

# Regional health inequalities in England

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## Abstract

This article aims to provide an up-to-date picture of regional health inequalities in England. Health inequalities can start early in life and persist not only into old age, but subsequent generations. To address these health inequalities, a better understanding is needed of how health compares across the country.

This article brings together a range of health indicators for each of the nine government office regions, making comparisons across regions and against England as a whole. Indicators include life expectancy, alcohol consumption, smoking, drug usage, child obesity and mortality rates by cause. Bringing these indicators together in this manner provides a fuller picture of health differences between regions, instead of looking at each indicator in isolation.

The article confirms other studies showing that the north-south divide between regions persists, as the overall picture of health is better in the south than it is in the north. However, the article also reveals exceptions where some health indicators do not fit in with this trend.

## Introduction

Which English region has the highest level of alcohol consumption? In which region are cancer incidence rates high? How does life expectancy at birth vary between the regions?

Over the last 50 years, there have been impressive social, economic and health improvements in this country. People from every class and region are healthier and live longer than ever before. Unfortunately, not everyone shares the benefits of these improvements.

Health inequalities can start early in life and persist not only into old age but subsequent generations. To reduce these health inequalities, the health gap needs to be narrowed between disadvantaged groups or communities and the rest of the country. This is an aim of Public Service Agreement (PSA) 18, to promote better health and wellbeing for all.

This article looks at inequalities among 18 health indicators by region. The aim is to provide an up-to-date picture of regional health inequalities and determine how the indicators compare against England as a whole. Bringing these indicators together in this manner provides a fuller picture of health differences between regions, instead of looking at each indicator in isolation.

The indicators analysed in this article are:

- male and female life expectancy at birth in 2006–08
- age-standardised mortality rates in 2008 – all causes of death, cancer, diseases of the respiratory and circulatory systems
- age-standardised cancer incidence rates in 2005–07 – breast cancer (females) and lung cancer (males and females)
- infant mortality rates in 2007
- drug use among 16 to 24-year-olds – British Crime Survey 2008/09
- average weekly alcohol consumption (males and females) – General Lifestyle Survey (GLF) 2008
- current smokers (males and females) – GLF 2008
- self-reported limiting longstanding illness – GLF 2008
- childhood obesity in 2008/09, (reception and Year 6) – National Child Measurement Programme (NCMP)

## Notes

The authors would like to thank colleagues in contributing departments and other organisations for their generous support and helpful comments without which this article would not have been possible.

Unless otherwise stated the data used in this article were those available at the time of writing.

Further information on the sources and context for these indicators is available in the [Annex: Data sources](#).

The values for each indicator have been standardised (Box 1) and compared against the national figure for England, creating the spine charts shown in this article. The patterns emerging from the spine charts are discussed in detail in the section Regional Comparisons.

The robustness of the data (the width of the confidence intervals – Box 2) can affect whether significant differences are identifiable (Box 3). Caution needs to be exercised when analysing regional health data, largely because a lot of the indicators are based on sample surveys with small regional samples.

### Box 1: Spine charts range standardisation methodology

The method used to create the spine charts, using the regional values for each indicator, is explained here.

The indicators featured are all different, some being proportions, some rates and some years. To ensure each region’s set of health indicators are comparable on one chart, the data are standardised. The specific technique, known as range standardisation, compares each value to the minimum value for that indicator if a high value is ‘good’ (such as life expectancy) or the maximum value if a high value is ‘bad’ (such as alcohol consumption). This is then standardised in relation to the England value. These figures are then altered so that England falls on zero, and any values below zero are worse, and any values above are better. These standardised figures are then plotted to create the spine charts.

An example of this calculation is shown in Table 4.1 for childhood obesity in reception year in the North East.

The proportion of children in reception year who were obese was 10.2 per cent in the North East in 2008/09. As higher proportions of obesity are bad, this figure must be standardised using the maximum value of the full set of regional figures (11.2 per cent in London), using the following calculation:

$$\begin{aligned}
 &= \left( \frac{\text{regional value} - \text{maximum value}}{(\text{England value} - \text{maximum value}) \times 0.5} \right) - 0.5 \\
 &= ((10.2 - 11.2) / (9.6 - 11.2) \times 0.5) - 0.5 \\
 &= 0.3155 - 0.5 \\
 &= \mathbf{-0.1845}
 \end{aligned}$$

The value -0.1845 has been plotted on the spine chart for the North East (Figure 4.5), revealing that it had higher reception obesity levels than England.

This calculation is repeated for each indicator in turn.

## Regional comparisons

Figure 4.2 provides a set of spine charts showing the chosen health indicators for each region, whereas Figure 4.3 compares the regions for each indicator.

The England values for each indicator are represented by the centre line at zero, the actual non-standardised values of each indicator are shown in Table 4.4. If the indicator’s bar is to the right-hand side of this, it suggests that region or indicator performed ‘well’ in comparison to England, whereas if it is on the left-hand side, it appears the region or indicator performed ‘badly’. A regional example using London shows that the levels of childhood obesity are ‘worse’ than England, and the drug use prevalence is ‘better’. Where no bar is

Table 4.1

### An example – Prevalence of childhood obesity in reception years

Percentages	
Region	Prevalence of obese children in reception 2008/09
North East	10.2
North West	9.6
Yorkshire and The Humber	9.6
East Midlands	9.1
West Midlands	10.1
East of England	8.7
London	11.2
South East	8.7
South West	8.9
England	9.6
Minimum	8.7
Maximum	11.2

Source: Department of Health

### Box 2: Confidence intervals

The GLF and NCMP provide a selection of the indicators analysed in this article. These are sample surveys which interview a sample of the population of interest. The estimated rates or proportions resulting from these surveys will rarely be identical to the true population value, and an indication of the accuracy of these estimates is provided using confidence intervals.

In addition, rates or figures based on a small number of events (such as deaths) or within a small population can also be subject to variability. Examples in this article include the age-standardised mortality rates, infant mortality rates, and cancer incidence rates. The estimates of these can be subject to fluctuation due to chance alone. For this reason, confidence intervals are also calculated around these figures.

Confidence intervals give a range in which the true value for the population is likely to fall. Upper and lower 95 per cent confidence intervals mean there is a 95 per cent chance that the range contains the 'true' rate.

For further information about calculating confidence intervals, please see the *General Lifestyle Survey (GLF) 2008 Appendix C: Sampling Errors*.

shown against a region, this represents a value equal to that of England.

These spine charts show the indicators' standardised values for each region (Box 1) compared against England, but each of these comparisons may not actually be a statistically significant difference (Box 3). Please refer to the section for each region to see whether the differences are significant.

### Box 3: Statistically significant differences

This article focuses solely on regional differences which are statistically significant, as opposed to differences that could have occurred by chance. The differences are assumed to be significant if the confidence intervals of the two comparator figures do not overlap. If there is an overlap, the values could fall within the same range, and no significant difference can be inferred. For example, the 95 per cent confidence intervals for the prevalence of childhood obesity in reception class children for the North East and London are 9.8–10.6 and 11.0–11.5 respectively. Given that these intervals do not overlap, there is a statistical significant difference between the two regions.

In this article, the same method (overlapping confidence intervals) has been used to compare regional values with England to see if significant differences exist, even though it is acknowledged that a value for a region is not independent from the England value that includes data from the region.

The following section compares how the selected 18 health indicators performed in each region, and compared with England as a whole, referring to statistically significant differences only (Box 3). Background information for each indicator can be found in the [Data Annex](#).

In summary, this article shows that the northern regions generally do less well than the midlands and London, and the best performing regions are the East of England and southern regions. This regional pattern corroborates findings from previous health inequality publications such as the *Association of Public Health Observatories (APHO) Health Profiles 2009*.

