Inequality in Healthy Life Expectancy at Birth by National Deciles of Area Deprivation: England, 2009-11

Coverage: **England**
Date: **14 March 2014**
Geographical Area: **Other**
Theme: **Health and Social Care**

Key Findings

- Males in the most advantaged areas can expect to live 19.3 years longer in 'Good' health than those in the least advantaged areas as measured by the slope index of inequality (SII). For females this was 20.1 years.
- The largest differences in healthy life expectancy between neighbouring deciles were found between the most deprived area groupings.
- Males in the most deprived areas have a life expectancy 9.2 years shorter (when measured by the range) than males in the least deprived areas, they also spend a smaller proportion of their shorter lives in 'Good' health (70.9% compared to 85.2%).
- Females in the most deprived areas have a life expectancy 6.8 years shorter (when measured by the range) than females in the least deprived areas they also expect to spend 16.9% less of their life in 'Good' health (66.5% compared to 83.4%).

Summary

These are the first intercensal estimates of inequality in healthy life expectancy by deciles of deprivation to be produced by ONS using clusters of Lower Super Output Areas (LSOAs) by the English Index of Multiple Deprivation (IMD).

Inequality in health outcomes have been a concern for over 150 years since the early Medical Officer of Health reports (Wellcome Trust), with health outcomes generally worsening with greater

socioeconomic disadvantage. Since the influential 1980 Black Report (DHSS, 1980), efforts have been made to reduce health inequalities through policies and interventions. Even though notable improvements across society in indicators such as life expectancy (881 Kb Excel sheet) (ONS, 2013d) have occurred, a large, persistent health gap remains.

The Health and Social Care Act 2012 introduced legal duties on health organisations to have regard to the need to reduce health inequalities. Reducing differences in health between populations is a key policy objective for NHS England (NHS England, 2014) and Public Health England (PHE).

This bulletin is the first in a series focussing on inequality in Healthy life expectancy (HLE) at birth by deciles of area deprivation for males and females in England. This analysis covers the time period 2009-11; the next update will provide figures for the period 2010-12. This series will also add context to the previously released Healthy life expectancy (HLE) estimates for Upper Tier Local Authorities, published by ONS in 2013 (ONS, 2013c).

Included with this release is an infographic looking at healthy life expectancy by area deprivation.

Introduction

One way to assign socioeconomic status is to measure the relative deprivation of a small area unit, such as an electoral ward or a super output area, taking account of a number of aspects of living conditions to construct a scale, which can be grouped to create a deprivation index. The analysis in this statistical bulletin uses the English Indices of Deprivation 2010 (DCLG, 2011), which encompasses seven domains of deprivation:

- Income
- Employment
- Health and disability[1]
- Education, skills and training
- Barriers to housing and services
- Living environment
- Crime

These domains reflect the fact that deprivation is a broad concept, and denotes a general lack of resources and opportunities. Each area's exposure to these aspects of deprivation is measured and an area's relative exposure is ranked against other areas. Using the English Indices of Multiple Deprivation 2010 (IMD) (DCLG, 2011), the least deprived lower super output area in England is located in Three Rivers district in the county of Hertfordshire, while the most deprived is located in Tendring district in the county of Essex. It is worth noting, it is not the area itself which is deprived but the circumstances and lifestyles of those residing in the area that affects the area's deprivation score relative to another area. This means that not all residents of a deprived area are deprived, and conversely, not all deprived people live in deprived areas.

Measuring differences in health states between populations exposed to different levels of deprivation allows health organisations to make informed decisions about the level of intensity with which preventive actions designed to improve health should be focused (Institute of Health Equity, 2010).

It also enables organisations to understand the benefit to the wider economy in terms of fitness for work and extending the working lifespan.

In 2011 Lower Super Output Areas (LSOA) boundaries were revised, creating 32,844 LSOAs from the original 32,482 (based on 2001 boundaries). As a result of these boundary changes LSOAs have either remained unchanged, merged, split or had complex changes. To take account of these changes adjusted IMD 2010 (PHE, 2013) scores were applied using a formulation developed by Public Health England2. LSOAs were ranked using these adjusted scores and aggregated into ten groups or 'deprivation deciles' based on their ranking, with approximately equal numbers of LSOAs in each. The most deprived tenth were allocated to decile 1 and the least deprived to decile 10, with the intervening deciles having levels of exposure on a gradient between these extremes. This statistical bulletin assesses HLE in the private household population across these ten groupings of areas by gender and quantifies the inequality between them in absolute terms using the range and slope index of inequality (SII).

Small area deprivation indices, such as IMD, have frequently been used to measure health inequality. Several studies have reported a linear relationship between health and relative deprivation, however defined (Bajekal 2005; Rasulo et al., 2007; Olatunde et al., 2010; Smith et al., 2010; ONS 2013b). Due to the body of evidence, it is widely accepted that analyses of health inequality using area deprivation are as important as analyses based on socioeconomic position (Macintyre et al., 1993; Bajekal, 2005; White et al., 2005).

Notes for Introduction

1. The English Index of Multiple Deprivation includes a health component which has potential for bias when used to assess inequalities in a health outcome, due to correlation between the outcome and response variables. However it has been shown the impact of the health domain is minimal when used to assess inequalities in limiting long-term health and less-than-good general health by area deprivation, (Adams and White, 2006).

2. The responsibility for producing these adjusted deprivation scores lies purely with Public Health England - the figures have neither been quality assured nor endorsed by Department for Communities and Local Government (DCLG).

What is Healthy Life Expectancy?

HLE estimates average lifespan spent in very good or good health based on self assessed general health. These estimates add a quality of life dimension to life expectancy (LE) by dividing expected lifespan into time spent in given states of health.

The figures represent a snapshot of the mortality and health status of the entire specified area population (or grouping of areas) in a given time period. They are not, therefore, the number of years that a person in an area will actually expect to live in a given health state. This is because both mortality and health rates and their exposure and treatments are susceptible to change in the future, and because of migration into and out of more and less deprived areas (Norman et al, 2005).

