

## Slope Index of Inequality Briefing

### *Key messages*

- The Slope Index of Inequality (SII) is a measure of the **difference** in life expectancy between the most and least deprived sections of the local population. Included in the proposed NHS Public Health Outcomes Framework, it is used as part of the assessment of health inequalities. The London and East Midlands Health Observatories have recently updated the indicator and it is now available for 2006-10.
- The SII is sensitive to local population characteristics (e.g. location of care homes, accuracy of local population data for small areas). In some cases, this can lead to inconclusive results.
- Westminster continues to have the largest gap in life expectancy between the most and least deprived areas of anywhere in England. This is nearly 17 years for men and nearly 10 years for women. The overall increase in life expectancy over the past decade has been largely experienced in the less deprived areas of the borough, with the more deprived areas remaining principally the same.
- In Hammersmith & Fulham, the data suggests a life expectancy gap of nearly 8 years for men and just over 5 years for women. This is broadly similar to the national average. The gap appears to have widened over the past 5 years. However, the pattern is not as clear cut as in Westminster, meaning that these figures are less reliable. Like Westminster, the overall increase in life expectancy has been largely experienced in the less deprived areas of the borough, with the more deprived areas remaining almost the same.
- Data for Kensington and Chelsea suggest a life expectancy gap of nearly 7 years for men and 2-3 years for women. This is lower than the national average. There appears to be a narrowing of the gap among women over the past 5 years. However, as in Hammersmith & Fulham, the pattern is not clear cut. Improvements in life expectancy have been similar in both the most and least deprived areas.

