Cancer rates in Europe:
how does the South East compare?
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**South East Public Health Observatory**

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The population in the South East enjoys good health compared with other regions in the UK; so comparisons with European countries help to put the health of our region in context. The first European comparisons report, prepared by the South East Public Health Observatory, looked at all age, all cause mortality and identified that the populations of France, Sweden, Spain and Switzerland all have lower mortality rates than the South East. Comparisons at regional level showed that around one in five regions across Europe have a lower mortality than the South East. It identified a comparator ‘peer group’, based on economic indicators to allow for like-for-like comparisons with similar regions in Europe. The report raised some fundamental questions about why, given its economic status, the mortality in the South East is not the best in Europe. It challenged us to think more aspirationally about what we want to achieve in terms of health for our populations in this region.

The big killers in Europe are: cancers, vascular disease, and respiratory disease. This second report in the European comparisons series looks at cancer mortality, incidence and survival at national and regional level across Europe to gain a better understanding of the disparities with other countries and regions of Europe. The unexpected finding from this report is that for the South East there is a considerable discrepancy between the men and women in rankings for cancer mortality and incidence with men ranking better than many European regions, but women ranking considerably worse.

This report therefore has implications for the emerging new public health services and for health care services in England and in the South East.

Smoking is recognised as the greatest single avoidable cause of ill health and death in this country, and makes a substantial contribution to inequalities in health between different social groups. It is a key risk factor in cancer, especially lung cancer, and it seems likely that the poorer relative position in cancer mortality for women in the UK and the South East observed in this report can be explained in part by differential smoking patterns between men and women in different European countries. In the UK smoking rates in women are comparable to men, whereas in a lot of European countries, particularly in Eastern Europe, rates are considerably less than those in men. Tackling smoking must continue to be a high priority for Public Health England and for local public health services and, although we are facing a time of change for public health services, there can be no let up in the fight against tobacco use.

The breast cancer mortality rate in the South East is amongst the highest in Europe. This is partly due to the higher incidence rate and should be seen against the reassuring news of a 33% reduction in mortality rates between 1985 and 2008. Cancer survival figures are also a cause of concern, with lung cancer survival ranking amongst the lowest in Europe, and survival from colorectal, breast and prostate ranking in the lower half of Europe.

There is a need for a continuing focus on ensuring increased awareness of cancer symptoms, earlier diagnosis and equitable access to effective treatments. This has been highlighted in the recently published ‘Improving Outcomes: a Strategy for Cancer’ where the commitment to achieving cancer survival rates as good as the best in Europe has been restated.

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1 See the South East Regional Health Profiles 2010, available online at http://www.apho.org.uk/resource/view.aspx?RID=95272
Executive Summary

Background and approach
Health indicators in the prosperous South East are generally good compared with the rest of the UK. This series of reports uses NUTS 1 regions (equivalent to English Government Office Regions) across Europe to set the South East in a wider context. The first report in the series (ref 1) looked at age-standardised, all-cause mortality and examined its relationship with purchasing power parity (PPP) per capita – a measure of the purchasing power of an average citizen after allowing for differences in currency value and prices. Data included in the first report in this series showed that the South East has a high PPP and life expectancy, and low unemployment, compared to most European countries. The report also defined a ‘peer group’ of comparator regions with similar PPP to the South East. The South East was roughly in the middle of the range of mortality rates within this group.

This second report focuses on cancer. It examines differences in cancer mortality between countries and regions, and between men and women. By exploring differences in incidence and survival for four key cancers across European countries, it also goes one stage further in ‘unpicking’ the disparities in cancer mortality.

Mortality rates
Cancer mortality rates vary widely across Europe, both at national and regional level. The United Kingdom is in the middle of the rank-ordering of countries (range: from 122 per 100,000 in Cyprus to 241 per 100,000 in Hungary; UK: 180 per 100,000). The UK is, however, much nearer the highest (worst) end of the range if Eastern European countries which have recently acceded to the European Union are excluded.

Cancer mortality rates are higher among men than women in the 24 European countries compared (range for men: from 151 per 100,000 in Cyprus to 337 per 100,000 in Hungary; range for women: from 100 per 100,000 in Cyprus to 175 per 100,000 in Hungary). Comparatively speaking, however, UK women fare worse than UK men. The UK is ranked 12th best out of 26 countries for male cancer mortality (UK mortality rate: 217 per 100,000) and 21st out of 26 for female (UK rate: 155 per 100,000).

The South East region shows a similar discrepancy between rankings for male and female cancer mortality to the UK as a whole. It is ranked 12th best out of 84 European regions for male cancer mortality, but only 57th best for women. Only 27 regions in Europe have a significantly higher female cancer mortality rate than the South East, many of them within new accession countries such as Hungary and Poland – as well as elsewhere in the UK.

All twelve UK regions fall in the worst 31 out of 84 European regions for female cancer mortality, and five fall into the worst 13; whereas for men, five UK regions are in the best 24. Within the UK, the South East has the lowest male cancer mortality, and the third lowest for women.

