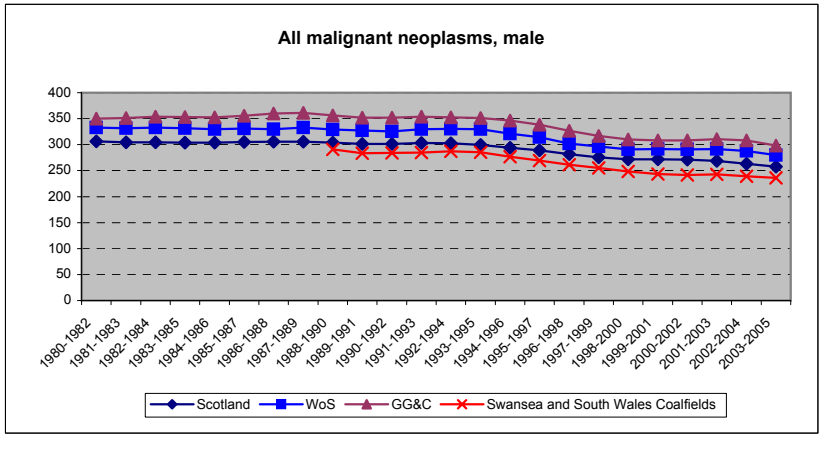


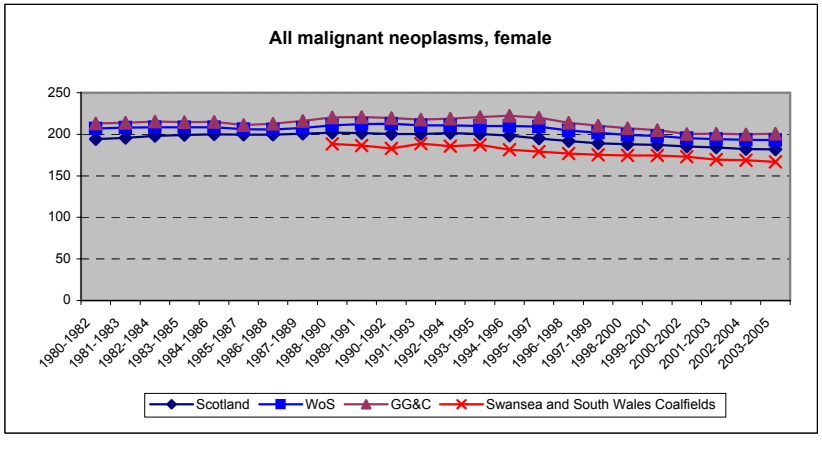
Appendix 8i. Age-standardised mortality rates: Swansea & S. Wales Coalfields compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