**Table 4.4**  
**England indicators**

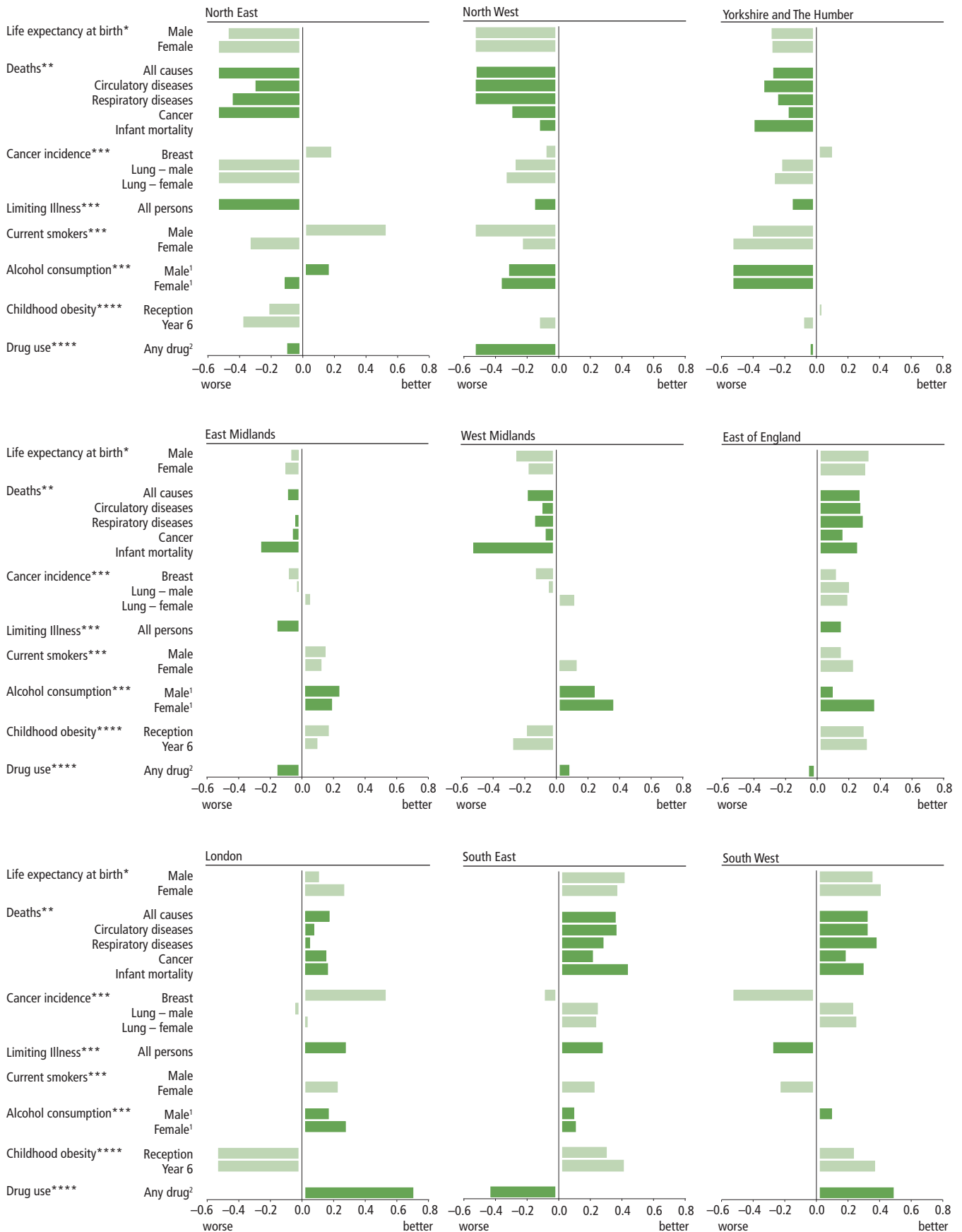
Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	177	Drug use 16–24 – Age (2008/09)	23
Deaths – Respiratory (2007)	73	Alcohol consumption – Male (2008)	22
Deaths – Cancer (2007)	172	Alcohol consumption – Female (2008)	15
Deaths – All causes (2007)	575	Smoking – Male (2008)	21
Breast cancer – Female (2008)	123	Smoking – Female (2008)	20
Lung cancer – Male (2008)	59	Limiting illness (2008)	17
Lung cancer – Female (2008)	36	Childhood obesity – Reception (2008/09)	10
		Childhood obesity – Year 6 (2008/09)	18
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006–08)	78	Infant mortality (2007)	4.8
Life expectancy at birth – Females (2006–08)	82		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.2

Health indicator spine charts by region – standardised values, 2006 to 2008

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16–24 year olds.

\* 2006–08 \*\* 2007 \*\*\* 2008 \*\*\*\* 2008/09

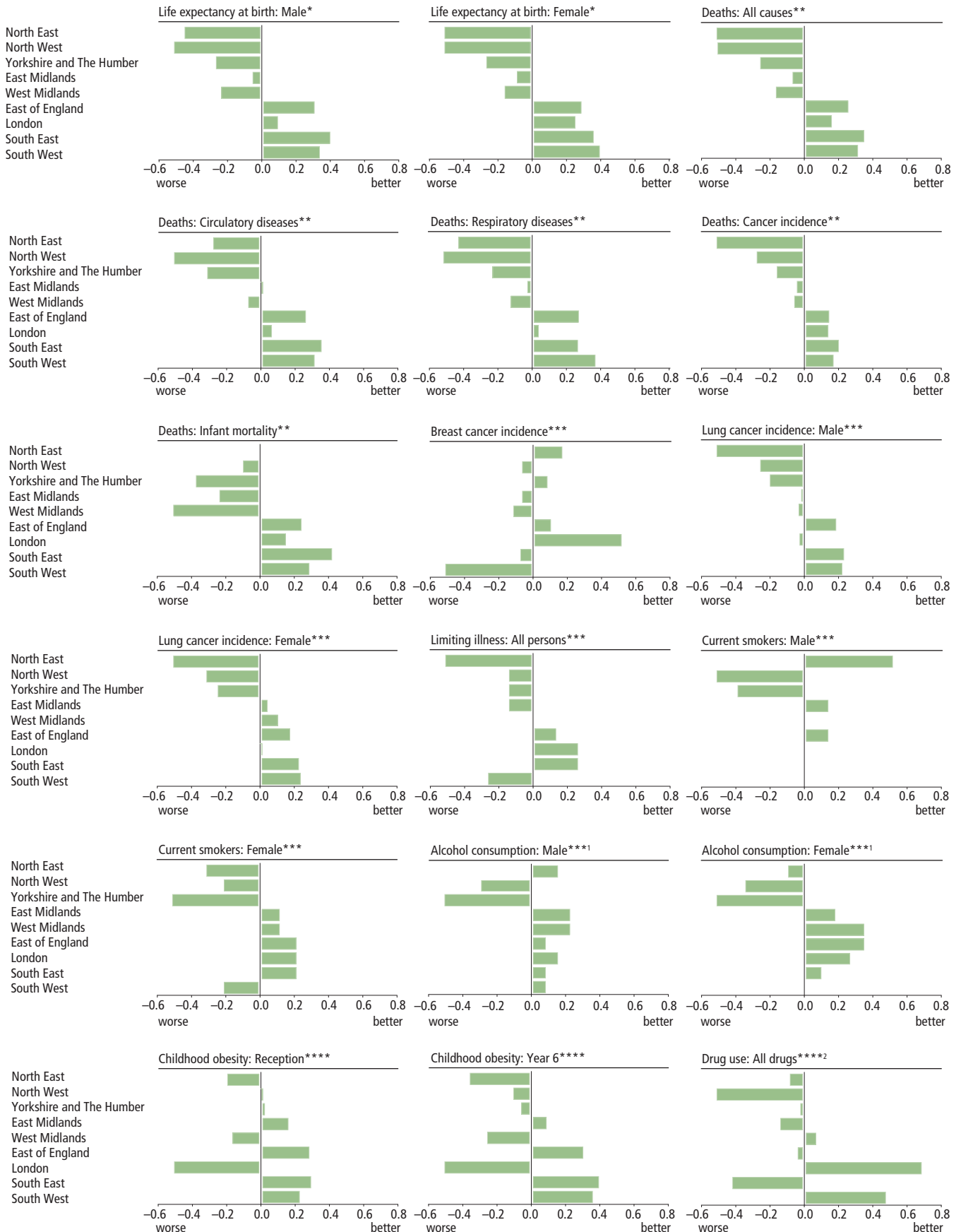
Source: Office for National Statistics; Department of Health; Home Office