Health Expectancies (HEs), both HLE and Disability-free life expectancy (DFLE), are used as high-level outcomes to contrast the health status of different populations at specific points in time and to monitor changes in population health over time, providing context to the impacts of policy changes and interventions at both national and local levels. HEs are used across public, private and voluntary sectors, in the assessment of healthy ageing, fitness for work, monitoring health improvement, extensions to the state pension age, pension provision and health and social care need.

Survey measurements of general health and limiting persistent illness are used globally to identify health inequality between administrative areas, inform unmet care and health service needs and to target and monitor health care resource allocation amongst population groups (Marmot, 2010). International organisations and networks such as the World Health Organisation (WHO, 2011), Eurostat (Eurostat, 2013) and the Reves network on health expectancy (Reves) use this information to compare morbidity across countries and to monitor trends over time.

HLE is included in both of the two overarching indicators for the Public Health Outcomes Framework (PHOF). The vision for the indicators is “to improve and protect the nation’s health and wellbeing, and improve the health of the poorest fastest” (page 9, DH, 2012).The first indicator is to increase HLE, taking account of the quality as well as the length of life; the second is to reduce the differences in LE and HLE between communities.

What are the Measures of Inequality?

When comparing the least and most deprived groups of areas, two measures are routinely used; the range, (the absolute difference between the least and most deprived area deciles) and the slope index of inequality (SII – the difference between the extremes of a population weighted line of best fit). The use of the range can mask the scale of inequality as it ignores the inequality present between the intervening deciles. The SII better represents the magnitude of the absolute inequality in HLE between more and less deprived areas, as it reflects the experiences of the whole population. It is, therefore, more sensitive to changes in the socioeconomic profile of all areas (Low and Low, 2004). SII can be interpreted as the range in HLE between the most and least deprived parts of the population, based on the line of best fit.

Data

The estimates of HLE at birth for deciles within England are calculated using self-reports of general health status collected in the Annual Population Survey (APS) from private households. These rely on a method developed by ONS to derive general health state prevalence for persons under 16 years of age (ONS, 2013a) (see methods section).

The question from the APS about general health used in this analysis is as follows:

‘How is your health in general; would you say it was…’ – Very good, Good, Fair, Bad or Very bad?

Responses to this question are grouped to define ‘Good’ general health and ‘Not Good’ general health; ‘Good’ general health combines the responses very good and good and ‘Not Good’ general health combines fair, bad and very bad.

Results are presented with 95% confidence intervals to aid interpretation. Confidence intervals in this bulletin indicate the uncertainty surrounding LE and HLE estimates and enable more meaningful comparisons between deciles. When comparing the estimates of two deciles, non-overlapping confidence intervals are indicative of statistical significance but to confirm this, a test of significance should be carried out. When the statistical significance is noted in the text this is based on a statistical test of the differences (Jagger et al, 2007). All differences noted in the text have been calculated to more than 1 decimal place.

Quality information about ONS health expectancies (178 Kb Pdf) (178 Kb Pdf) is available on the ONS website.

Key Comparisons

In the most deprived 10% of LSOAs in England (decile 1), HLE was 18.4 years lower for males and 19.0 years lower for females than the least deprived 10% of LSOAs when measured by the range (the difference between the most and least deprived deciles). This inequality is almost twice as wide as the difference seen in LE at 9.2 years for males; for females it is almost three times wider than the difference in LE at 6.8 years. A more comprehensive measure of inequality is the SII; it can be interpreted in the same way as the range but takes account of inequality across the whole distribution as well as giving greater weight to larger populations and less weight to smaller populations. Using the SII shows a greater inequality than the range at 19.3 years for males and 20.1 years for femalese between the least and most deprived areas. When assessing LE with the same measure this is less than half the size at 9.4 years for males and 6.9 years for females. This shows greater inequality exists in the prevalence of self-assessed ‘Good’ general health than mortality.

At the national level females live longer than males; however deprivation affects the gender inequality in longevity in that males living in deciles 5 through 10 have longer LE than females in decile 1. For HLE a similar pattern is observed, however in this instance, males in deciles 2 through to 10 have a longer HLE than females in decile 1. This shows the gender disadvantage of males in regards to LE can be overcome by socio economic advantage.

Figure 1 - LE and HLE by deciles of deprivation for males

England, 2009-11

Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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Table 1: LE, HLE and Proportion of life in ‘Good’ health for deciles of area deprivation for males

England, 2009-11

Years, percentage

Decile	LE	HLE	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Proportion of life in 'Good' health (%)
Most Deprived					
1	73.4	52.1	51.6	52.5	70.9
2	75.5	55.8	55.3	56.4	73.9
3	76.8	58.4	57.9	58.9	76.0
4	78.0	61.2	60.6	61.7	78.4
5	79.0	63.5	63.0	64.0	80.4
6	79.8	64.9	64.4	65.4	81.3
7	80.6	66.8	66.3	67.3	82.9
8	81.1	67.7	67.2	68.2	83.4
9	81.5	68.4	67.9	68.9	83.9
10	82.7	70.5	70.0	71.0	85.2
Least Deprived					

Table source: Office for National Statistics

Table notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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Table 2: SII and Range for LE, HLE and Proportion of life in ‘Good’ health for deciles of area deprivation for males

England, 2009-11

Years, percentage

Decile	Range[2]	Slope Index of Inequality (SII)	Lower 95% Confidence Interval	Upper 95% Confidence Interval
LE	9.2	9.4	7.9	10.9
HLE	18.4	19.3	16.1	22.6
Proportion of life in 'Good' health	14.3	15.2	12.2	18.3

Table source: Office for National Statistics

Table notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.
2. Range is the difference between decile 1 and decile 10.