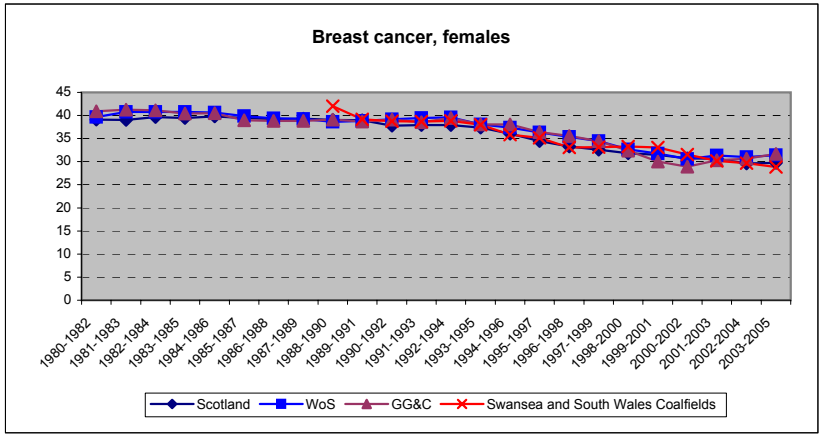


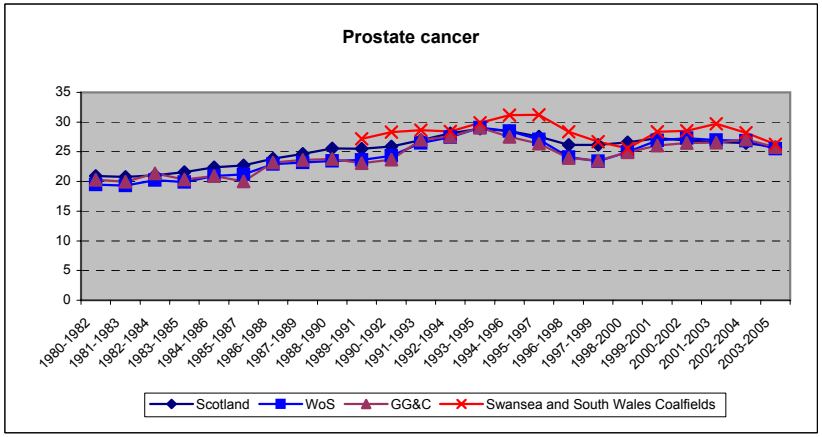


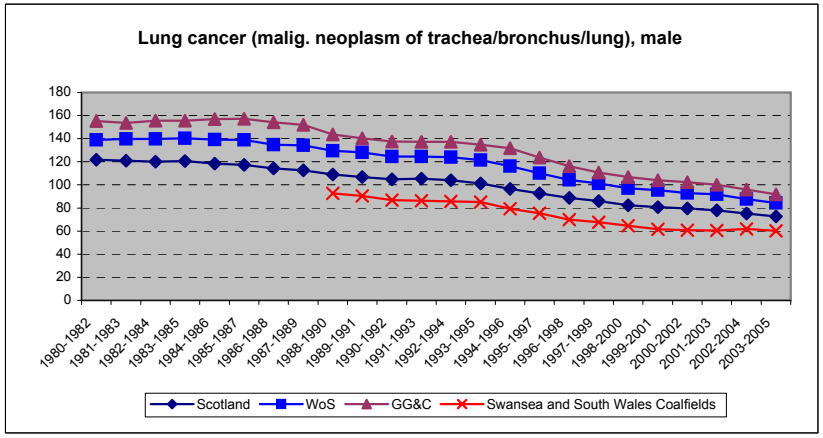


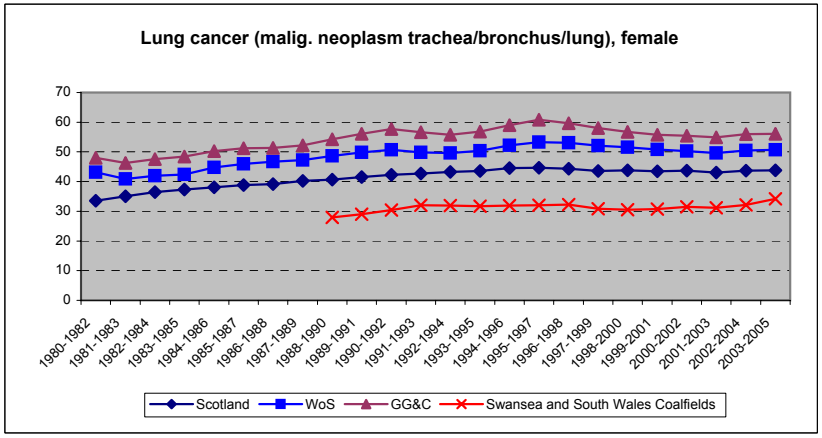
Appendix 8i. Age-standardised mortality rates: Swansea & S. Wales Coalfields compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