Mortality rates and Purchasing Power Parity
Cancer mortality is not closely correlated to PPP across European regions. Among men, there is a discernible trend of lower mortality with greater affluence, but it is not statistically significant. No such trend is seen for women. If recent EU accession countries are excluded, the trend also disappears for men.

Close comparator group for the South East
This report redefines the ‘peer group’ for the South East using more recent PPP figures (2006) than the first report in the series. Of the twenty regions identified previously as having the closest PPP to the South East, only one has changed: the new peer group includes Ireland, but excludes the South West of England. Cancer mortality varies widely within this group, with rates ranging
from 164 to 254 per 100,000 for men, and from 100 to 179 per 100,000 for women. The South East is ranked seventh best out of 21 for male cancer mortality, and 15th best for female.

Although PPP is an imperfect measure of socio-economic wellbeing, it offers a practical means of establishing a peer group to allow the comparison of ‘like with like’ across Europe. The recently published I2SARE work on European regions (www.i2sare.eu) provides an alternative approach, but since its clusters include a mixture of NUTS 1 and NUTS 2 level regions, they do not permit such direct comparison with the South East. Moreover, I2SARE’s general typology places the South East in a cluster which comprises all regions in the UK except London, and all regions in Sweden except Stockholm, a more limited geographical range and one that does not achieve the aim of separating the South East from less prosperous regions in the UK.

**Cancer incidence**

There is a difference in cancer incidence between men and women in the UK, relative to other European countries, and it is likely that this constitutes a significant part of the variation in mortality described above. Men have a higher absolute incidence rate than women (for all cancers combined, the incidence rate among women in the UK is 349 per 100,000 (European range 260–409), and for men it is 411 per 100,000 (European range 323–599). However, UK women have the 7th highest cancer incidence rate across Europe, and the South East falls between the 8th and 9th highest countries. By contrast, UK men have the 20th highest incidence rate, with the South East falling between the 21st and 22nd highest countries (or the 3rd and 4th lowest). The difference between men and women is most striking for lung cancer. The UK and the South East are also towards the higher end of the range for breast cancer incidence.

Incidence and mortality are also presented side by side to illustrate the relationship between the two.

**Smoking prevalence**

Smoking is a key risk factor for cancer, and differences in smoking rates between countries, and for men and women in different countries, are likely to contribute strongly to differences in cancer incidence (and therefore mortality). Smoking rates in men and women are much closer in some countries (eg Ireland, Norway, the Netherlands Sweden and the UK) than in others (Estonia, Latvia, Lithuania, Portugal, Romania and Slovakia all have much lower rates in women than men). Countries with lower smoking rates in women tend also to have lower cancer mortality in women. It seems likely that much (though not all) of the discrepancy between male and female cancer mortality in the UK (and the South East), relative to other European countries (and regions), is due to differences in male and female smoking rates.

**Cancer survival**

Relative differences between men and women in the UK and the South East are much less striking for five year survival than for incidence. Lung cancer survival in the UK, and the South East, is among the lowest in Europe, especially for women. The UK and the South East fall into the lower half of Europe for colorectal cancer, prostate cancer and breast cancer.

**Conclusions and next steps**

This report builds on the work presented in the first report in the European Comparisons series, examining differences in cancer mortality between NUTS 1 European regions, and between men and women within them. It pushes the analysis further by exploring differences in cancer incidence and survival at national level, and also compares the South East to its ‘close comparator’ peer group based on similar purchasing parity power.

Among the surprising findings in the report are the discrepancy between the comparative position of the South East (and the UK) in terms of cancer mortality rates for men and for women (which are likely to be due partly to relatively high smoking rates among UK women), and the comparatively poor mortality rates for breast cancer that emerge from this analysis.
1. Aims

The aims of this report are as follows:

- To compare cancer mortality rates between English Government Office Regions and other regions of comparable level across Europe, as well as between whole European countries.
- To compare cancer mortality rates and indicators of economic well-being (Purchasing Power Parity per capita – PPP) across Europe, and to examine the South East’s position within a ‘peer group’ of regions with similar PPP.
- To compare cancer mortality, incidence and survival in men and women in different countries and regions across Europe.
- To highlight questions about comparative rates of cancer mortality, about the relationship between economic well-being and cancer mortality, and about sex differences in cancer mortality, raised by the routine data analysed in this report.
- To provide commissioners, policy makers and other interested stakeholders in the South East with the basis for further exploration of this topic.
2. Background

The South East is one of the most prosperous parts of Britain and health indicators for the region are often correspondingly good compared to other regions in the UK. This series of reports seeks to broaden the picture comparing regions across Europe to set the South East in a wider context. The first report (ref 1) presented data on all-cause mortality, and this, the second in the series, focuses on one of the ‘big killers’: cancer.

Comprehensive work on European-wide health indicators is ongoing, for example through Eurostat (the European Commission’s statistical arm) and I2SARE (Health Inequalities Indicators in the Regions of Europe – a collaborative project between regional public health organisations in different European countries – see http://www.i2sare.eu). Such work often addresses geographical levels which do not correspond to English Government Office Regions (GORs). However, Eurostat focuses principally on NUTS 2 areas (see below) and I2SARE works with regional levels selected individually by different countries (for example, NUTS 1 for the UK and Germany but NUTS 2 for France and Spain). There is also an issue of timeliness: data in Eurostat reports is typically several years out of date.