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Figure 2 – LE and HLE by deciles of deprivation for females

England, 2009-11

Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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Table 3: LE, HLE and Proportion of life in 'Good' health for deciles of area deprivation for females

England, 2009-11

Years, percentage

Decile	LE	HLE	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Proportion of life in 'Good' health (%)
Most Deprived					
1	78.9	52.5	52.0	53.0	66.5
2	80.4	56.1	55.5	56.6	69.7
3	81.2	59.7	59.1	60.2	73.4
4	82.1	61.7	61.1	62.2	75.1
5	83.0	64.3	63.7	64.8	77.4
6	83.4	66.0	65.4	66.5	79.1
7	84.0	67.7	67.2	68.2	80.6
8	84.3	68.6	68.0	69.1	81.4
9	84.9	69.8	69.3	70.3	82.2
10	85.7	71.5	70.9	72.0	83.4
Least Deprived					

Table source: Office for National Statistics

Table notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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Table 4: SII and Range for LE, HLE and Proportion of life in ‘Good’ health for deciles of area deprivation for females

England, 2009-11

Years, percentage

Decile	Range[2]	Slope Index of Inequality (SII)	Lower 95% Confidence Interval	Upper 95% Confidence Interval
LE	6.8	6.9	5.9	7.9
HLE	19.0	20.1	16.7	23.5
Proportion of life in 'Good' health	16.9	18.0	14.4	21.6

Table source: Office for National Statistics

Table notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.
2. Range is the difference between decile 1 and decile 10.

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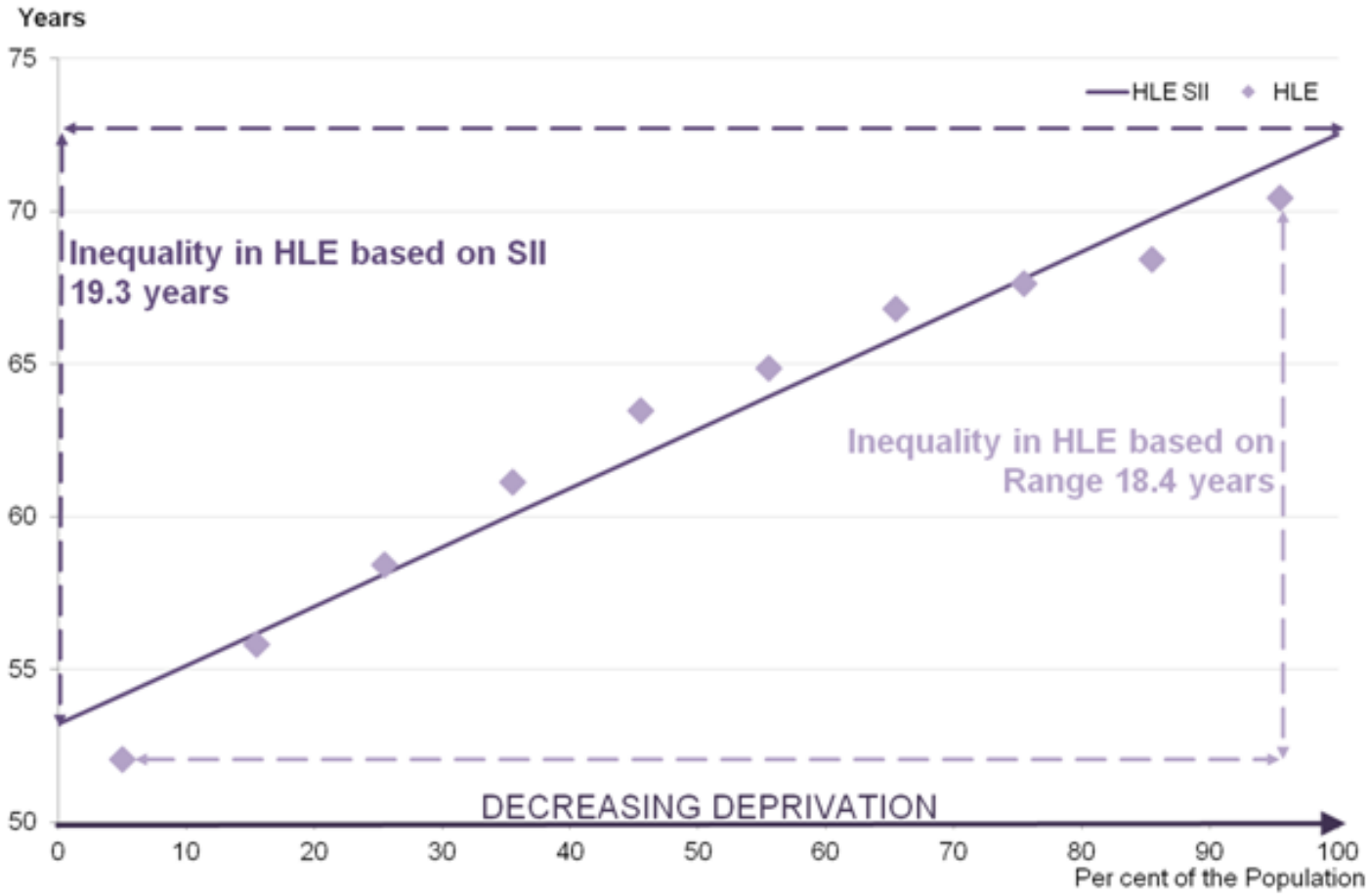
The incremental pattern of inequality in HLE, with the indicator decreasing in line with increasing deprivation, can also be illustrated through looking at years spent in ‘Not Good’ health. Males in decile 10 (least deprived) can expect to spend 12.2 years in ‘Not Good’ general health, despite having longer lives. Those in the most deprived areas can expect to spend 21.4 years of their already shorter life in ‘Not Good’ health. For females these figures are 14.2 years in ‘Not Good’ health in the least deprived decile and 26.4 years in the most deprived decile (see figure 1 and figure 2).

The difference between the range and SII is shown by figures 3 and 4 below. The lighter colour diamonds display the HLE results as presented earlier in the bulletin. Using these results we are able to calculate the range by taking the difference between the HLE estimates in decile 1 and decile 10. The SII also takes the difference between the extremes but this time using a line of best fit for the data, which has been calculated by taking into account the HLE estimates of all 10 deciles and the population in each decile. In this case the most and least deprived parts of the population are represented by 0% and 100% of the population when ranked by area deprivation. Using the SII gives us an estimate of inequality that is bigger than the range.