Figure 4.3

Health indicator spine charts by indicator – standardised values, 2006 to 2008

Relative to England average

1



1 Males 8+ units; females 6+ units at least once a week.  
2 16–24 year olds.

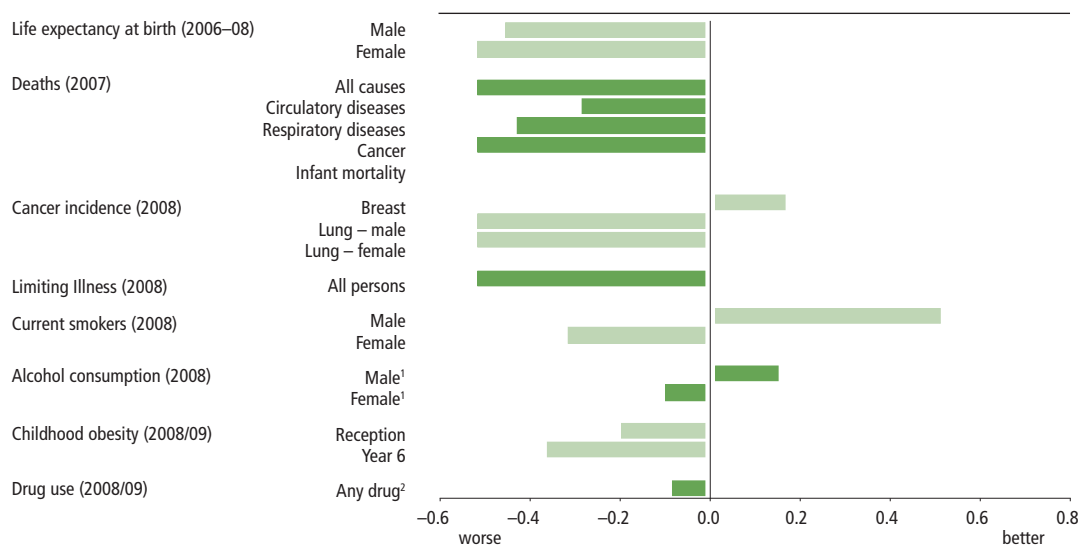
\* 2006–08 \*\* 2007 \*\*\* 2008 \*\*\*\* 2008/09

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.5

Spine chart for North East

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16–24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

North East

The spine chart for the North East (Figure 4.5) shows a picture of poor health when compared with England. The North East, along with the North West and Yorkshire and The Humber, all show a similar number of indicators that were worse than England. The life expectancy for both males and females was lower than the England average and significantly lower than all other regions except for the North West.

Poor life expectancy is linked to the other indicators that were lower than the England figure. Age-standardised mortality rates from all cancer, respiratory, circulatory and ‘all causes’ were worse than England and the majority of regions.

Incidence rates of lung cancer for both men and women (82 and 53 newly diagnosed cases in 2005–7 per 100,000 population respectively – Table 4.6) were greater than the rates for England (59 and 36 cases respectively) and all other regions.

However, some indicators such as incidence of breast cancer, childhood obesity in reception years, alcohol consumption and drug use were not significantly worse than the England average.

Surprisingly, the proportion of males smoking was much lower than the England average. Because of a large confidence interval around this figure, it was only significantly different from the region with the highest proportion of male smokers, the North West (Figure 4.7).

Table 4.6

North East indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	191	Drug use 16–24 (2008/09)	23
Deaths – Respiratory (2007)	88	Alcohol consumption – Male (2008)	20
Deaths – Cancer (2007)	204	Alcohol consumption – Female (2008)	16
Deaths – All causes (2007)	657	Smoking – Male (2008)	17
Breast cancer – Female (2008)	119	Smoking – Female (2008)	23
Lung cancer – Male (2008)	82	Limiting illness (2008)	21
Lung cancer – Female (2008)	53	Childhood obesity – Reception (2008/09)	10
		Childhood obesity – Year 6 (2008/09)	20

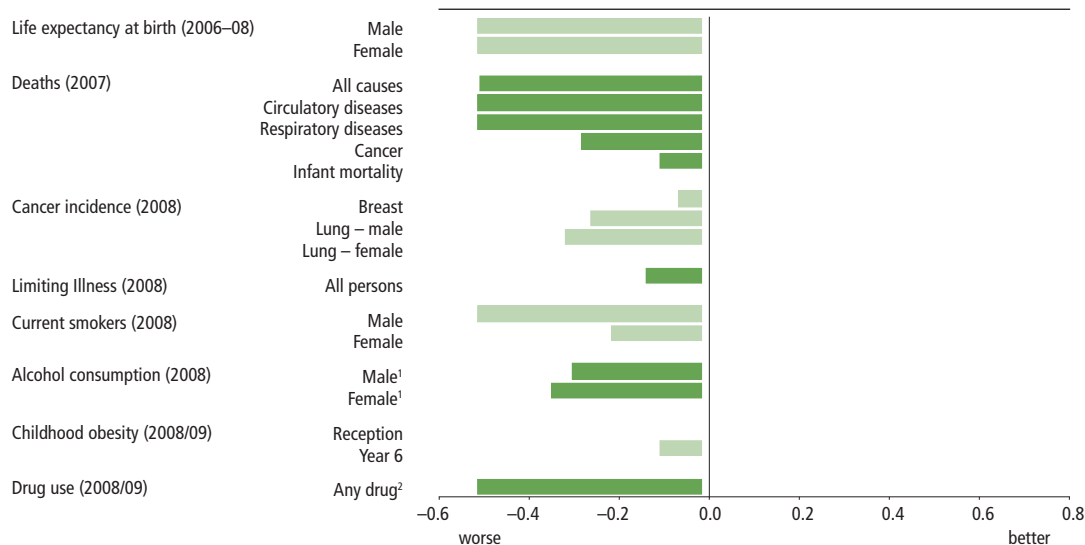
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006–08)	77	Infant mortality (2007)	4.8
Life expectancy at birth – Females (2006–08)	81		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.7

Spine chart for North West

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

North West

In common with the North East, the spine chart for the North West shows a picture of poor health when compared with England. Along with the North East and Yorkshire and the Humber, the region shows a similar number of indicators that are worse than those of England. The life expectancy for both males and females was lower than the England average and lower than all other regions except for the North East.

Poor life expectancy is linked to other indicators that were also different to England. The age-standardised mortality rates from all cancer, respiratory, circulatory and 'all causes' were significantly worse than England and the majority of regions.

The proportions of male smokers and drug use amongst 16 to 24-year-olds (25 and 27 per cent respectively) appear much higher than the England averages (21 and 23 per cent) and are the highest across all regions. However, these differences were not significantly different compared with England as the confidence intervals for these statistics are wide.

Lung cancer rates for both males and females (70 and 46 people per 100,000 respectively) were higher than the England averages and only lower than one region, the North East.

In contrast, the levels of some indicators were more moderate and close to the England average. For example, breast cancer, childhood obesity (reception), long-term limiting illness and infant mortality indicators were not significantly different compared with England.

Table 4.8

North West indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	203	Drug use 16–24 (2008/09)	27
Deaths – Respiratory (2007)	92	Alcohol consumption – Male (2008)	26
Deaths – Cancer (2007)	189	Alcohol consumption – Female (2008)	19
Deaths – All causes (2007)	656	Smoking – Male (2008)	25
Breast cancer – Female (2008)	124	Smoking – Female (2008)	22
Lung cancer – Male (2008)	70	Limiting illness (2008)	18
Lung cancer – Female (2008)	46	Childhood obesity – Reception (2008/09)	10
		Childhood obesity – Year 6 (2008/09)	19