This series examines NUTS 1 regions, which include English GORs as well as Wales, Scotland and Northern Ireland, and uses data for 2005–07 (the latest available for which there is a sufficient number of countries). Unfortunately, only a limited range of cancer data is available at NUTS 1 level, so this report also uses some national level data for different European countries to provide a context for the South East.

2.1 Poverty, inequality and health

The relationship between poverty – or prosperity – and health is well established and was summarised in the previous report in this series. One of the challenges for relatively prosperous areas such as the South East – and one of the driving forces behind this series of reports – is how to assess the health of its population (and the performance of those charged with improving it) in the face of relative economic advantage.

The first report in this series found a surprising lack of correlation between all-cause mortality and PPP, and suggested that patterns of income distribution (ie, the extent of income inequality) within countries and regions might be a more significant factor than the ‘average affluence’ measured by PPP. The evidence for the importance of income distribution as a determinant of population health has been persuasively summarised by Wilkinson and Pickett. However, this report retains as one focus an examination of the relationship between economic wellbeing (again using Purchasing Power Parity – PPP as the best available proxy) and health. The analyses presented here confirm that this relationship is not straightforward. Within-country – or indeed within-region – income inequalities may well account for some of the differences revealed here between the experience of different countries and regions. Despite the number of ‘unknowns’, and the fact that this report does not attempt to measure income inequality, it is hoped that it nonetheless raises interesting questions and provides the basis for further exploration of the relationship between cancer mortality and economic wellbeing, particularly in the South East.

2.2 NUTS regions

The Nomenclature of Territorial Units for Statistics (the acronym NUTS derives from the French Nomenclature d’Unités Territoriales Statistiques) was developed by the European Commission. It is a geocode standard for splitting countries into administrative divisions for statistical purposes.

Three NUTS levels are defined. In the UK, NUTS 1 corresponds to the nine English Government Office Regions (GORs), plus Scotland, Wales and Northern Ireland. NUTS 2 areas correspond

to some former SHA boundaries in the UK but do not have any direct correlation to current administrative boundaries. NUTS 3 areas are co-terminous with some upper tier local authorities or groupings of local authorities.

Not all countries have every level of division, depending on their size (in Latvia, Lithuania, Luxembourg and Malta, for example, NUTS 1, 2 and 3 all correspond to the entire country). Even when the different NUTS levels exist, they do not necessarily reflect meaningful administrative or historical divisions within a country. In Germany, NUTS 1 corresponds to the sixteen well-recognised German states (Bavaria, Bremen etc), and in Belgium there are three NUTS 1 regions: Brussels, the Flemish region and the Walloon region. In other European countries, however, NUTS 1 is less meaningful. In Spain, the NUTS 1 region ‘Este’ (East) comprises Catalonia, Valencia and the Balearic Islands, while ‘Noreste’ (North East) contains the Basque country, Navarre, Rioja and Aragon. In Italy (mortality figures not available for 2005/2007) the North West NUTS 1 division includes the regions of Aosta, Liguria, Lombardy and Piedmont, while the Centre division comprises Lazio, Marche, Tuscany and Umbria. A full list of NUTS 1 and corresponding NUTS 2 regions is included in the appendix.
3. Methodology

Mortality statistics at sub-national level, including numbers and rates of deaths, are available online from the European Commission’s Eurostat website (www.epp.eurostat.ec.europa.eu). These are presented in the form of three year rolling averages, 2005–07 being the latest period which is sufficiently comprehensive to be a viable source for this report. Aggregate breakdowns are available by age, sex, diagnostic grouping and geographical area.

For the purposes of this report, SEPHO calculated age-standardised mortality ratios (ASMRs) for cancer for NUTS 1 regions across Europe, in order to compare the South East with other European NUTS 1 areas. These calculations used the aggregate numbers of deaths and population data provided by Eurostat. European countries for which 2005–07 data were not available in Eurostat (Albania, Belgium, Denmark, Italy, Luxembourg) were excluded from the analyses.

The incidence data (ref 2) was only available at country level; the countries shown in this report have been restricted to those for which 2005/2007 mortality data was available in order that direct comparisons could be made. The analysis used did not include confidence intervals. The South East (England) rates for colorectal cancer came from National Cancer Information Service (NCIS), and for the other three cancers from the Clinical and Health Outcomes Knowledge database (NCHOD).

The survival data does not consist of exactly the same group of countries as used for the mortality and incidence, there being no data available for Cyprus, Lithuania, Latvia and Estonia. In addition, whilst 2005/2007 mortality data was unavailable for Italy, Denmark, Belgium and Iceland, survival data was available and has been included in order to provide a sufficient number of values to compare with the South East. As a result, however, comparison of survival data with the mortality and incidence data can only be of a general nature. The source of survival data for European countries, Wales, England, Scotland and NI was the Eurocare website (http://www.eurocare.it/DatabaseEU4/tabid/78/Default.aspx). For the South East region, colorectal, breast and prostate percentages see ref 3. The survival time period used for the European data was 1995–1999, for the South East (England) 1997–1999. For lung cancer only this source could not be used because of differing ICD_10 criteria, so survival data for the South East Coast and South Central SHAs obtained from the NCIS database, was substituted as an approximation. The survival data for lung is based on ICD 10 codes C33-C34 (trachea, bronchus and lung), rather than C32-34. Note also that for colorectal cancer survival South East comparison data was only available for colon cancer only, for the period 1997–1999.