Figure 3 - Inequality in HLE by deprivation decile for males

England, 2009-11



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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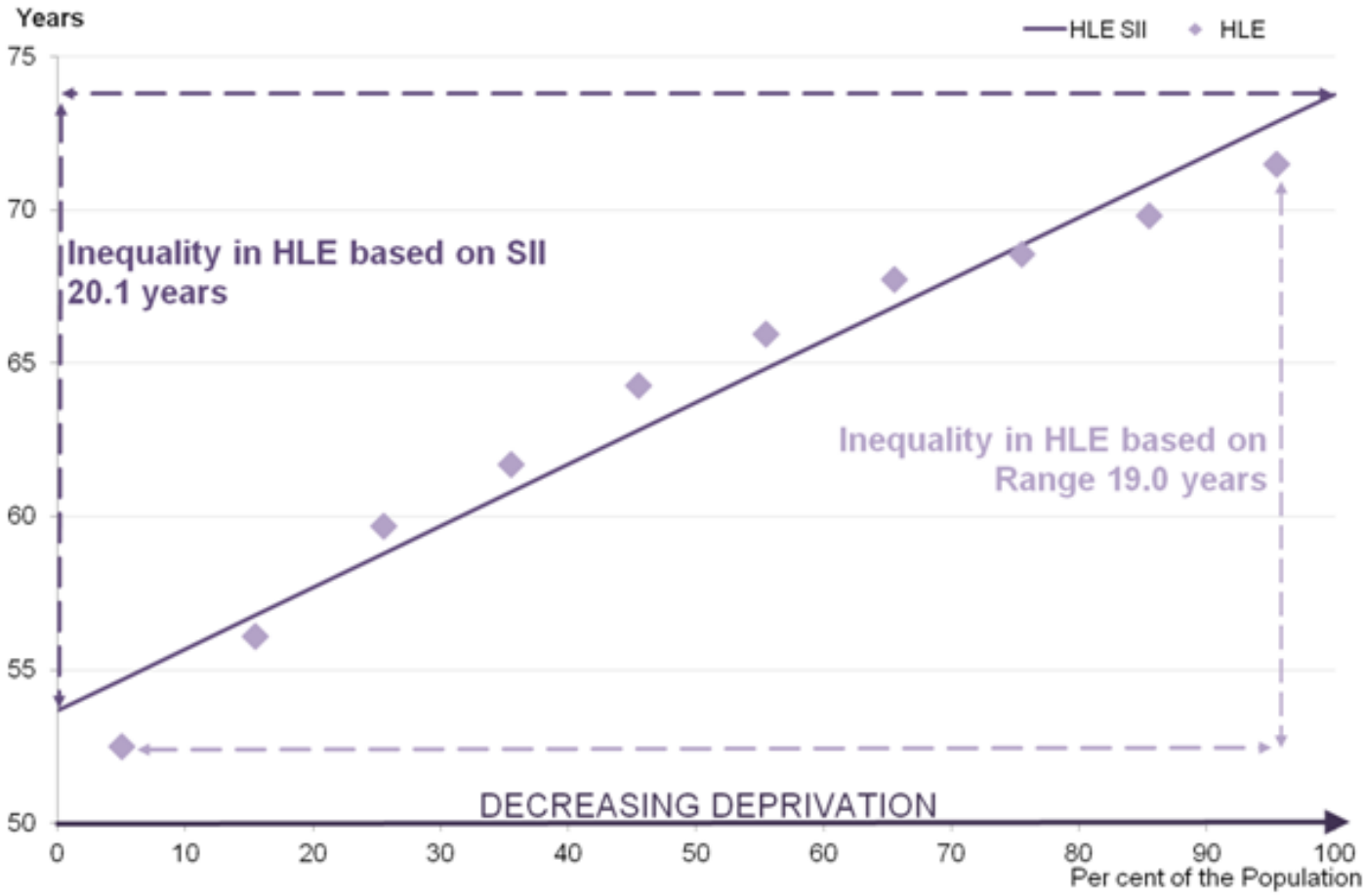
Figure 4 - Inequality in HLE by deprivation decile for females

England, 2009-11



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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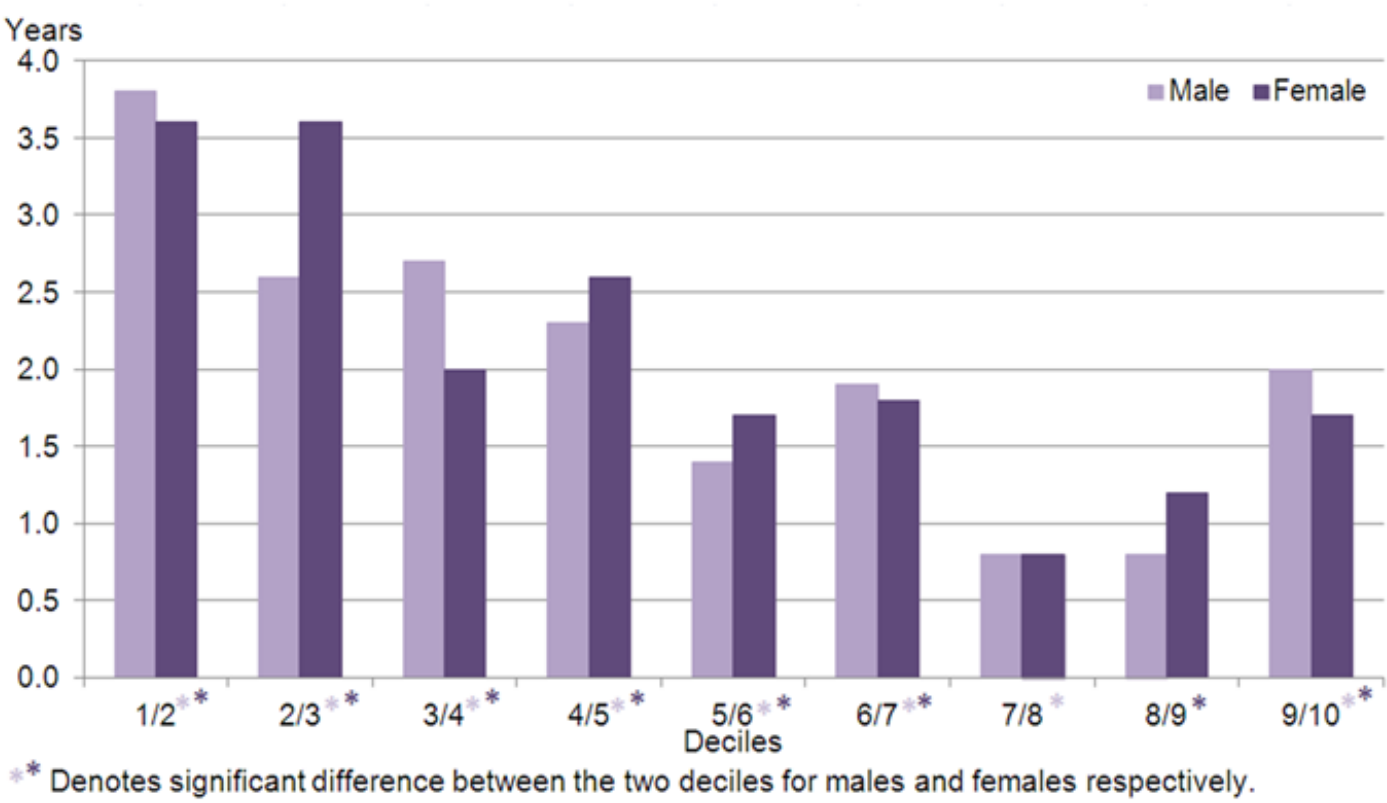
The difference in HLE between adjacent deciles is not equal. Not only do those in the most deprived areas suffer worse health outcomes: they also have the biggest difference between themselves and their neighbouring more advantaged decile for each gender, meaning they need to make bigger improvements to achieve the HLE of the decile above them. It is important to look at these differences for prioritising resource allocations. For example the biggest differences are seen between decile 1/2 for males at 3.8 years and decile 1/2 and 2/3 for females, both at 3.6 years. The smallest gap and therefore smallest inequality between adjacent deciles is between deciles 7/8 and 8/9 for males and 7/8 for females all at 0.8 years. Interestingly the gap widens again for both genders between decile 9/10, where males see the difference increase to 2.0 years and females see