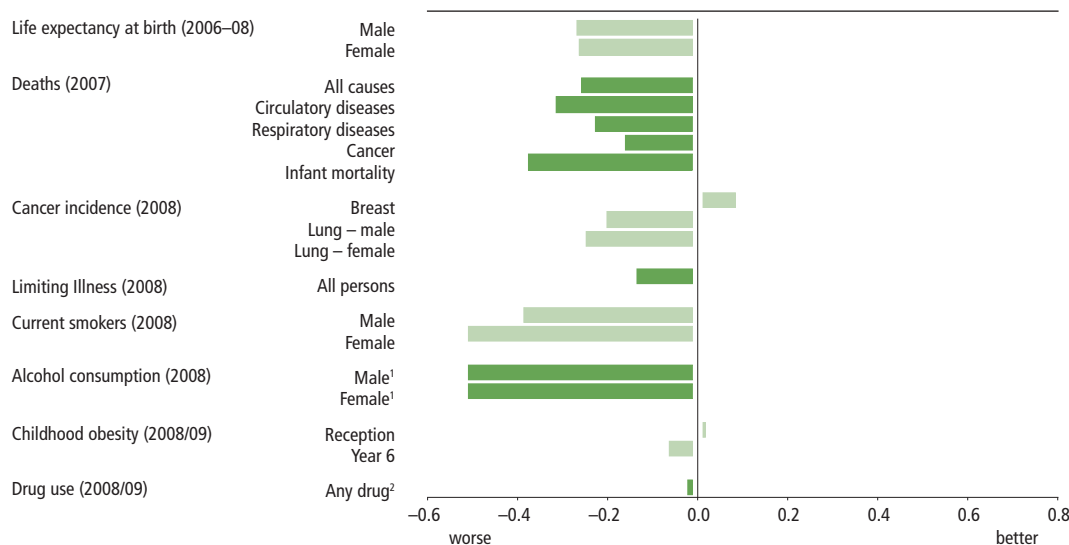
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006–08)	76	Infant mortality (2007)	5.0
Life expectancy at birth – Females (2006–08)	81		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.9

Spine chart for Yorkshire and The Humber

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
 2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

Yorkshire and The Humber

The Yorkshire and The Humber spine chart also illustrates poor health generally, although more moderate for some indicators when compared with the North East and the North West. For example, life expectancy for males was higher than the North East and North West, although it was lower than England.

The region shows the highest level of alcohol consumption (29 and 21 per cent respectively), measured as the percentage of males/females drinking more than 8/6 units of alcohol at least once in the survey week. The level was higher than the England average and the majority of regions.

Table 4.10

Yorkshire and The Humber indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	193	Drug use 16-24 (2008/09)	23
Deaths – Respiratory (2007)	81	Alcohol consumption – Male (2008)	29
Deaths – Cancer (2007)	181	Alcohol consumption – Female (2008)	21
Deaths – All causes (2007)	616	Smoking – Male (2008)	24
Breast cancer – Female (2008)	121	Smoking – Female (2008)	25
Lung cancer – Male (2008)	68	Limiting illness (2008)	18
Lung cancer – Female (2008)	44	Childhood obesity – Reception (2008/09)	10
		Childhood obesity – Year 6 (2008/09)	19

Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006-08)	77	Infant mortality (2007)	5.6
Life expectancy at birth – Females (2006-08)	81		

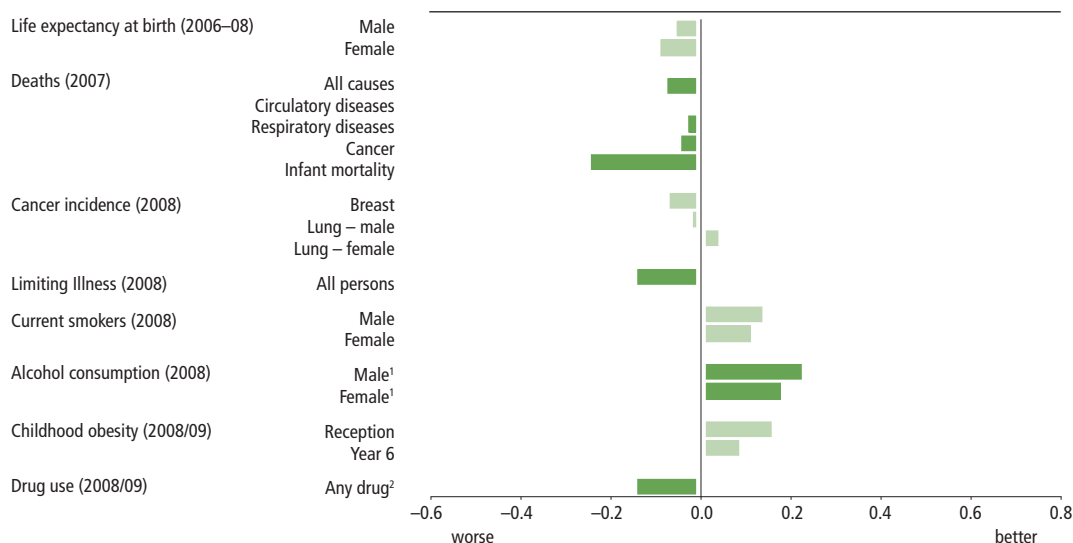
Source: Office for National Statistics; Department of Health; Home Office



Figure 4.11

Spine chart for East Midlands

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

East Midlands

The spine chart for the East Midlands shows that the health in this area was similar to the England average for many of the indicators. It clearly shows that the health in this area was better than that demonstrated in North East, North West and Yorkshire and The Humber regions.

Life expectancy in this area for both males and females was close to the England average. It is the only region where the life expectancy for males was not significantly different to the England average.

There are some indicators that appear to be better than the England average – such as alcohol consumption and smoking

– but these were not significantly different to the England average. The level of child obesity was low in this region and this was better than the England average.

To add to the mixed picture of health in this region, there are some indicators that were worse than the England average – such as breast cancer, long-term limiting illness, drug use and infant mortality. However, only one indicator was significantly worse compared with England – deaths from all causes.

The infant mortality rate in 2007 appeared to be higher than the England average according to the spine chart, but was only significantly higher than the South East. Comparisons with England and the other regions were not significantly different.

Table 4.12

East Midlands indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	177	Drug use 16-24 (2008/09)	24
Deaths – Respiratory (2007)	74	Alcohol consumption – Male (2008)	19
Deaths – Cancer (2007)	174	Alcohol consumption – Female (2008)	13
Deaths – All causes (2007)	584	Smoking – Male (2008)	20
Breast cancer – Female (2008)	124	Smoking – Female (2008)	19
Lung cancer – Male (2008)	59	Limiting illness (2008)	18
Lung cancer – Female (2008)	35	Childhood obesity – Reception (2008/09)	9
		Childhood obesity – Year 6 (2008/09)	18

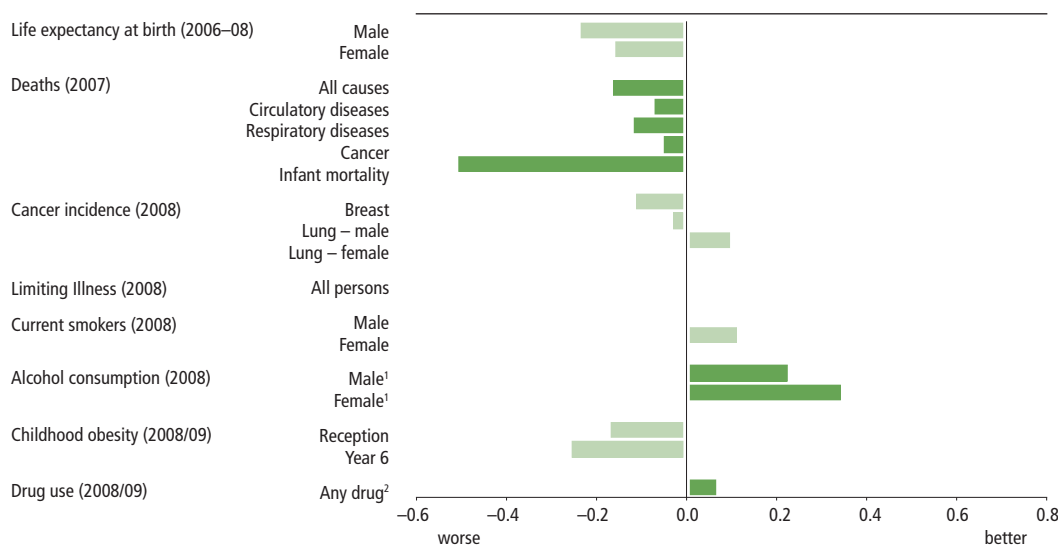
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006-08)	78	Infant mortality (2007)	5.3
Life expectancy at birth – Females (2006-08)	82		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.13

Spine chart for West Midlands

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

West Midlands

The West Midlands' spine chart shows a mixed picture of health across the range of indicators. Life expectancy for males and females was lower than the East Midlands and the England average.