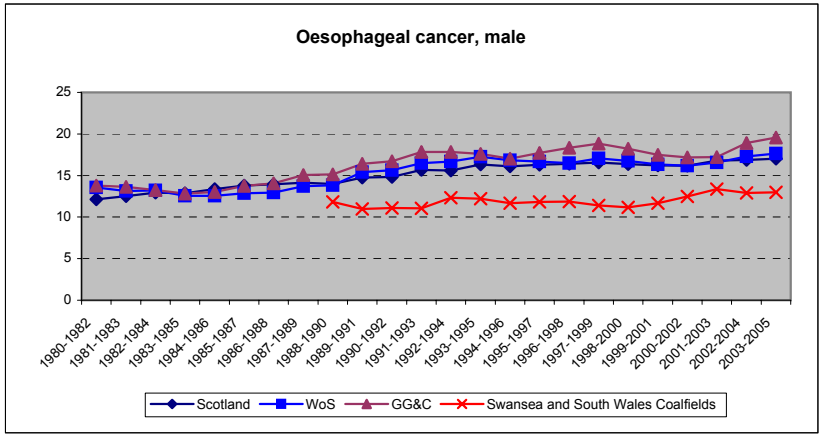


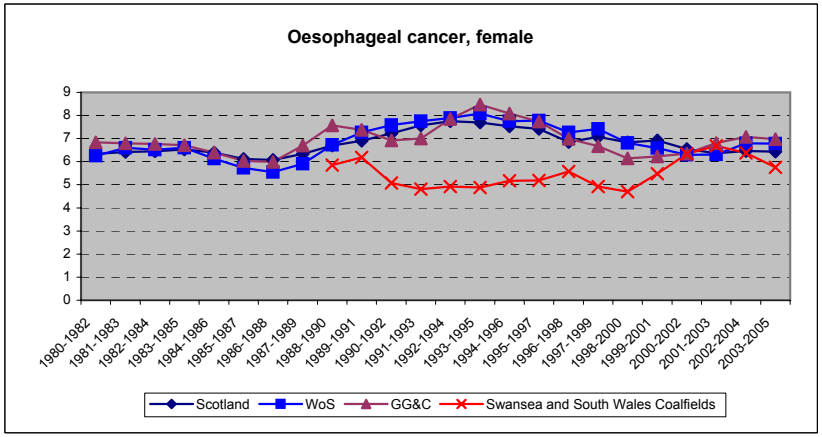


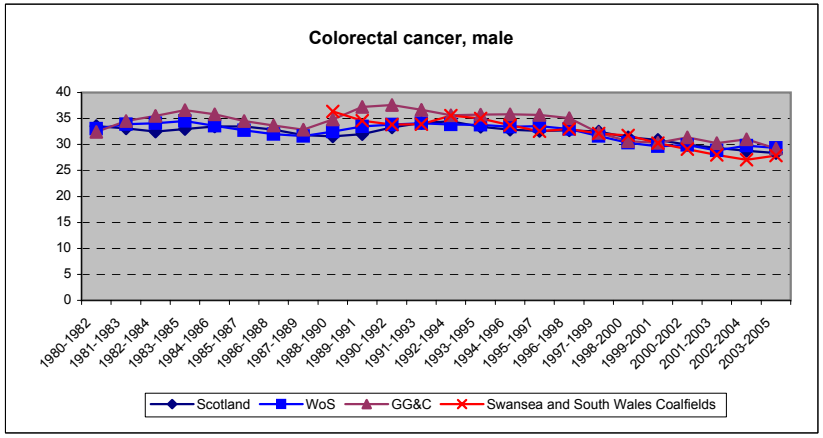


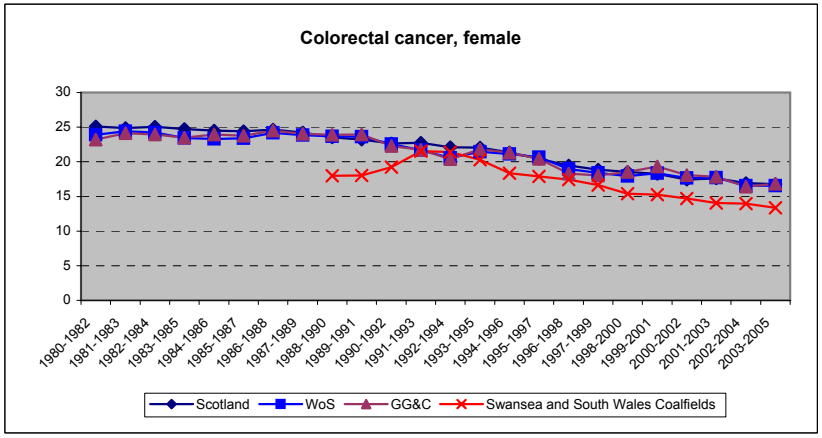
Appendix 8i. Age-standardised mortality rates: Swansea & S. Wales Coalfields compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.