The adult smoking prevalence data for European countries was obtained from the World Health Organisation’s Tobacco Control database (http://data.euro.who.int/tobacco/?TabID=2402), and for South East England from ‘Smoking and drinking among adults 2005’, The General Household Survey 2005, Table 1.12, p.26, and ‘Living in Britain’, The General Household Survey 2000/01, Table 8.6, p118.

3.1 Purchasing Power Parity

There are, at present, no pre-existing groupings of ‘like’ European regions deemed to be broadly similar in terms of economic development and prosperity. SEPHO identified Purchasing Power Parity (PPP) as the best available measure of economic prosperity for this series of reports. PPP is available in Eurostat and provides a way of comparing living standards in different countries. It is defined as the exchange rate that equates the price of an identical basket of goods and services in two countries. PPP per capita, which is used in this report, is effectively a measure of the ‘affluence’ (purchasing power) of an average citizen after allowing for differences in currency value and prices in different countries. This indicator does not reflect within-region inequalities in income distribution.

Although PPP is an imperfect measure of socio-economic wellbeing, it offers a practical means of establishing a peer group to allow the comparison of ‘like with like’ across Europe. The
recently published I2SARE work on European regions (www.i2sare.eu) provides an alternative approach: it defines a series of typologies (one ‘general’ typology, and others based on health status, determinants of health and health resources – number of doctors and acute care beds per unit population). However, these typologies are not limited to NUTS 1 level regions: countries are instead split into regions at whatever level is most meaningful to them. The sense of this approach is clear, but it does mean that many of the regions included are not directly comparable to the South East.

Moreover, the I2SARE general typology unfortunately does not offer a very wide range of comparators for the UK. All regions in the UK except London are grouped with all regions in Sweden except Stockholm and no regions from any other countries are included in the cluster. This does not, therefore, achieve the aim of separating the affluent South East from the rest of the UK (the fact that the South East tends to come out well in comparisons with other UK regions was one of the main drivers for this series of reports). The typology of health status offers a wider range including for example parts of France, Spain, Italy, Austria, Germany and Belgium (again including the whole of the UK). In addition, this typology is based on mortality data (specifically, premature mortality and infant mortality), which is the outcome measure in our reports.

The health determinants typology (based on analyses of aging population, tertiary education, unemployment and maternal age distribution) perhaps offers the best alternative. It places the South East in a cluster with London and Scotland; Ireland; two Belgian regions (NUTS 2 level); Cyprus; three Spanish regions (NUTS 2 level) including Madrid; the Ile de France (which includes Paris); two regions of Sweden (NUTS 2) including Stockholm. Interestingly, there is quite considerable overlap between this cluster and the PPP-based peer group used in this report (which includes London, Scotland, the South East, Ireland, and all the areas of Sweden and Spain in the I2SARE cluster). This offers some reassurance that the PPP peer group captures areas of Europe with similar ratings for these determinants of health.

To establish the South East’s close comparator ‘peer group’, all European regions (except those in countries for which data was not available) were sorted in order of PPP. The twenty regions with PPP closest to that of the South East, whether above or below, were included in the comparator group – yielding a very similar grouping to that identified for the first report. PPP was also plotted against cancer mortality for all regions, in order to examine the correlation between the two across Europe as a whole.
4. Results

4.1 Mortality rates for all cancers combined – country level

Cancer mortality rates vary widely across Europe (Figures 1, 2 and 3). The range in the countries included in this analysis, for men and women combined, is from 122 per 100,000 in Cyprus to 241 per 100,000 in Hungary. The United Kingdom is in the middle of the rank-ordering of European national cancer mortality rates, with a rate of 180 per 100,000, although it is much nearer the worst end of the range if recent EU accession countries in Eastern Europe are excluded. Removing Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Slovenia and Hungary from the analysis leaves the UK with the third highest cancer mortality rate, after Ireland and the Netherlands.

Cancer mortality rates are higher among men than women in all countries (Figures 2 and 3: range for men: from 151 in Cyprus to 337 in Hungary; range for women: from 100 in Cyprus to 175 in Hungary). Compared to other European countries, however, UK women fare worse in terms of cancer mortality than UK men. The UK is ranked 12th best out of 26 countries for male cancer mortality (rate: 217 per 100,000) and 21st out of 26 for female (rate: 155 per 100,000). Countries which have higher male cancer mortality than the UK, but a lower female rate include: Slovenia, Slovakia, Lithuania, Latvia, Estonia and Romania, as well as Spain and France.

This raises an interesting conundrum, which is only revealed by comparing the UK with its European neighbours: UK women have a lower absolute cancer mortality rate than UK men, which might lead one to conclude that efforts should focus on reducing cancer mortality among men. However, when the UK is compared to other countries, it is clear that UK women fare less well, relatively speaking, than UK men.