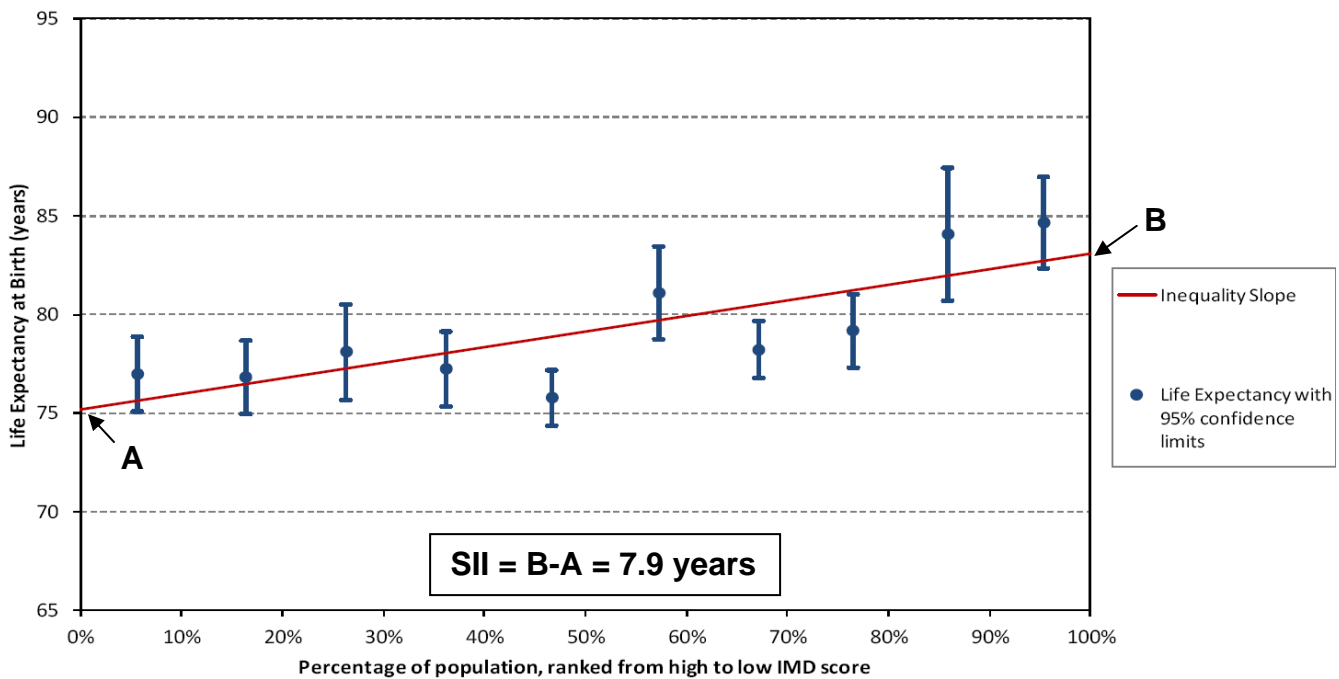
**How does it work?**

The population is divided into ten parts (deciles) by grouping the LSOAs (lower layer super output areas) in the borough by their level of deprivation (using the Index of Multiple Deprivation (IMD)).

Life expectancy is calculated for each of these ten groups and plotted on a graph (blue). A line of best fit (red) is drawn through all of the points, and the difference in life expectancy between the lowest and the highest points on the line is the figure quoted as the Slope Index of Inequality.

Like life expectancy, there is a figure for males and a figure for females. The example below is for males in Hammersmith & Fulham.

**Life Expectancy by Deprivation Deciles, showing the Slope Index of Inequality  
Hammersmith and Fulham PCT, Males, 2006-10  
Slope Index of Inequality = 7.9 years (95% Confidence Interval: 2.8 to 13.0)**



Source: Slope Index of Inequality Data for PCOs - Network of Public Health Observatories

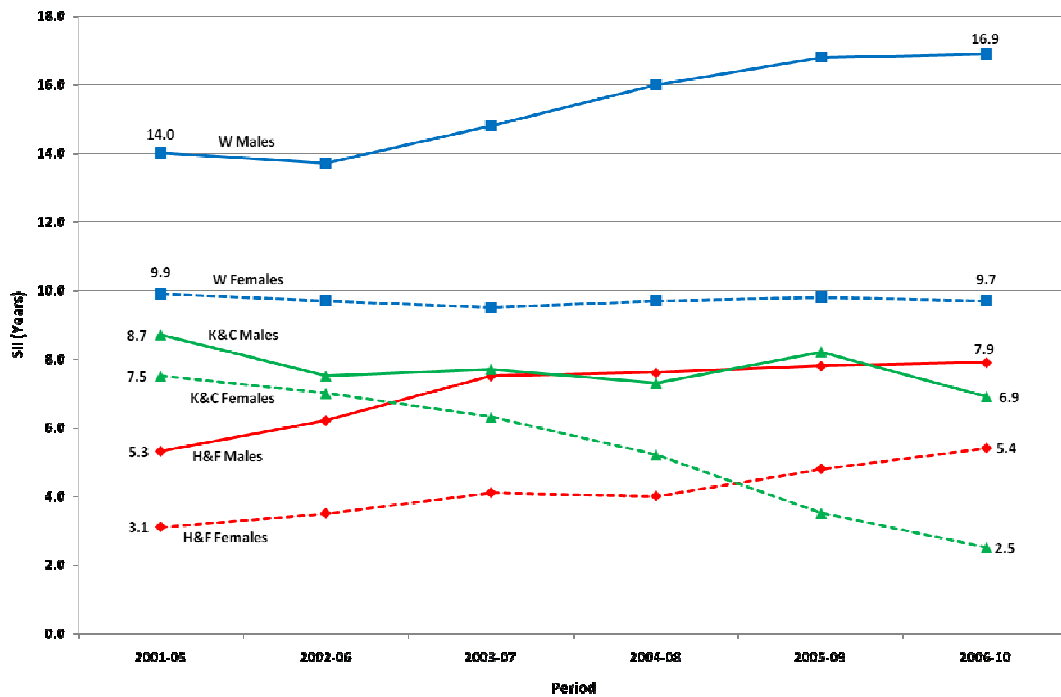
**INWL picture**

Nationally, Westminster is the highest ranked PCT in England, having the highest life expectancy gap for both males and females. Both Hammersmith & Fulham, and Kensington and Chelsea have lower rankings, with the latter having the lowest ranking in the country for females.