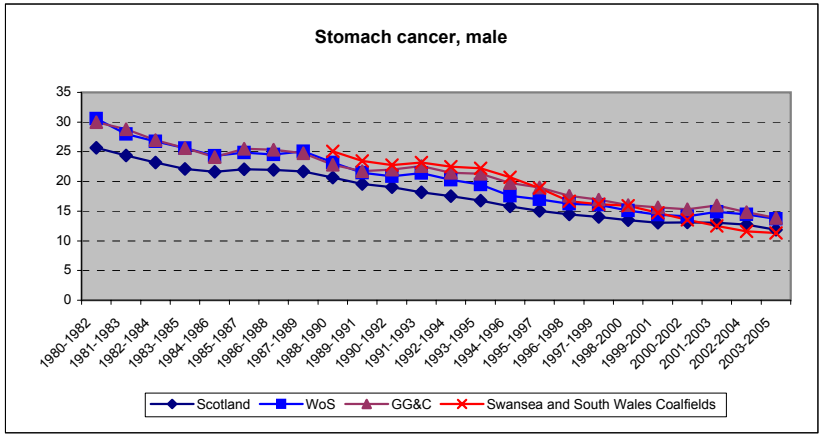


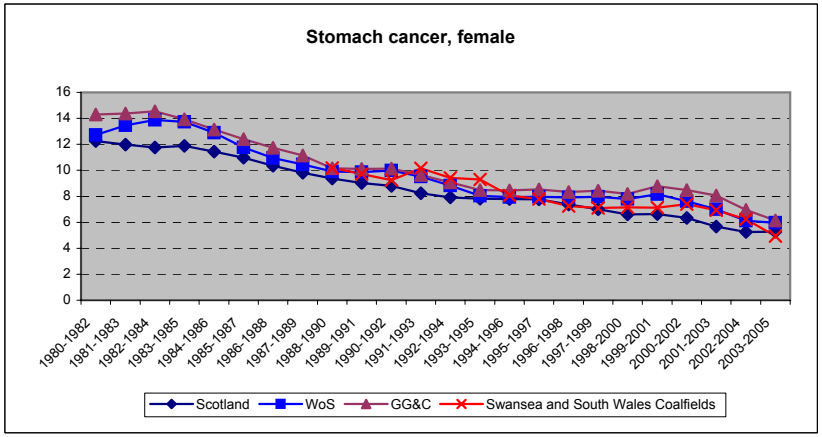


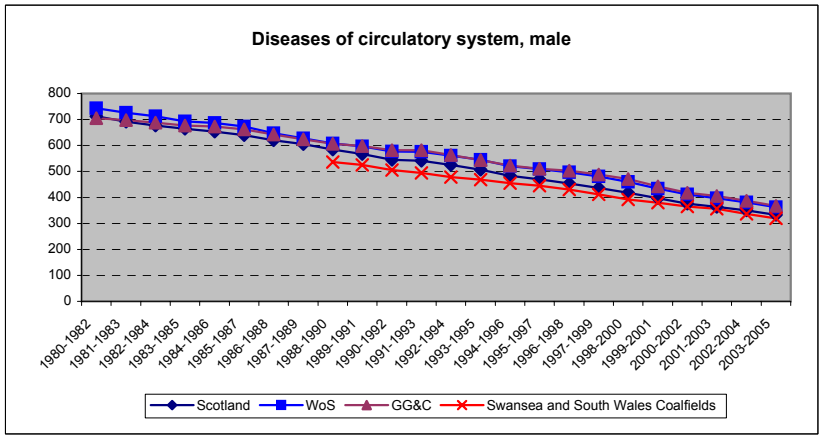


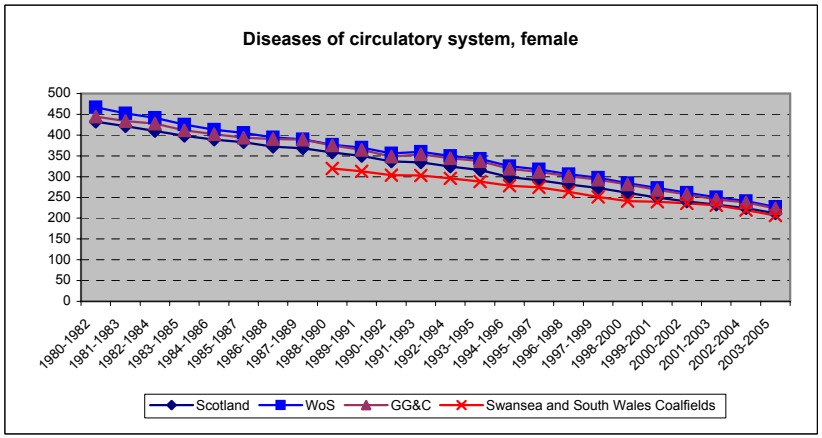
Appendix 8i. Age-standardised mortality rates: Swansea & S. Wales