The South East region is included in Figures 1, 2 and 3 to place it in the context of national mortality rates. The South East has a mortality rate below the UK average for both men and women. The discrepancy between the sexes highlighted above is also seen within the region,
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which falls between the 5th and 6th countries in rank order for men, and between the 17th and 18th for women.

Figure 2:
Cancer mortality by country, all cancers combined, men. Directly standardised rate per 100,000, 2005–07.
Source: Eurostat

Figure 3:
Cancer mortality by country, all cancers combined, women. Directly standardised rate per 100,000, 2005–07.
Source: Eurostat
4.2 Mortality rates for all cancers combined – regional level

A similar pattern is seen when cancer mortality is analysed at regional level (Figures 4–7). Among men, mortality rates vary from 151 per 100,000 in Cyprus (where the whole country constitutes one NUTS 1 region) to 349 in Alfold es Eszak in Hungary. Among women, rates vary from 98 in Kentriki Ellada (Greece) to 188 in Kozep-Magyarorzaszg (Hungary). Figures 4 and 5 show all regions ranked by their individual cancer mortality rates, and Figures 6 and 7 show regions grouped by country to illustrate within-country variation.

The South East is ranked 12th best out of 84 regions for male cancer mortality, with a rate of 198 per 100,000, and 57th best (or 28th worst) for women, with a rate of 145 per 100,000. Regions performing better than the South East for female cancer mortality include the whole of Estonia, Latvia, Lithuania, Switzerland, Cyprus, Norway, Finland, Malta and Romania and one Polish region; all regions in France, Spain, Greece, Sweden and Bulgaria, and 14 out of 16 German regions. Only 27 regions in Europe have a higher female cancer mortality rate than the South East: they include all regions in the Netherlands and Hungary, eight of the ten other UK regions, two German regions, five out of six Polish regions, the Czech Republic and Ireland.

Among the eleven regions with a lower male cancer mortality than the South East are three regions of Sweden, three regions of Austria and one region (Baden-Wurttemberg) of Germany, as well as the whole of Cyprus, Switzerland, Malta and Finland.

UK regions all fall in the worst 31 for female cancer mortality, and five in the worst 13 – whereas for men, five UK regions are in the best 24. The South East has the lowest male cancer mortality in the UK, and the third best for women.
Figure 4: Cancer mortality by region, all cancers combined, men. Directly standardised rate per 100,000, 2005–07. Ranked by mortality rate.

Source: Eurostat
Figure 5:
Cancer mortality by region, all cancers combined, women. Directly standardised rate per 100,000, 2005–07. Ranked by mortality rate.

Source: Eurostat
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Figure 6:
Cancer mortality by region, all cancers combined, men. Directly standardised rate per 100,000, 2005–07. Grouped by country.

Source: Eurostat
Figure 7:
Cancer mortality by region, all cancers combined, women. Directly standardised rate per 100,000, 2005–07. Grouped by country.
Source: Eurostat
Maps 1 and 2 show how cancer mortality varies across regions of Europe in geographical terms, for men and women separately. NUTS 1 regions are divided into ten equal bands (deciles) and shaded accordingly, with the palest colour corresponding to the lowest mortality rates, and the darkest colour to the highest. These maps also illustrate the countries for which data were unavailable and which have therefore been excluded from the analyses in this report (shaded white on the maps).
These maps enable the position of the UK (and the South East in particular) relative to the rest of Europe to be seen at a glance. The picture is quite different for men and for women: whilst Scotland and Northern England are towards the higher (darker) end of the spectrum for men, the pattern for the UK is matched by Northern France, and comparable to other stretches of western Europe. The South East is on a par with the lowest (palest) areas in the middle of Europe and Scandinavia. For women, however, the position of the UK as a whole as a ‘hotspot’ of high mortality, matched only by the worst parts of Eastern Europe, and to a lesser extent by the Netherlands, is very clear.
4.3 Cancer mortality compared with PPP

This section examines the relationship between cancer mortality rates and purchasing power parity through a series of scatter plots. Figures 8 and 9 show mortality for men and women plotted against PPP for European countries; Figures 10 and 11 do the same for European regions. Figures 12 and 13 show how the regional plots are altered by removing Eastern European countries which are recent accessions to the EU, which tend to have high cancer mortality rates and low PPP, and may therefore skew the pattern.

Although none of these graphs show a statistically significant association between PPP and cancer mortality, there are nonetheless some interesting findings. Among men, there is a discernible (albeit non-significant) trend of decreasing mortality with increasing PPP, which is not seen for women. This trend is apparent at both national and regional level, and disappears when new accession countries are excluded from the analysis. Among women, the ‘excluding new accession countries’ plot actually shows a very slight upwards trend, with mortality rates rising with increasing affluence. All of these patterns must be interpreted with caution, since none of them are strong enough to be statistically significant, but they suggest that the relationship between economic factors and health (or at least cancer mortality) is subtly different for men and women.