the gap increase to 1.7 years. For males the difference between 9/10 is similar to that between 4/5. For females the difference between 9/10 is the same as that in 5/6.

This is best illustrated by figure 5 below, where the difference between adjacent deciles for males and females is displayed. When assessing whether these differences are significant or not , males only had one non-significant difference, between deciles 8 and 9 (where decile 9 is not significantly higher than decile 8). For all other adjacent deciles, the differences were statistically significant with the less deprived area having a HLE statistically significantly higher than the more deprived area. For females, again there was only one non-significant difference; this time decile 7 and 8, where decile 8 is not significantly higher than decile 7.

Figure 5 - Difference in HLE between adjacent deciles for males and females

England, 2009-11



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.
2. Differences have been calculated to more than 1 decimal place.

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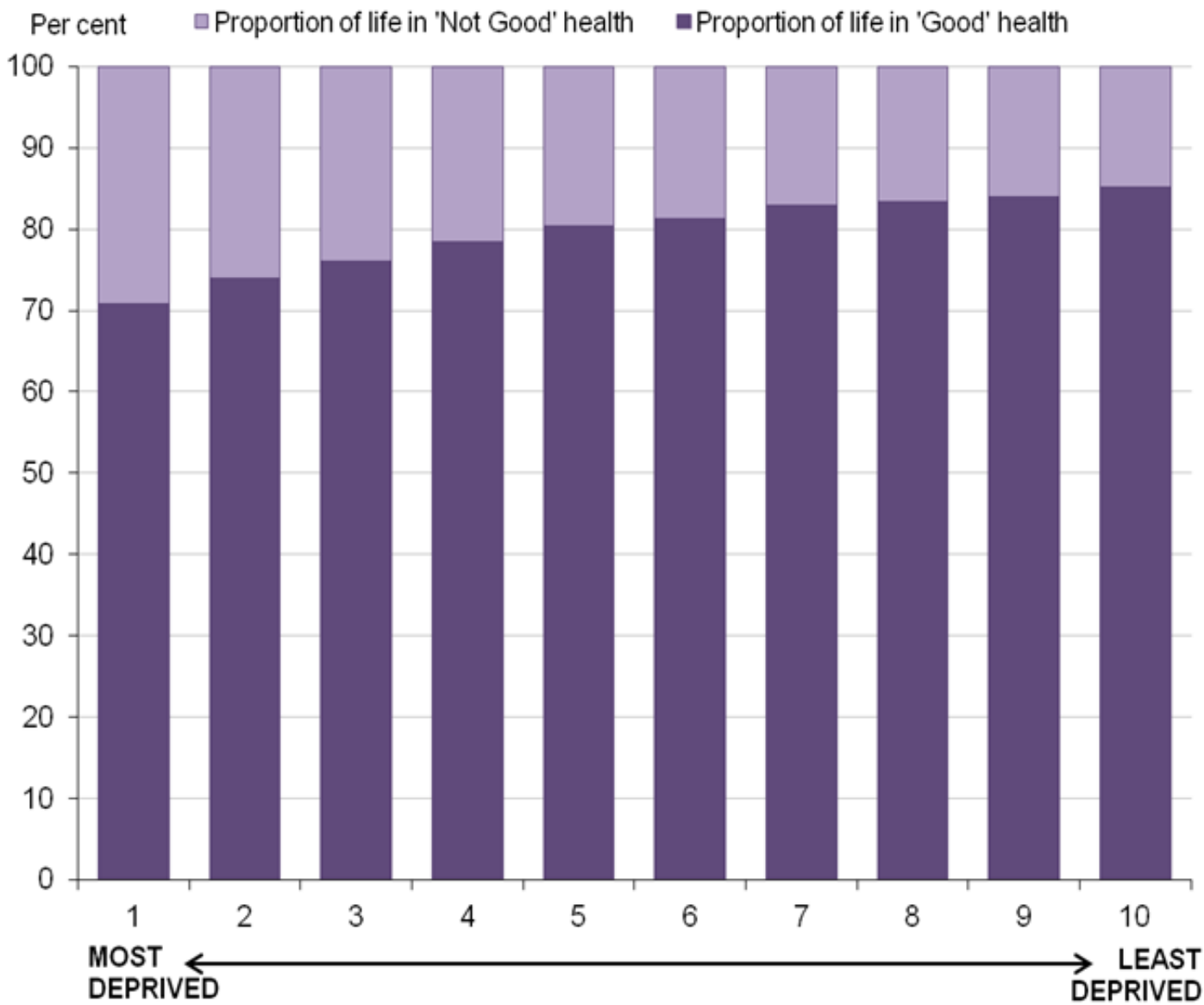
Figure 6 – Proportion of life in 'Good' health (%) by deciles of deprivation for males