The low life expectancy relates to several indicators that performed worse than the England average. Childhood obesity (reception and Year 6), deaths by all causes, deaths by respiratory causes, and infant mortality were all higher than the figures for England.

Most of these indicators had moderate values compared with the northern regions but the rate of infant mortality was the highest across all regions and was significantly higher than four of the regions.

By contrast, some indicators were better than the England average. The level of alcohol consumption by females (measured as the percentage of females drinking more than 6 units of alcohol at least once in the survey week) was lower than the England average (11 per cent versus 15 per cent). The incidence of female lung cancer was also lower than the England average.

Table 4.14

West Midlands indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths - Circulatory (2007)	180	Drug use 16-24 (2008/09)	22
Deaths - Respiratory (2007)	77	Alcohol consumption - Male (2008)	19
Deaths - Cancer (2007)	175	Alcohol consumption - Female (2008)	11
Deaths - All causes (2007)	600	Smoking - Male (2008)	21
Breast cancer - Female (2008)	125	Smoking - Female (2008)	19
Lung cancer - Male (2008)	60	Limiting illness (2008)	17
Lung cancer - Female (2008)	33	Childhood obesity - Reception (2008/09)	10
		Childhood obesity - Year 6 (2008/09)	20

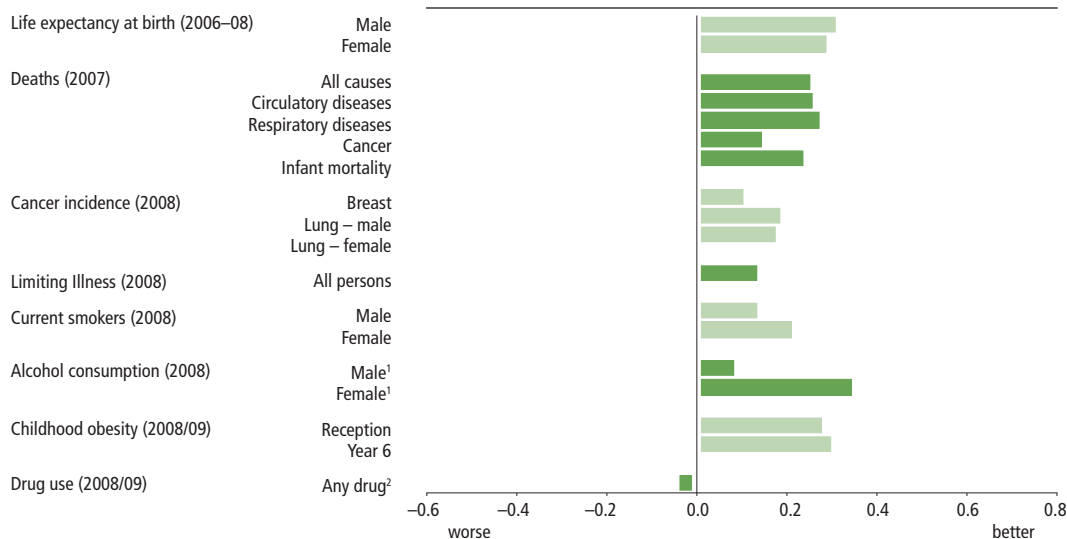
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth - Males (2006-08)	77	Infant mortality (2007)	5.9
Life expectancy at birth - Females (2006-08)	82		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.15

Spine chart for East of England

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

East of England

The spine chart for the East of England shows one of the best depictions of health across all regions, with almost every indicator better than the England average.

Of the 18 indicators, 11 performed significantly better than the England average. This included child obesity (reception and Year 6), deaths from all causes and deaths from cancer,

respiratory and circulatory conditions. It was the region with the lowest percentage of females who consumed more than 6 units of alcohol on one or more occasions in a survey week. This was lower than the England figure and the North West and Yorkshire and The Humber.

The indicators which were better than average related to the high life expectancy in this region. Only the South East and the South West had a significantly higher life expectancy.

Table 4.16

East of England indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths - Circulatory (2007)	164	Drug use 16-24 (2008/09)	23
Deaths - Respiratory (2007)	63	Alcohol consumption - Male (2008)	21
Deaths - Cancer (2007)	164	Alcohol consumption - Female (2008)	11
Deaths - All causes (2007)	535	Smoking - Male (2008)	20
Breast cancer - Female (2008)	120	Smoking - Female (2008)	18
Lung cancer - Male (2008)	51	Limiting illness (2008)	16
Lung cancer - Female (2008)	30	Childhood obesity - Reception (2008/09)	9
		Childhood obesity - Year 6 (2008/09)	17

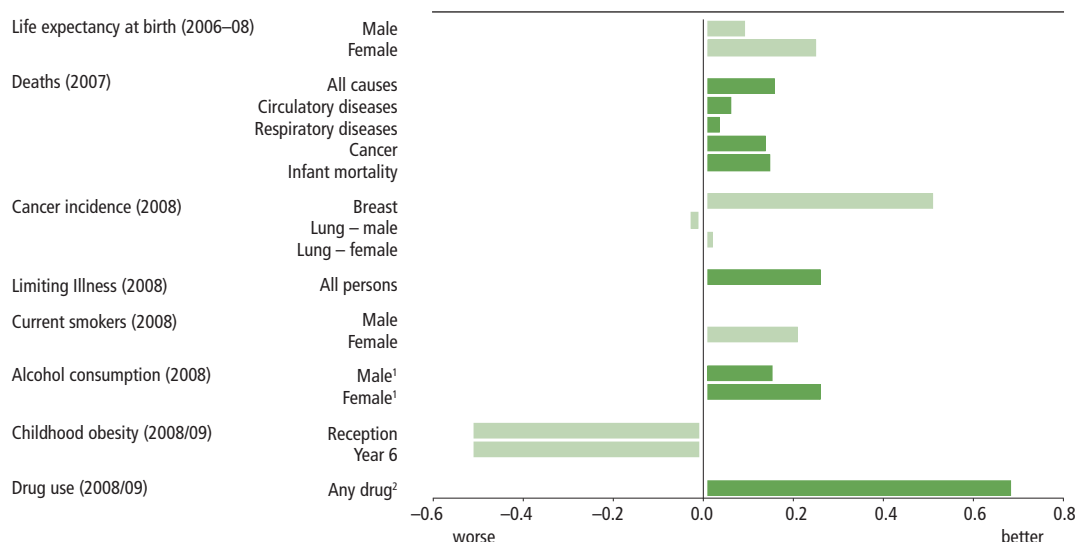
Indicator	Years at birth	Indicator	Deaths per 1,000 live births
Life expectancy at birth - Males (2006-08)	79	Infant mortality (2007)	4.3
Life expectancy at birth - Females (2006-08)	83		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.17

Spine chart for London

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

London

The London spine chart shows that health in this region was broadly better than, or closer to the England average.

Infant mortality, long term limiting illness, alcohol consumption, smoking percentages, respiratory deaths, circulatory deaths and incidence of lung cancer were all indicators that were not significantly different to the England average.

There are several indicators that stand out as performing much better than the England average. The incidence of breast cancer was lower than England and all the regions. The

percentage of 16 to 24-year-olds using drugs was lower than the North East, North West, East Midlands, East of England and the South East.

In contrast, the level of child obesity (11 per cent for reception years and 21 per cent for Year 6) in London was significantly higher than the England average (10 and 18 per cent respectively) and every other region.

Life expectancy seems to be in line with the picture of good health in London. Only the South East, South West and the East of England had significantly higher life expectancy.