It is also interesting to note that the UK falls on the ‘best fit’ line for men (cancer mortality is just what would be expected, given the UK’s PPP) but above it for women (cancer mortality is higher than would be expected for PPP). There is an even greater disparity for the South East region, with male cancer mortality falling below the ‘best fit’ line (lower than expected for the region’s PPP) and above it for women (higher than expected). This pattern remains when new accession countries are excluded from the plot and reflects the findings the previous sections, demonstrating the difference between cancer mortality rates between men and women in the South East (and the UK) in a slightly different way.
Figure 10: Cancer mortality (directly standardised rate) plotted against Purchasing Power, by region, men. Source: Eurostat

Figure 11: Cancer mortality (directly standardised rate) plotted against PPP, by region, women. Source: Eurostat

Figure 12: Cancer mortality (directly standardised rate) plotted against PPP, by region, men: excluding new accession countries. Source: Eurostat
**4.4 The South East and its close comparator peer group**

This section places the South East in the context of a close comparator group of similarly affluent regions (the 20 regions with the closest purchasing power parity, PPP, to the South East). The close comparator group has been redefined for this report, using 2006 PPP data rather than the earlier figures used for the first European comparisons report, but it is almost identical to the original group – the only difference is the substitution of Ireland for the South West of England. Map 3 shows the location of the regions in the close comparator group. Demographic and other details of these regions were included in the first report (ref 1).

There is wide variation in cancer mortality rates within this group of similarly affluent regions (Figures 14–17). Among men, the range is from 164 per 100,000 in Baden-Wurttemberg to 254 in Saarland, and among women the range is from 97 per 100,000 in Madrid to 179 per 100,000 in Scotland. This represents a considerable proportion of the entire regional distribution, especially among women: Madrid has the third lowest female mortality rate of all European regions, and Scotland the second highest (see Figure 5). Among men, Baden-Wurttemberg has the third lowest mortality rate of all regions, and Saarland is 20th from highest.

The South East ranks seventh best for male cancer mortality among the close comparator group of 21, and fifteenth for female cancer mortality. Most of the other comparator regions are ranked very similarly for men and women (for example, Scotland, Saarland and the three Netherlands regions are towards the higher end of both distributions; Finland, Attica in Greece and the two Swedish regions are generally near the lower end of both, with Sweden being around the middle for men). However, all three Spanish regions come lower in the mortality rankings for women than men, which is the opposite to the sex disparity seen for the South East and East of England.

Figures 15 and 17 confirm that there is no correlation between PPP and cancer mortality rates within this group, for men or women. Again, it is worth noting that the South East falls just below the ‘best fit’ line for men (cancer mortality at or below what would be expected, given the region’s PPP) while it falls above the line for women (cancer mortality higher than expected).
Map 3:
The South East and its close comparator group of twenty regions with the closest PPP.

EN: © EuroGeographics for the administrative boundaries

Data source: Eurostat.
Cancer rates in Europe: how does the South East compare?

Figure 14: Cancer mortality (directly standardised rate) among the twenty NUTS 1 regions with PPP closest to the South East: men.
Source: Eurostat

Figure 15: Cancer mortality (directly standardised rate) plotted against PPP for the twenty NUTS 1 regions with PPP closest to the South East: men.
Source: Eurostat
4.5 Mortality – four key cancers separately

This section explores differences in mortality rates between different types of cancer. For the sake of simplicity, country-level data are presented here as a context for the South East. These charts reveal some interesting contrasts, and show the extent to which each of the key cancers examined here contributes to the UK’s (and the South East’s) relatively high female cancer mortality rate.

For lung cancer, the UK (and the South East) does substantially worse, compared to other European countries, on female cancer mortality than male. The UK has the second highest female mortality rate out of 24 countries, and the 17th highest male mortality rate, while the South East falls between the fifth and sixth highest countries for women, and the 23rd and 24th highest for men. Differences in lung cancer incidence and mortality are likely to reflect, to a large extent, differences in smoking rates. These are discussed further in Section 4.6.2 below.

For colorectal cancer, the sex differences are much less marked. The UK is ranked 20th highest in mortality rates for men and 19th for women. The South East is ranked slightly, but not substantially, higher (worse) for men than women.

Breast and prostate cancer cannot, obviously, be compared directly, but the UK has a high relative mortality rate for breast cancer (5th highest out of 24 countries), and the South East’s rate is even higher than the UK average (exceeded only by Ireland and the Netherlands). By contrast, both the UK and the South East are close to the middle of the range for prostate cancer.
Cancer rates in Europe: how does the South East compare?

Figure 18:
Lung cancer mortality (directly standardised rate), by country, men (2005–07).
Source: Eurostat

Figure 19:
Lung cancer mortality (directly standardised rate), by country, women (2005–07).
Source: Eurostat
Figure 20: Colorectal cancer mortality (directly standardised rate), by country, men (2005–07).
Source: Eurostat

Figure 21: Colorectal cancer mortality (directly standardised rate), by country, women (2005–07).
Source: Eurostat
Cancer rates in Europe: how does the South East compare?