England, 2009-11



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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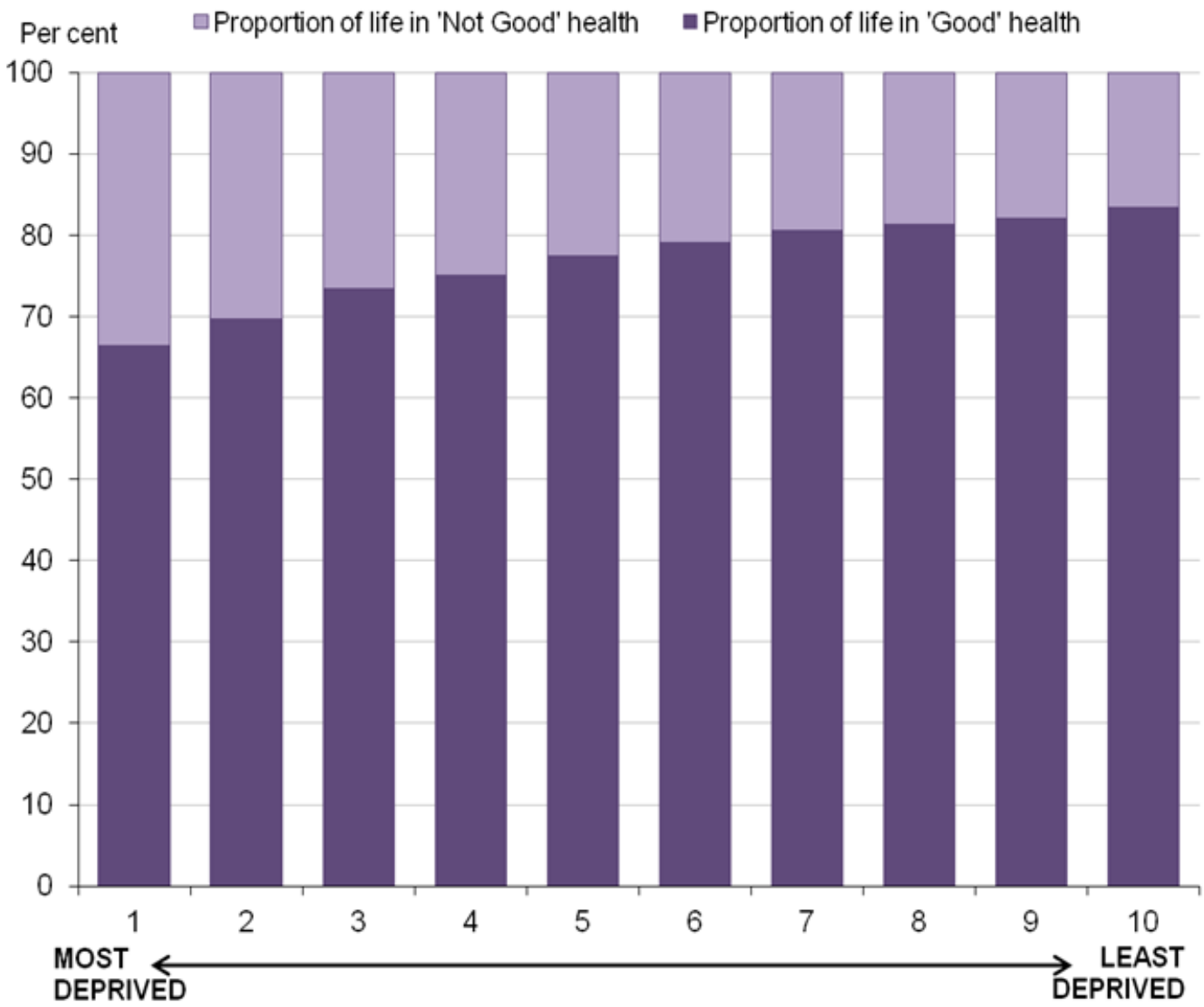
Figure 7 - Proportion of life in 'Good' health (%) by deciles of deprivation for females

England, 2009-11



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

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Figures 6 and 7 display the proportion of LE spent in 'Good' health. This allows us to see whether those who a have shorter LE can still expect to live the same proportion of that life in 'Good' general health. Figure 6 shows us that for males, this isn't the case. Even though those in decile 1 have a

shorter life expectancy, they also expect to spend a smaller proportion of that life in 'Good' health when compared to those in decile 10. This difference amounts to those in decile 10 (least deprived) having an extra 14.3 percentage points of their longer life in 'Good' general health compared to those in decile 1 (most deprived). Females in decile 10 can expect an extra 16.9 percentage points of their life in 'Good' general health when compared to females in decile 1. When analysing this difference using SII the inequality is bigger than using the range and equates to males in the least deprived areas being expected to live an extra 15.2 percentage points of their life in 'Good' health compared to males in the most deprived areas; for females this is increased to18.0 percentage points.

Based on these figures females in decile 1 can expect to live two thirds of their life in 'Good' health and males just over that, whilst males and females in decile 10 can expect to live over four fifths of their life in 'Good' health.

Conclusion

The analysis presented in this bulletin allows us to assess the scale of inequality in HLE between deciles of deprivation in England for the first time. The results add to the knowledge base that HLE varies throughout England, both being geographically spread (ONS, 2013c) and following a largely linear gradient inverse to deprivation. These results are consistent with findings for DFLE (ONS, 2013b).