Table 4.18

London indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	174	Drug use 16-24 (2008/09)	17
Deaths – Respiratory (2007)	72	Alcohol consumption – Male (2008)	20
Deaths – Cancer (2007)	164	Alcohol consumption – Female (2008)	12
Deaths – All causes (2007)	551	Smoking – Male (2008)	21
Breast cancer – Female (2008)	111	Smoking – Female (2008)	18
Lung cancer – Male (2008)	60	Limiting illness (2008)	15
Lung cancer – Female (2008)	36	Childhood obesity – Reception (2008/09)	11
		Childhood obesity – Year 6 (2008/09)	21

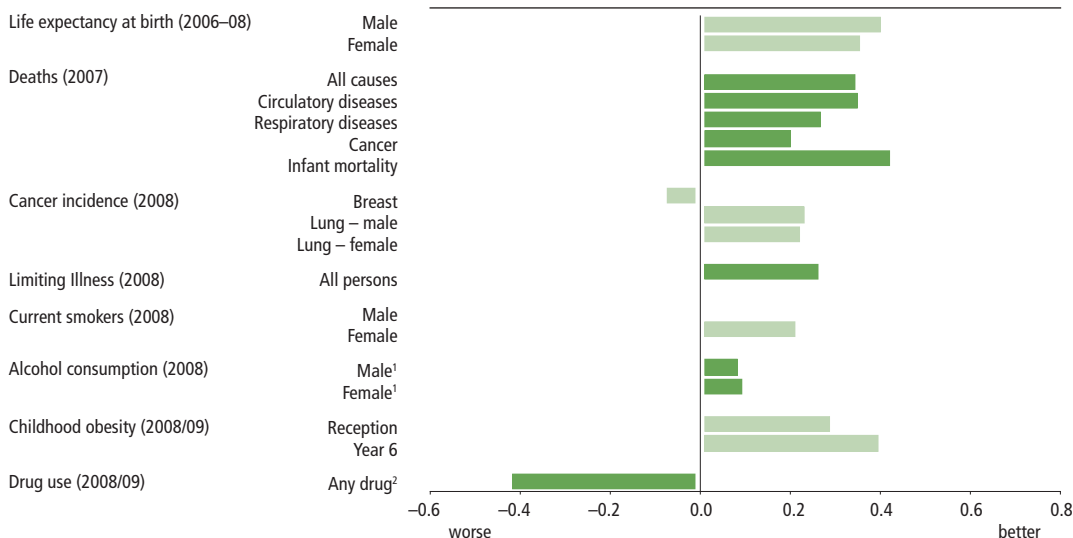
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006-08)	78	Infant mortality (2007)	4.5
Life expectancy at birth – Females (2006-08)	83		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.19

Spine chart for South East

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16–24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

South East

The South East spine chart depicts a very positive picture of health, with almost every indicator better than the England average. The region had similar rates and percentages to the East of England and South West regions. This is reflected in the high life expectancy, which was higher than the England average and all other regions.

This high level of life expectancy is linked to the better than average values for the majority of the indicators. In particular, the mortality rates for cancer, respiratory, circulatory and all

causes were lower than the England average and most of the regions.

Other indicators also performed strongly with 12 out of the 18 indicators significantly better than the England average. Levels of childhood obesity and infant mortality were both lower than the England average and many of the regions.

The only indicator that dramatically differs from the rest was the percentage of drug use amongst 16 to 24-year-olds (26 per cent). It was higher than the other southern regions; London (17 per cent), and the South West (19 per cent).

Table 4.20

South East indicators

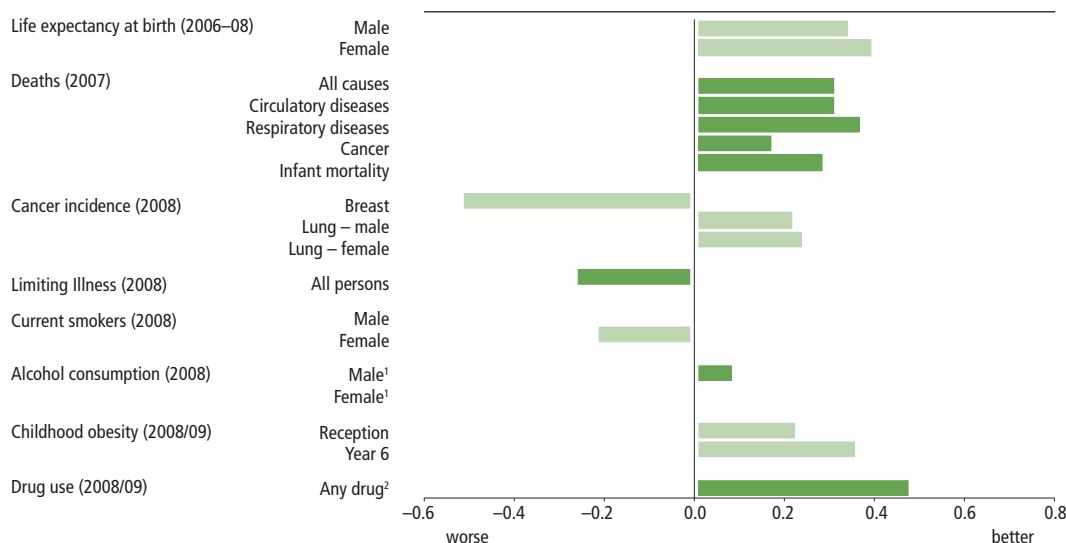
Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	159	Drug use 16–24 (2008/09)	26
Deaths – Respiratory (2007)	64	Alcohol consumption – Male (2008)	21
Deaths – Cancer (2007)	160	Alcohol consumption – Female (2008)	14
Deaths – All causes (2007)	520	Smoking – Male (2008)	21
Breast cancer – Female (2008)	124	Smoking – Female (2008)	18
Lung cancer – Male (2008)	49	Limiting illness (2008)	15
Lung cancer – Female (2008)	28	Childhood obesity – Reception (2008/09)	9
		Childhood obesity – Year 6 (2008/09)	16
Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006–08)	79	Infant mortality (2007)	3.9
Life expectancy at birth – Females (2006–08)	83		

Source: Office for National Statistics; Department of Health; Home Office

Figure 4.21

Spine chart for South West

Relative to England average



1 Males 8+ units; females 6+ units at least once a week.  
2 16-24 year olds.

Source: Office for National Statistics; Department of Health; Home Office

South West

The South West spine chart shows an indication of relatively good health, similar to that seen in the South East and the East of England. Life expectancy was very similar to the South East, East of England and London and was better than the England average.

Like the South East, the high life expectancy appears to be linked to the low mortality rates for cancer, respiratory and circulatory causes, all of which were lower than the England average.

There were also low levels of lung cancer and child obesity, both lower than the England average and most of the northern and midland regions. The region also had one of the lowest levels of drug use amongst 16 to 24-year-olds, lower than the North West and the South East, but not compared with the other regions due to the relatively wide confidence intervals.

There were three indicators that performed worse than the England average, but only one of these indicators was significantly lower than the England average. The South West had the highest level of breast cancer across all regions (135 cases per 100,000 population) and was higher than the England average (123 per 100,000 population) and all other regions.

Table 4.22

South West indicators

Indicator	Rate per 100,000	Indicator	Percentages
Deaths – Circulatory (2007)	162	Drug use 16–24 (2008/09)	19
Deaths – Respiratory (2007)	60	Alcohol consumption – Male (2008)	21
Deaths – Cancer (2007)	162	Alcohol consumption – Female (2008)	15
Deaths – All causes (2007)	526	Smoking – Male (2008)	21
Breast cancer – Female (2008)	135	Smoking – Female (2008)	22
Lung cancer – Male (2008)	49	Limiting illness (2008)	19
Lung cancer – Female (2008)	28	Childhood obesity – Reception (2008/09)	9
		Childhood obesity – Year 6 (2008/09)	16

Indicator	Years at birth	Indicator	Rate per 1,000 live births
Life expectancy at birth – Males (2006–08)	79	Infant mortality (2007)	4.2
Life expectancy at birth – Females (2006–08)	83		

Source: Office for National Statistics; Department of Health; Home Office

## Conclusions

1 This article has shown that there are many regional variations, leading to inevitable health inequalities. Overall, there was a north–south divide in health experiences. The northern regions (North East, North West and Yorkshire and The Humber) were at one end of the scale where health experiences were generally poorer than average, but in the south (South East, South West, East of England and London) the health experiences were largely better than average. The East Midlands and the West Midlands appeared to be around the England average.

This regional trend is consistent with findings from previous health inequality publications such as the Association of Public Health Observatories (APHO) Health Profiles 2009. See the References section for more north–south divide publications.