	<b>Male SII</b>	<b>National Rank</b>	<b>Female SII</b>	<b>National Rank</b>
H&F	7.9	93	5.4	142
K&C	6.9	119	2.5	151
W	16.9	1	9.7	1

Source: Slope Index of Inequality Data for PCOs - Network of Public Health Observatories

The SII has been measured for the periods 2001-05 to 2006-10. The graph below details the change in the life expectancy gap for the three boroughs in INWL.



Source: Slope Index of Inequality Data for PCOs - Network of Public Health Observatories

Between 2001-05 and 2006-10 there have been different trends across the three boroughs, giving a very mixed picture.

Westminster has continually had the largest gap in life expectancy for both males and females. The male life expectancy gap has been steadily increasing (now standing at 16.9 years), whilst the female gap has remained largely static.

The life expectancy gap in Hammersmith & Fulham has been rising for both males and females. The SII used to be the lowest in INWL for both sexes, but the latest figures show that they are now both higher than Kensington and Chelsea.

In Kensington and Chelsea, the trend is very different to the other boroughs. The life expectancy gap has been falling for both sexes, with the female life expectancy gap showing a particularly marked decrease to 2.5 years.

**What does it mean?**

The SII gives an indication of the difference (the inequality) in life expectancies between the more and less deprived sections of the population. A large number means a large gap, but does *not* reflect the overall life expectancy of the area.

Diverse populations, from very affluent to very deprived, tend to have wider health inequalities and as a result, more likely to have differences between the different population deciles. This would tend to be represented by a higher SII. More stable and uniform populations will tend to have a lower SII, reflecting smaller differences in population structure.

The SII is a better estimation for some populations than others. For example, the graph above shows data for Hammersmith & Fulham. You can see that the line of best fit (red line) does not marry well with the life expectancies (blue dots).

This can also be said of Kensington and Chelsea, where the life expectancies are even more spread out. This could account for some of the contradictory trends seen in the SII figures for INWL.

Westminster has a significantly better fit to the SII and can be viewed as a more reliable figure than the other boroughs, further highlighting the extent of inequality in the City.

The SII describes the extent of overall inequalities in life expectancy within the local population, but cannot attribute the inequalities to any one cause.

There are many factors which influence the inequality in life expectancy within an area. The number of deaths can vary from year to year, from random variation. Other factors include particular local lifestyle and behavioural characteristics. For example, how services are accessed by different parts of the population, e.g. the amount of care homes or nursing homes in a particular area can influence death rates. Also, if a population is particularly mobile, this makes it more difficult to estimate population levels, influencing life expectancy estimates. The width of the confidence intervals, around the SII, give an indication of the degree of uncertainty around the calculated values.<sup>1</sup>

Points A and B on the SII chart give highest and lowest life expectancy estimates for the borough and can help put the figures into perspective. For example, Hackney has an SII of 3 years (for males), but the best life expectancy is still worse than the lowest for Kensington and Chelsea (males).

**Wider Context**

These figures cannot be viewed in isolation. Overall life expectancy is rising, and is now above the national average for both males and females in all three boroughs.

Coupled with the increasing SII figures in Hammersmith & Fulham and Westminster, this can be interpreted as the increase being driven by a faster increase in life expectancy in the less deprived sections of the population in those areas.

<b>Life Expectancy</b>	<b>1998-2000</b>	<b>2008-2010</b>
H&F Males	74.1	79.4
H&F Females	80.6	84.3
K&C Males	77.3	85.1
K&C Females	82.3	89.8
W Males	76.3	83.8
W Females	81.8	86.7
E&W Males	75.3	78.5
E&W Females	80.1	82.5

Source: Life expectancy at birth, England and Wales, 1991-1993 to 2008-2010 - ONS

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<sup>1</sup> Further information on the derivation and detail of SII is available from the network of Public Health Observatories at <http://www.apho.org.uk/default.aspx?RID=110504>