A sizeable inequality in HLE as measured by the SII was observed; with males in the least deprived areas expected to live a further 19.3 years in 'Good' general health than their counterparts in the most deprived areas; for females this is larger at 20.1 years. Not only do those in the more deprived areas have a shorter LE and HLE, they are also expected to spend a smaller proportion of their shorter life in 'Good' health; for males this is 70.9% compared with 85.2% in the least deprived areas and for females this is 66.5% compared with 83.4% in the least deprived areas.

Although the relationship between HLE and deprivation is generally linear, HLE decreases sequentially as deprivation increases, the increments between deciles aren't the same. The greatest differences between adjacent deciles occur between decile 1/2 for both genders (also 2/3 for females) and the smallest between deciles 7/8 and 8/9 for males and 7/8 for females. Interestingly this difference increases again between deciles 9/10 for both genders. This may indicate an 'access to resources' effect (implying relative wealth between neighbourhoods), where the top 10% of the private household population hold 43.8% of the aggregate total wealth (ONS, 2012). This may be accounting for the greater increase in HLE between decile 9/10; conversely falling below a resource threshold may present a disproportionate risk to health, as observed in the greater falls in HLE which occurred between decile 2 and decile 1.

The inequality in health shown in this bulletin has also been shown in other health measures (when based on quintiles of equivalised household income), for example level of physical activity, level of wellbeing, prevalence of mental ill health and reporting of a health problem (HSE, 2013).

The importance of HLE as a summary measure of population health is reflected in its inclusion in the two high-level outcomes in Public Health England's Public Health Outcomes Framework.

It is necessary to track HLE and LE by area deprivation as LE increases, to see whether these years of additional life are equally distributed across the population and how many are spent in states of good health or in poor health and disability. This is also relevant to the recent changes to the state pension age in the UK where people are expected to extend their working lives to take account of improvements in LE. These figures suggest that the impact of increasing the state pension age differs greatly between populations exposed to greater and lesser levels of deprivation. It also helps to understand the extent of inequality that health organisations now must have regard to when developing health related policies. This analysis also complements the approach known as proportionate universalism whereby action is taken across the whole population but is concentrated more intensely in those areas where people have the greatest needs.

This bulletin is the first in a series of inequality in HLE by national deciles of area deprivation. This first time period sits wholly within the recent economic recession, and therefore future updates will need to be appraised in the context of period effects related to changes in the economic climate. National and local initiatives designed to narrow the gap between administrative areas, and legislation such as the smoking ban introduced in England in 2007 should also be taken into account. Research has shown an accrual of health benefits, since the implementation of smoke-free legislation in constituent countries of the UK and the Republic of Ireland (Allwright et al., 2005; Pell et al., 2008; Sims et al., 2013). It is also worth assessing over time how changes in the lower level indicators included in the PHOF, for example excess weight in adults and mortality from cardiovascular disease considered preventable, translate into changes in the high summary measures such as LE and HLE.

Methods

Calculating Healthy Life Expectancy

The data used in calculating the prevalence of ‘Good’ general health was obtained from the APS and aggregated over a three year period to achieve sufficiently large sample sizes to enable meaningful statistical comparison.

The following question from the APS was used to assess general health:

- ‘How is your health in general; would you say it was…’ – Very good, Good, Fair, Bad or Very bad?

The responses of which are grouped to define ‘Good’ general health and ‘Not Good’ general health; ‘Good’ general health is the combination of the very good and good responses and ‘Not Good’ general health the combination of fair, bad and very bad responses.

For this, the first in the series of inequality in HLE using the APS, the period 2009-12 (July 2009 – June 2012) was used for the prevalence of general health as the APS did not begin collecting information on general health until July 2009. Therefore a complete 12 months of data for 2009 is not available. To overcome this shortfall, and to ensure greater accuracy in the estimates and avoid any unwanted seasonal effects, a complete three years of health data from July 2009 – June 2012 was aggregated. The difference between these estimates and those that would have been produced, had three years of aggregate data from January 2009 to December 2011 been available,

was shown to be minimal and would not have altered the principal finding in this bulletin of a large inequality in HLE between deprivation deciles.

The mortality and population data used in this analysis include all communal establishments; however the APS excludes communal establishments apart from NHS housing and students in halls of residence where they are recorded at their parents' address.

The prevalence of 'Good' general health among males and females was compared across aggregations of LSOAs to deprivation deciles.

LSOAs are classified in the super output area classification of statistical geographies. They were originally established in 2004 and cover populations of between 1,000 and 3,000 (400-1,200 households) (ONS).

LSOAs were allocated to deprivation deciles by allocating each one their deprivation score as measured by the English Index of Multiple Deprivation (IMD) and using these scores to rank the areas and divide into 10 groups with approximately equal numbers of LSOAs in each.

HLE was then calculated using the Sullivan method which combines prevalence data with mortality and mid-year population estimates (MYPE) over the same period and decile aggregation to calculate estimates of LE and HLE at birth by sex (ONS Life Table Template (192.5 Kb Excel sheet (192.5 Kb Excel sheet)); Jagger, 2007). The MYPEs used to estimate HLE for this bulletin are the revised backdated estimates based on the 2011 census.

The APS provides prevalence information for those over the age of 16. We are able to estimate HLE at birth by directly imputing health prevalence at age 16 -19 for those under 16 (ONS, 2013a).

The age band structure used for calculating HLE is not that outlined in the update to methodology to calculate health expectancies (ONS, 2013a) but the standard age band structure of <1, 1-4, 5-9, 10-14, 15-19……85+.

Slope Index of Inequality

The slope index of inequality (SII) was used to assess the absolute inequality in HLE between the least and most deprived deciles. This indicator measures the gap in HLE by taking into account the inequality across all adjacent deciles of relative deprivation, rather than focusing only on the extremes.

To calculate the slope index of inequality:

Deciles were ordered by decreasing area deprivation, that is, from the most to the least deprived. The fraction of the total population in each decile (f) was calculated. The cumulative frequency (ci), that is the cumulative sum of the population in successively less deprived deciles, was also obtained and the relative deprivation rank (x) for each decile was calculated as:

Equation for Relative Deprivation Rank

$$\chi = c_{j-1} + (0.5f)$$

This formula calculates the relative deprivation rank for use in the slope index of inequality calculation.