This article has highlighted that some indicators do not follow this north–south divide for health experiences. Some indicators which oppose the general trend are:

- High levels of childhood obesity in London – this contrasts the majority of indicators doing better than England in this region. This finding is backed up by the APHO Profiles
- High proportion of drug use in the South East – goes against the trend of good health in this region
- High levels of breast cancer incidence in the South West – opposing the picture of good health in this region

## Annex: Data sources

### Life expectancy

Life expectancy is a widely used summary indicator of the state of the nation's health, but it does not take into account quality of life and whether it is lived in good health, with disability or dependency.

Life expectancy is defined as the average amount of time people can expect to live. This can be time from birth, or remaining time from any particular age. More precisely, period life expectancy – used in this article – is an estimate of the average number of years a person would live if he or she experienced the particular age-specific mortality rates of that region, for that time period, throughout the rest of their lives.

All figures are three-year averages, produced by aggregating the number of deaths and mid-year population estimates across each three-year period to provide large enough numbers to ensure that the figures presented are sufficiently robust.

This article focuses on the life expectancy at birth by region and England for 2006–08 only, but it is also possible to view this over a longer time period.

Over the period 1991–93 to 2006–08, life expectancy at birth has improved in all English regions. Figure 4.23 shows the life expectancy in the North East, as this region experienced a consistently low life expectancy compared with the other regions, and the life expectancy for England. The life expectancy in the North East increased by 4.5 years for males and 3.2 years for females over this time period. The trend for England increased by a similar magnitude, with female life expectancy being consistently higher than male life expectancy in both cases.

### Infant mortality

The infant mortality rate (IMR) is defined as the number of deaths under the age of one year per 1,000 live births.

Figure 4.24 shows how the IMR has changed over time in the West Midlands (with a consistently high rate) and the South East (with a consistently low rate), in comparison to England.

The West Midlands had a consistently higher IMR than the South East over this period, and the gap did not obviously narrow. In 1996, the IMR in the West Midlands was 6.8 deaths per 1,000 live births, and this reduced slightly to 6.5 in 2008. In contrast, the South East's rate decreased from 5.3 to 4.0 deaths per 1,000 live births. There is greater variability in the regions' data because of the relatively small number of such events that occur in each region compared with England as a whole.

### Age-standardised mortality rates

Age-standardised mortality rates allow comparisons to be made between populations which may contain different age structures, for example, between the regions. They are standardised to the European Standard Population and measured per 100,000 population. The European Standard Population is a hypothetical population that is useful for comparisons between different countries, over time and between sexes. The analysis in this article focuses on the mortality rate from all causes, diseases of the respiratory and circulatory systems, and cancer. These were the underlying causes of death, as defined by the International Classification of Diseases (ICD). Data are for deaths registered in 2008.

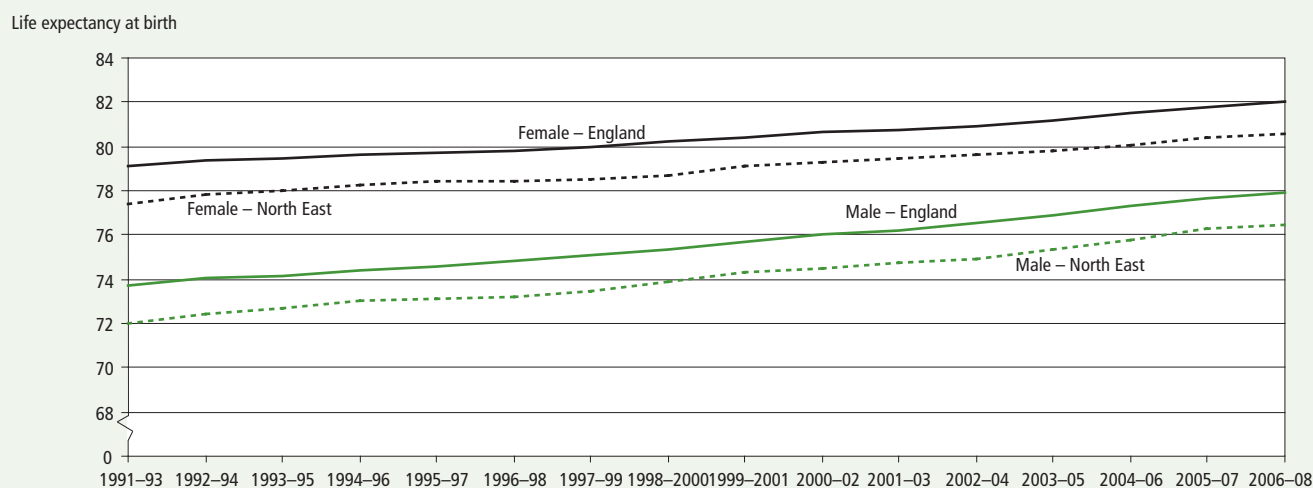
Cardiovascular disease (CVD) is a form of circulatory disease, a generic term covering diseases of the heart or blood vessels. The major types of CVD are angina, heart attack, and stroke. CVD is associated with risk factors such as smoking, sedentary lifestyles, heavy alcohol consumption and poor diets.

Respiratory diseases refer to causes of death such as influenza, pneumonia and lung diseases (see ICD).

To provide an indication of the magnitude of the data, Table 4.25 compares the age-standardised mortality rates per

Figure 4.23

### Life expectancy at birth in the North East and England, 1991–93 to 2006–08



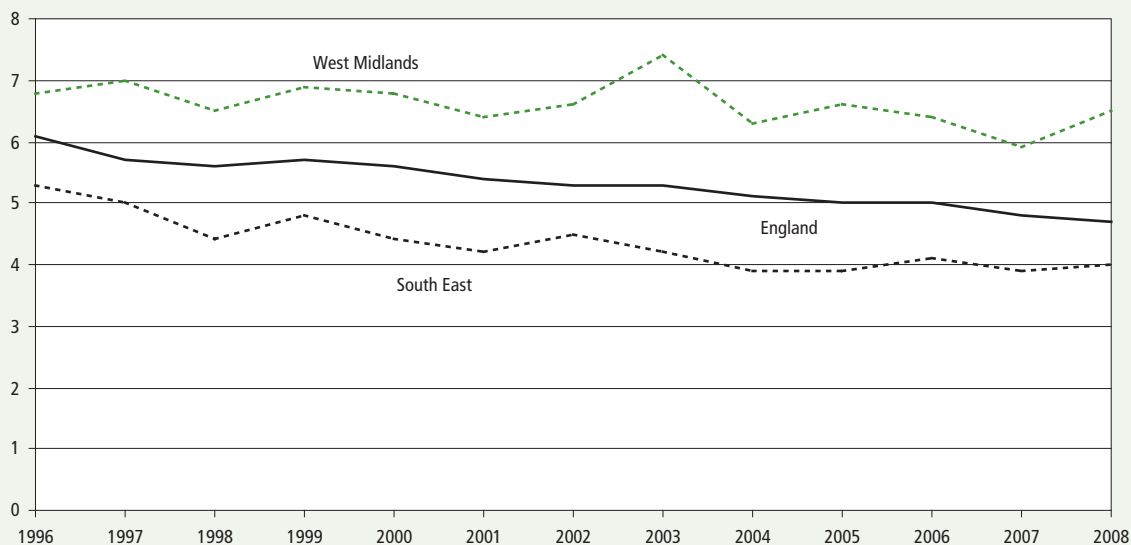
Source: Office for National Statistics



**Figure 4.24**

**Infant mortality rate, England, West Midlands and South East, 1996 to 2008**

Rate per 1,000 live births



Source: Office for National Statistics

100,000 population for all causes and each of the three other causes considered in this article, for England only.

**Drug use among 16 to 24-year-olds**

The British Crime Survey (BCS), carried out by the Home Office, is an important source of information about levels of crime and public attitudes to crime as well as other criminal justice issues. The results play an important role in informing Government policy.