Coalfields compared to Scotland, West of Scotland, and Greater Glasgow & Clyde, 1980-2005

All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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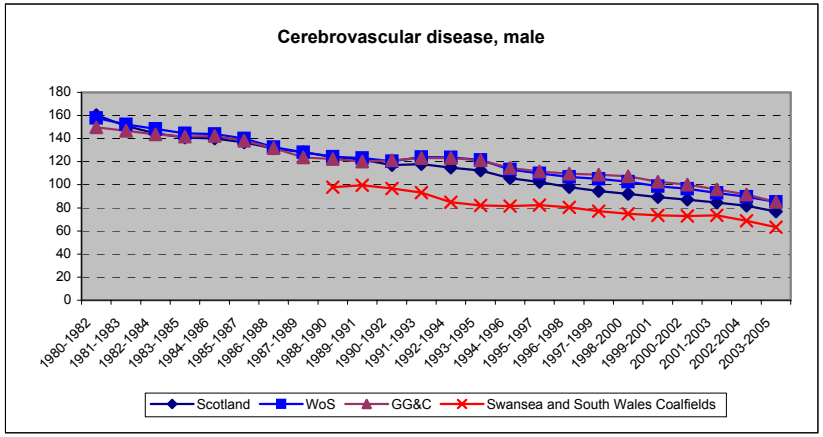