The SII (slope of the regression line) was then estimated by regressing HLE for each decile against the relative deprivation rank (x), weighted by the population in each decile.

Interpretation of HLE

HLE at a given age for a specific period and population, such as males and females at birth residing in private households in deprivation deciles in England in 2009-11, is an estimate of the average number of years a person would live in a state of 'Good' general health if he/she experienced the specified population's age-specific mortality and health status rates for that time period throughout the rest of his/her life.

The figures reflect the mortality and health status of a population in a given time period residing in that area, rather than those born in an area. It is not therefore the number of years that a person will actually expect to live in the various health states, because both the death rates and health status rates of the specified population are likely to change in the future, and because of changes to health risk determinants. In addition some of those in the specified population may live elsewhere for part of their lives.

Health expectancies are indicators of health status that take into account differences in the age structures of populations. Results are comparable by age, sex and between specified populations.

References

Adams J and White M (2006) Removing the health domain from the Index of Multiple Deprivation 2004 – effect on measured inequalities in census measure of health. Journal of Public Health. Vol. 28 No. 4 pp.379-383.

Allwright S, Paul G, Greiner B, Mullally B J, Pursell L, Kelly A, Bonner B, D'Eath M, McConnell B, McLaughlin J P, O'Donocan D, O'Kane E and Perry I J (2005) Legislation for smoke-free workplaces and health of bar workers in Ireland: before and after study. British Medical Journal. 12; 331:1117–1120. Doi: 10.1136/bmj.38636.499225.55

Bajekal M (2005) 'Healthy life expectancy by area deprivation: magnitude and trends in England, 1994–1999.' Health Statistics Quarterly, 25, pp 18–27.

DCLG (2011) The English Indices of Deprivation 2010. Neighbourhoods Statistical Release. Department for Communities and Local Government.

DH (2012) Improving outcomes and supporting transparency. Part 1A: A public health outcomes framework for England 2013-2016. Department of Health.

DHSS (1980), Inequalities in Health: Report of a Research Working Group (Black Report) Department of Health and Social Security

Eurostat (2013) Healthy Life Years and Life Expectancy at birth, by sex

Health and Social Care Act (2012)

HSE (2013) Health Survey for England – 2012

Institute of Health Equity (2010) Key Messages of 'Fair Society Healthy Lives', 'Fair Society Healthy Lives' (Marmot Review). UCL Institute of Health Equity.

Jagger C, Cox B, Le Roy S, EHEMU (2007) Health Expectancy Calculation by the Sullivan Method. Third Edition. EHEMU Technical Report.

Low A and Low A (2004) 'Measuring the gap: quantifying and comparing local health inequalities.' Journal of Public Health, 26, pp 388-395.

MacIntyre S, MacIver S and Sooman A (1993) 'Area, class and health: should we be focusing on places or people?' Journal of Social Psychology 22 pp 213–234.

Marmot M (2010) 'Fair Society, Healthy Lives; The Marmot Review. Strategic review of Health Inequalities in England post–2010'. The Marmot Review

NHS England (2014) Our Vision and Purpose. NHS England. Accessed 03/02/14

Norman P, Boyle P and Rees P (2005) Selective migration, health and deprivation: a longitudinal analysis. Social Science and Medicine. 60(12): 2755-2771

Olatunde O, White C and Smith M P (2010) 'Life expectancy and disability–free life expectancy estimates for middle super output areas; England, 1999–2003.' Health Statistics Quarterly, 50, pp 33–65.

ONS (no date) Super Output Areas (SOAs). Office for National Statistics. Accessed 14/02/14.

ONS (2012) South East has biggest share of the wealthiest households. Office for National Statistics.

ONS (2013a) Update to the Methodology used to Calculate Health Expectancies. Health Statistics Quarterly Spring 56:1

ONS (2013b) Inequality in Disability-Free Life Expectancy by Area Deprivation: England, 2003–06 and 2007–10. Office for National Statistics.

ONS (2013c) Healthy Life Expectancy at birth for Upper Tier Local Authorities: England 2009-11. Office for National Statistics.

ONS (2013d) Interim Life Tables, 2010-2012. Office for National Statistics.

Pell J P, Haw S, Cobbe S, Newby D E, Pell A C H, Fischbacher C, McConnachie A, Pringle S, Murdoch D, Dunn F, Oldroyd K, MacIntyre P, O'Rourke B and Borland W (2008) Smoke-free Legislation and Hospitalizations for Acute Coronary Syndrome. The new England Journal of Medicine. 359: pp. 482-491.

PHE (2013) English Indices of Deprivation 2010 - adjustments to align scores with 2011 boundaries for Lower Layer Super Output Areas (LSOAs). Public Health England.

PHE (no date) What we do. Public Health England. Accessed 03/04/14

Rasulo D, Bajekal M and Yar M (2007) 'Inequalities in health expectancies in England and Wales – small area analysis from the 2001 Census.' Health Statistics Quarterly 34 pp 35–45.

Reves (no date) Network on Health Expectancy

Sims M, Maxwell R and Gilmore A (2013) Short-term impact of the smoke free legislation in England on emergence hospital admissions for asthma among adults: a population-based study. Thorax. 68. Pp 619-624.

Smith M P, Olatunde O and White C (2010a) 'Monitoring inequalities in health expectancies in England – small area analyses from the Census 2001 and General Household Survey 2001–05,' Health Statistics Quarterly, 46, pp 53–70.

Wellcome Trust (no date) London's Pulse: Medical Officer of Health reports 1848-1972. Wellcome Library. Accessed 27/02/2014.

White C, R Wiggins, D Blane, A Whitworth and M Glickman (2005) 'Person, place or time? The effect of individual circumstance, area and changes over time on mortality in men 1995-2001' Health Statistics Quarterly, 28, pp 18-26.

WHO (2011) World Report on Disability.

Background notes

1. A quality and methodology information report for ONS health expectancies (185.7 Kb Pdf) is available on the ONS website. Quality and methodology information reports are overview notes which pull together key qualitative information on the various dimensions of statistical quality as well as providing a summary of the methods used to compile the particular output.

2. Enquiries relating to these statistics should be made to:

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6. Media contact:

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