The BCS measures the amount of crime in England by asking people aged 16 and over about crimes they have experienced in the last year. It includes crimes which are not reported to the police, or recorded by them, so it is an important alternative to police records. The survey collects information about:

- the victims of crime
- the circumstances in which incidents occur
- the behaviour of offenders in committing crimes

A self completion module on the BCS is used to provide data on drug use among young people, focusing on 16 to 24-year-olds. This article focuses on 'all' drug use among 16 to 24-year-olds, without breaking this down by type of drug.

**Table 4.25**

**Age-standardised mortality rates, selected causes, 2008**

England	Rate per 100,000 population
All causes	575.3
Diseases of the circulatory system	176.6
Cancer	172.2
Diseases of the respiratory system	73.2

To add further context to this indicator, the most common drug taken by this age category in 2008/09 was cannabis. In England, 18.8 per cent of 16 to 24-year-olds had taken cannabis. The equivalent proportion in London was 13.6 per cent, contrasted against the South East at 22.6 per cent. These are the lowest and highest proportions across England respectively.

**General Lifestyle Survey**

In 2008 the Office for National Statistics launched the Integrated Household Survey (IHS). In the IHS, a questionnaire is comprised of two sections: a suite of core IHS questions, followed by individual survey modules, one of which is the General Lifestyle Survey (GLF). The GLF is the new name for the General Household Survey now that it is part of the IHS. The GLF is a multi-purpose survey carried out by ONS, and the results used in this article are for the 2008 calendar year.

The GLF can provide information and statistics for certain health indicators, including alcohol consumption, cigarette smoking and limiting longstanding illness as reported by the respondent.

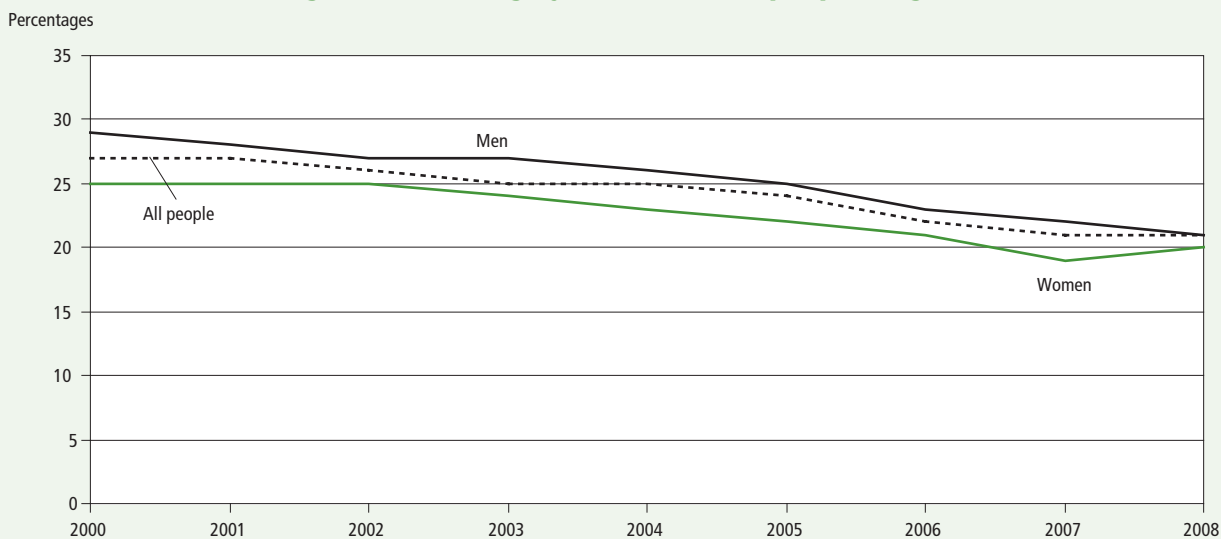
**Prevalence of cigarette smoking: by sex**

This article solely focuses on 2008 smoking trends, but the GLF also provides regional time series data for the proportion of males and females aged 16 and over who are current smokers. Figure 4.26 shows the prevalence of cigarette smoking for men, women and all people in England from 2000 to 2008.

When using time series data from the GHS/GLF, it is important to remember that in 2005, a new sample design was adopted in line with European requirements, changing from a cross-sectional to a longitudinal format. As a consequence, datasets from 2006 are not independent from one another as the

**Figure 4.26**

**Prevalence of adult' cigarette smoking by sex and for all people, England, 1998 to 2008**



1 People aged 16 and over.  
 2 2005 data include last quarter of 2004/05 data due to survey change from financial to calendar year

Source: General Lifestyle Survey 2008, Office for National Statistics

sample of respondents overlaps. This new format is more efficient at detecting statistically significant estimates of change over time.

Other measures of smoking prevalence are recorded by the GLF, such as mean number of cigarettes people smoke per day.

It is likely that the survey underestimates cigarette consumption. Please see the report Smoking and drinking among adults, 2008 published alongside the GLF data.

**Alcohol consumption: by sex**

The measure used in the article is the maximum amount consumed on any one day in the previous seven days, as recorded by the GLF. For men, this is benchmarked at eight units or more, and for women six units or more. This indicator gives an estimate of the level of binge drinking in a region as the benchmark is twice the recommended safe maximum amount to drink in a day.

Other measures of alcohol consumption are available from the GLF such as the number of respondents drinking over four or three units in a day, for males and females respectively, as well as respondents drinking over 21 or 16 units over a week, for males and females respectively.

Obtaining reliable information about drinking behaviour is difficult, and social surveys consistently record lower levels of consumption than would be expected from data on alcohol sales. This is partly because people may consciously or unconsciously underestimate how much alcohol they consume.

**Limiting longstanding illness**

The GLF provides information about the self-reported health of adults and children, and about their use of health services.

This includes statistics of people aged 16 and over with a self-reported limiting longstanding illness, used as an indicator in this article. The question asked to the respondent is whether they have a long-standing illness, disability or infirmity. The question wording clarifies that longstanding means anything that has troubled the respondent over a period of time.

**Childhood obesity**

Obesity is a major public health concern due to its association with serious chronic diseases such as type 2 diabetes and hypertension, which are major risk factors for cardiovascular disease and cardiovascular related mortality. Obesity is also associated with cancer, disability and reduced quality of life, and can lead to premature death. It is therefore important to measure levels of childhood obesity as this could be a predictor of obesity prevalence in adult life.

Established in 2005, the National Child Measurement Programme (NCMP) for England weighs and measures children in reception year (typically aged 4–5 years) and Year 6 (aged 10–11 years). It is operated jointly by the Department of Health (DH) and the Department for Children, Schools and Families (DCSF). The findings are used to inform local planning and delivery of services for children and gather population-level surveillance data to allow analysis of trends in weight. The programme also engages with parents about the importance of healthy weight in children.

Prevalence rates were calculated by deriving every child's Body Mass Index (BMI) (an indicator of body fat based on height and weight) and referencing the age and sex-specific UK National BMI percentiles classification to count the number of children defined as underweight, healthy weight, overweight or obese. Obesity is defined as a BMI greater than or equal to the 95th

percentile, that is the top 5 per cent of the assessed group in a specific year.

Pupils eligible for inclusion in the NCMP were all children in reception and Year 6 attending non-specialist, maintained schools in England. Geographical analyses are based on the location of the child's school rather than their home address. Parents and pupils are able to opt out of the measurement programme. Participation rates have increased over time, from 80 per cent in 2006/07 to 90 per cent in 2008/09. Participation rates were slightly higher in reception (91 per cent) than Year 6 (89 per cent). There is evidence that obese children in Year 6 were slightly more likely to opt out of being measured than other Year 6 children and so the figures for Year 6 are likely to be slightly underestimated. However, participation rate was shown to have little or no effect on prevalence estimates for reception children.

For charts, trends and geographical maps for national data,

please refer to the NHS Information Centre for health and social care report entitled 'National Child Measurement Programme: England 2008/09 school year'.

### Cancer incidence

Age-standardised cancer incidence rates per 100,000 population are available with confidence intervals from the Office for National Statistics. This article selects lung cancer for both males and females and breast cancer. These rates are standardised to the European Standard Population as this allows comparisons between populations which may contain different proportions of people of different ages.

The incidence is defined as the number of newly diagnosed cases registered in each calendar year, and the data have been combined for the years 2005–07. Breast and lung cancer are defined by the International Classification of Diseases (ICD-10), Tenth Revision.

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