Figure 22:
Breast cancer mortality (directly standardised rate), by country (2005–07).
Source: Eurostat

Figure 23:
Prostate cancer mortality (directly standardised rate), by country (2005–07).
Source: Eurostat
4.6 Cancer incidence

Several factors can contribute to differences in cancer mortality between countries and regions. Broadly speaking, they can be divided into differences in incidence (how many people get cancer?) and in survival (how do people with cancer fare?). This and the following section explore differences in cancer incidence and survival between European countries, in order to tease out their impact on mortality rates. The South East is again shown relative to European countries in these charts.

In particular, given the findings in earlier sections, it is interesting to explore the extent to which differences between men and women are seen for incidence and survival, and by inference which contributes most to the differences in mortality rates between the sexes, since each requires a different approach to tackle inequalities in cancer outcomes.

Figures 24 and 25 present data for all cancers combined, for men and women.
Cancer rates in Europe: how does the South East compare?

Figure 25:
Cancer incidence by country, all cancers combined, women. Directly standardised rate per 100,000, 2006.


It is very clear from these charts that there is a difference in cancer incidence between men and women in the UK, relative to other European countries, and it is likely that this constitutes a significant part of the variation in mortality described above.

As for mortality, men have a higher absolute incidence rate than women, both in the UK and in every other country. For all cancers combined, the incidence rate among women in the UK is 349 per 100,000 (European range 260–409), and for men it is 411 per 100,000 (European range 323–599). However, UK women have the 7th highest cancer incidence rate across Europe, and the South East falls between the 8th and 9th highest countries. By contrast, UK men have the 20th highest incidence rate, with the South East falling between the 21st and 22nd highest countries (or the 4th and 5th lowest).

Figures 26–31 show how incidence varies across different types of cancer. For lung cancer, there is a striking difference in relative incidence rates for men and women. There is, however, little difference in the relative position of UK men and women for colorectal cancer, although the South East is ranked worse for women than men. The UK (and the South East) is also towards the higher end of the range for breast cancer incidence, and closer to the middle for prostate cancer.
Figure 26:
Lung cancer incidence by country, men. Directly standardised rate per 100,000, 2006.

Figure 27:
Lung cancer incidence by country, women. Directly standardised rate per 100,000, 2006.
Cancer rates in Europe: how does the South East compare?

Figure 28:
Colorectal cancer incidence by country, men. Directly standardised rate per 100,000, 2006.

Figure 29:
Colorectal cancer incidence by country, women. Directly standardised rate per 100,000, 2006.
**Figure 30:**
Breast cancer incidence by country, women. Directly standardised rate per 100,000, 2006.


**Figure 31:**
Prostate cancer incidence by country. Directly standardised rate per 100,000, 2006.

4.6.1 Incidence and mortality

Figures 32 and 33 show cancer incidence and mortality on the same charts, in order to demonstrate the relationship between them. Incidence is shown on the left, mortality on the right; these charts combine all cancers but men and women are separated. The South East is shown alongside European countries.

It is clear that incidence and mortality are not always closely correlated; the variability is greater for men than for women. The charts are ranked by incidence rate, and one might expect mortality to follow roughly the same rank order, but it does not: Switzerland and Sweden, for example, have lower mortality for men than would be expected given their incidence rates, while Estonia, Latvia and Slovakia are among the countries with higher than expected mortality. Both the UK and the South East (which, as anticipated, fall lower in the rank order for men than for women) have perhaps a slightly higher mortality rate than expected, although not dramatically so.
Figures 34–39 show incidence and mortality side by side for each of the four key cancers separately. For lung cancer, although there are a few outliers (e.g., Cyprus), mortality follows incidence quite closely. (It is also worth noting that mortality is much closer to incidence for lung cancer than the other cancers presented here.) For colorectal cancer, the pattern is much less predictable, suggesting that outcome is more susceptible to variations in stage at presentation and/or treatments. Breast cancer and prostate cancer have a lower mortality rate for a given incidence rate. It is notable that mortality varies rather less between countries for breast cancer, although the UK and the South East have a higher than expected mortality for their incidence rates.
Cancer rates in Europe: how does the South East compare?

**Figure 34:**
Lung cancer incidence and mortality by country, men. Directly standardised rate per 100,000, 2006.


**Figure 35:**
Lung cancer incidence and mortality by country, women. Directly standardised rate per 100,000, 2006.

**Figure 36:**
Colorectal cancer incidence and mortality by country, men. Directly standardised rate per 100,000, 2006.


**Figure 37:**
Colorectal cancer incidence and mortality by country, women. Directly standardised rate per 100,000, 2006.

Figure 38:
Breast cancer incidence and mortality by country, women. Directly standardised rate per 100,000, 2006.
Eurostat

Figure 39:
Prostate cancer incidence and mortality by country, men. Directly standardised rate per 100,000, 2006.
Eurostat
4.6.2 Smoking prevalence

Smoking is a key risk factor for cancer. It is estimated to be responsible for around 90% of cases of lung cancer, but it also increases the risk of many other types of cancer, including several head and neck cancers and pancreatic, stomach, colorectal, cervical, renal and bladder cancer. Differences in smoking rates between countries, and for men and women in different countries, are therefore likely to contribute strongly to differences in cancer incidence (and therefore mortality).