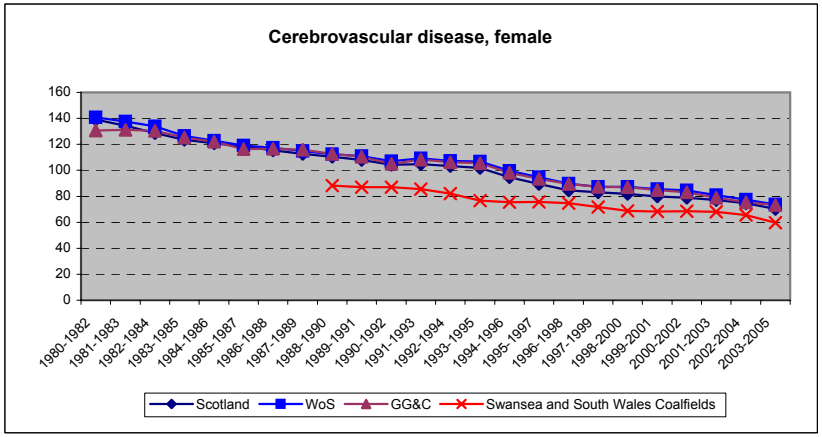

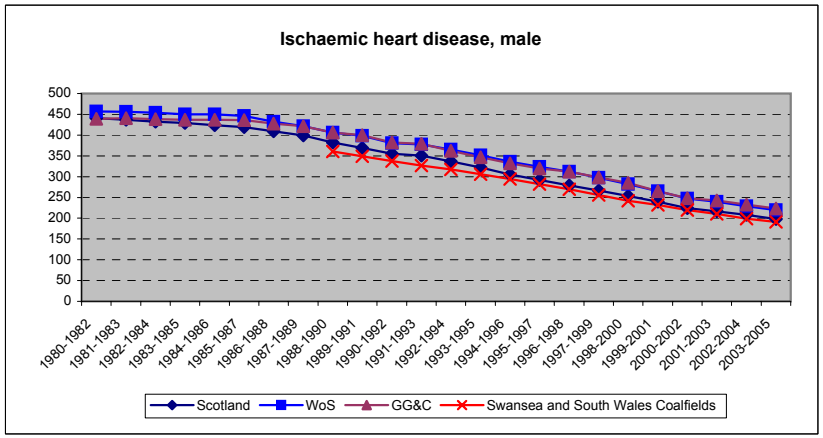

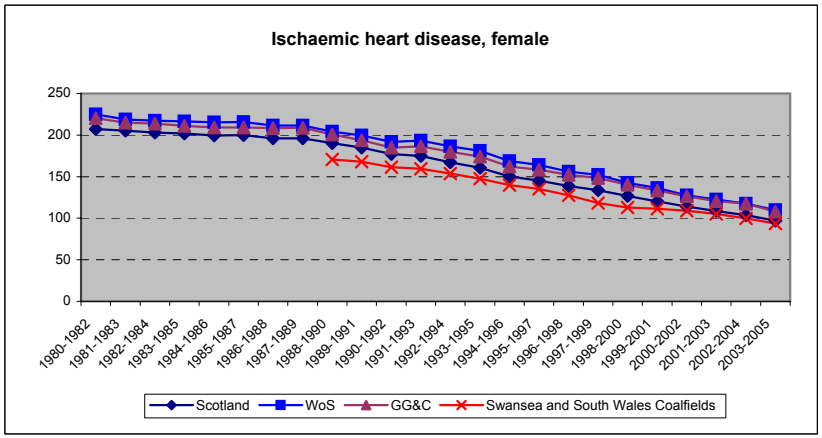

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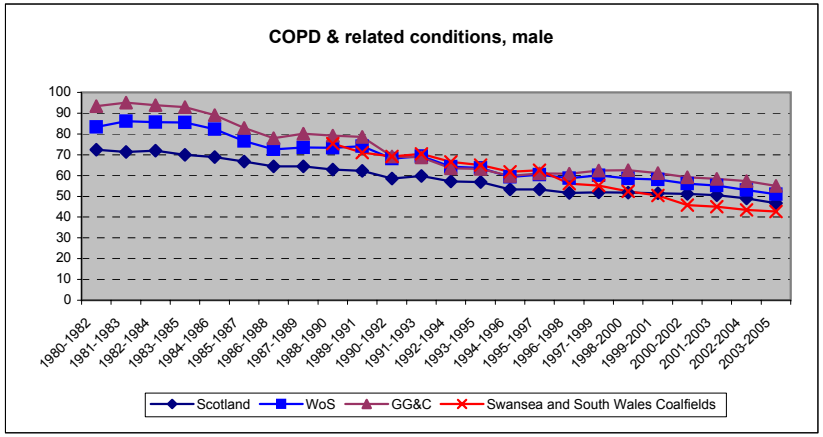
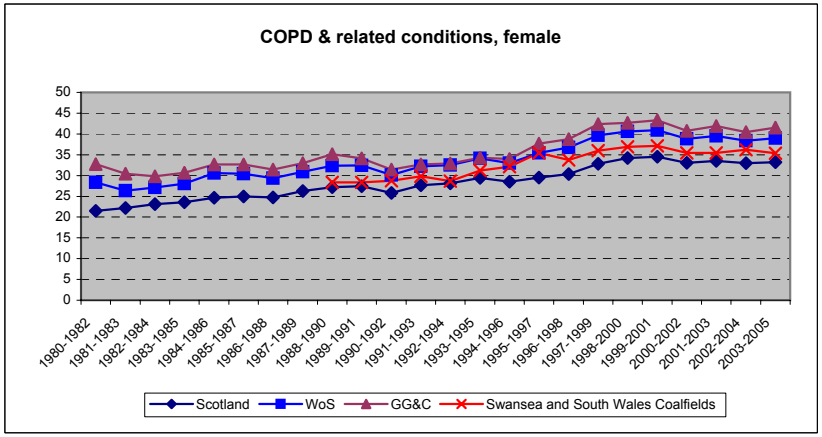