Figure 40 presents available data for smoking in the European countries featured in this report, to examine the extent to which this hypothesis is borne out. These are data assembled by the WHO for three different time periods: not all datasets are available for all countries, but nonetheless the charts illustrate the contrast between smoking rates in different countries; between men and women in different countries; and changes in these smoking rates over time.

It is clear that in some countries (eg Ireland, Norway, the Netherlands, Sweden and the UK) smoking rates in men and women are much more similar than they are in others. Countries in which smoking rates in women are particularly low, compared to men, include Estonia, Latvia, Lithuania, Portugal, Romania and Slovakia. Many of these were identified in Section 4.1 as among the countries with higher male cancer mortality than the UK, but a lower female mortality rate. Indeed, of the countries on that list only the Netherlands has similar smoking rates in men and women, and male/female cancer mortality rates in the Netherlands are closer to the UK’s than are those of the other countries cited.

It seems likely, therefore, that much (though not all) of the discrepancy between male and female cancer mortality in the UK (and the South East), relative to other European countries (and regions), is due to differences in male and female smoking rates. Where women smoke less than men, their mortality rate from cancer is correspondingly lower. It is also worth noting that in a number of countries smoking rates in women are staying the same or increasing while those in men are falling (eg Hungary, Estonia, Latvia, Poland, Spain). It is likely that these countries will see a rise in cancer mortality in women, at least relative to men, in the future.

Sweden is the only country, among those featured here, with higher rates of smoking among women than men.
Figure 40:
Source: Europe – World Health Organisation. 
South East – General Household Survey.
Netherlands

Norway

Poland

Portugal

Romania

Slovakia

Slovenia

Spain

Sweden

Switzerland

United Kingdom

South East

Men

Women
4.7 Cancer survival

This section explores the other factor contributing to cancer mortality, comparing five year survival for men and women for key types of cancer. Again, the South East is shown alongside European countries in these charts. In the case of lung cancer, no suitable data were available for the South East, but the two Strategic Health Authorities (South Central and South East Coast) are shown separately. Again for technical reasons, most of these charts include only England, rather than the UK, although the lung cancer chart does include the UK and all its constituent countries.

Figure 41:

Source: European countries – European Cancer Registry (Eurocare) 1995-1999,
Figure 42: Five year survival for lung cancer by country, women.
Source: European countries – European Cancer Registry (Eurocare) 1995–1999,

Figure 43: Five year survival for colorectal cancer by country, men.
Source: European countries – European Cancer Registry (Eurocare) 1995–1999,
Cancer rates in Europe: how does the South East compare?

**Figure 44:**


**Figure 45:**

Lung cancer survival in the UK, and the South East, is among the lowest in Europe, especially for women. The UK and the South East fall into the lowest third of countries for colorectal cancer survival, in the lower half of Europe for prostate cancer, and about midway for breast cancer. Relative differences between men and women in the UK and the South East are much less striking for five year survival than for incidence. It is important to note, however, that it is difficult to get reliable comparative data for European survival rates. There are complex issues concerning the methodologies used, and these are the subject of ongoing debate.
5. Conclusions

This report builds on the work presented in the first report in the European Comparisons series, examining differences in cancer mortality between NUTS 1 European regions, and between men and women within them. It pushes the analysis further by exploring differences in cancer incidence and survival at national level, and also compares the South East to its ‘close comparator’ peer group based on similar purchasing parity power.

Among the interesting findings in the report is the discrepancy between the comparative position of the South East (and the UK) in terms of cancer mortality rates for men and for women, with men faring relatively better and women relatively worse compared to their European peers. This is likely to be due partly to relatively low smoking rates among UK men. In the UK (and in the South East) smoking rates in women are comparable to men, whereas in a lot of European countries, particularly in Eastern Europe, rates in women are considerably less than those in men and are also lower than rates in UK women. Tackling smoking must continue to be a high priority for Public Health England and for local public health services in the South East.

The comparatively poor mortality rates for women with breast cancer in the UK and the South East are also highlighted. This reflects in part the higher incidence of breast cancer in these areas. Encouragingly, recent research has shown significant improvements in outcomes for breast cancer patients in England. One study shows that breast cancer mortality rates in England and Wales have decreased by 35% between 1989 and 2006, which is the second largest decline in any European country (ref 4). A similar (33%) decline has been observed in the South East between 1985 and 2008. A separate study comparing survival rates for breast cancer patients in the UK, Australia, Canada, Denmark, Norway and Sweden reported that while survival rates were persistently lower in England than in Australia, Canada and Sweden, the gap has narrowed between 1995 and 2007 (ref 5). Both studies confirm that although outcomes for women with breast cancer have improved there is still a gap between England and the best performing countries in Europe. The reasons for this might include later diagnosis or variations in treatment or poorer survival in older women and women from less affluent groups. In Improving Outcomes: a Strategy for Cancer (ref 6), the Department of Health have restated the commitment to achieving cancer survival rates as good as the best in Europe. This will require a continuing focus on improving awareness, ensuring earlier diagnosis and equitable access to effective treatments.
References