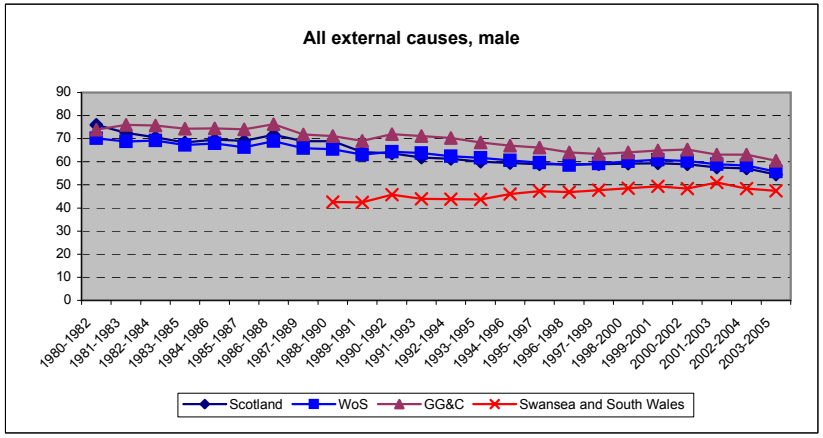
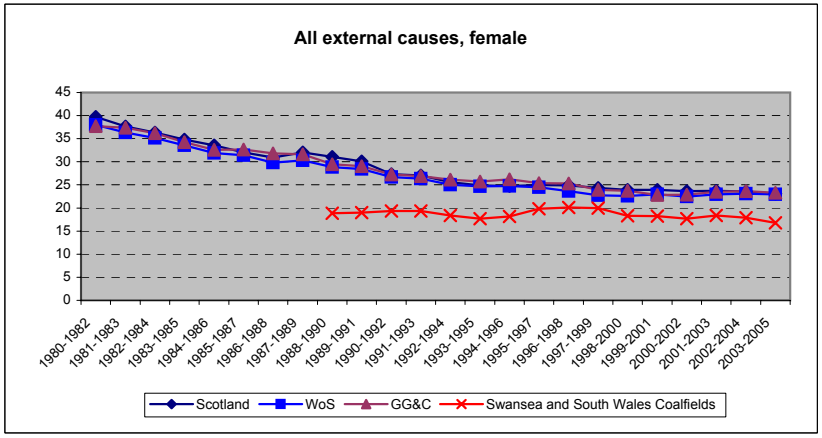
All ages, three year rolling averages. See Appendices 2-4 for details of all methods, definitions and sources.









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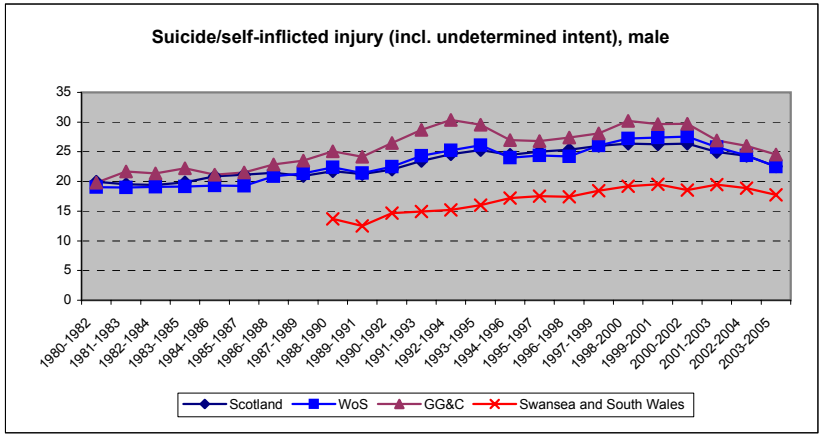

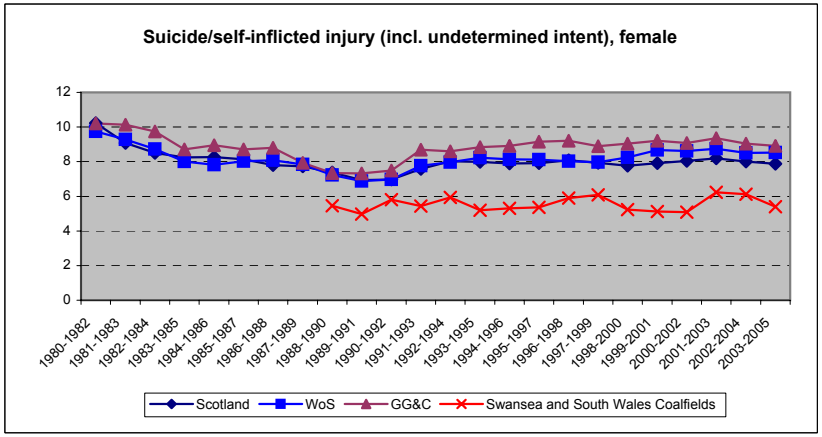

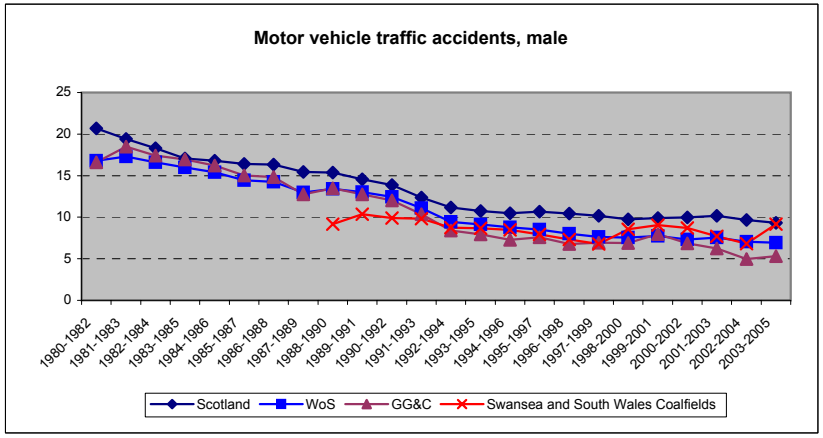

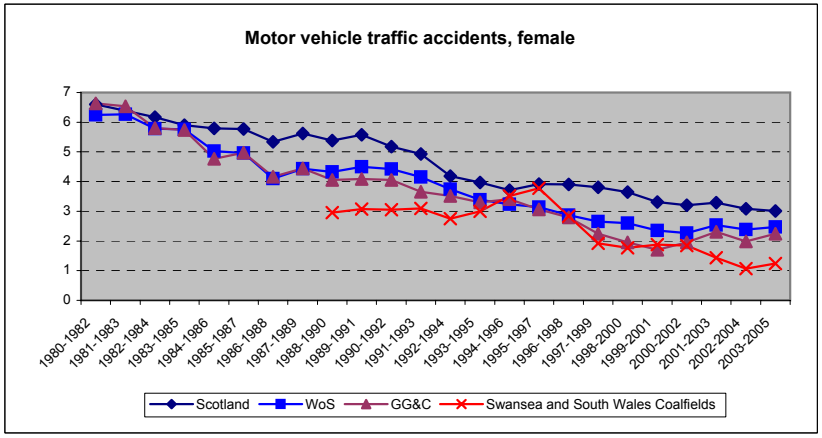

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