

Inequalities in healthy life expectancy by social class and area type: England, 2001–03

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Abstract

Background

Healthy life expectancy (HLE) is an important indicator which combines longevity with health status. This article examines inequalities in HLE by socio-economic position in England, and between Local Authorities (LAs) in the deprived ‘Spearhead group’ and other LAs.

Methods

Census and vital event data available from the ONS Longitudinal Study were used to calculate estimates of HLE based on general health status for each Registrar General’s Social Class (RGSC) in 2001–03, in England as a whole and within the ‘Spearhead group’ and non-Spearhead LAs.

Results

A predominantly linear relationship was present with HLE increasing with rising social class. The differences observed in HLE at birth and at age 65 between people assigned to the professional and unskilled manual social classes were statistically significant and substantial, demonstrating a clear social inequality in the amount of life, the quality of those years lived, the absolute number of healthy life years, and thus the relative proportion of life spent in ‘Good’ or ‘Fairly Good’ health.

HLEs at birth were statistically significantly higher for women than for men in the non-Spearhead LAs for all social classes; however, in the ‘Spearhead group’ of areas higher HLEs in women were only present among the skilled non-manual, skilled manual and partly skilled social classes. This suggests that an interaction effect between sex and area in the level of HLE may be operating.

The magnitude of inequality in HLE between professionals and the unskilled manual class in the proportion of life spent in ‘Good’ or ‘Fairly Good’ health also varied between the ‘Spearhead group’ and non-Spearhead LAs: among men, a difference of 6.6 per cent was present in non-Spearhead LAs, compared with 10.6 per cent in the ‘Spearhead group’; among women, the equivalent differences were 5.3 per cent and 7.6 per cent.

Conclusions

The within-class HLEs for men and women were lower in the ‘Spearhead group’ compared with the non-Spearhead LAs, and statistically significantly lower among the intervening social classes for men; among women they are significant for all social classes other than the professional class. The scale of inequalities shown is important for policy responses and understanding of differences in service needs.

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Introduction

Measuring the combined impact of mortality and health status provides greater insight into social differences in health than using measures relying solely on longevity. This article provides analyses of Healthy Life Expectancy (HLE) by the Registrar General's Social Class (RGSC) in England, and also compares the social patterns observed in those local authorities (LAs) which are in the Department of Health's 'Spearhead group' with other LAs. The 'Spearhead group' of LAs are those identified as the most deprived in England.

This analysis was funded by the Department of Health, as part of a wider programme of work focusing on the measurement of inequalities in health.

A companion article, in the same edition of Health Statistics Quarterly, presents a similar analysis for disability-free life expectancy (DFLE).

Background

The influence of socio-economic position and area characteristics on life chances and risk of illness has been the subject of detailed investigation during the last 30 years.^{1,2,3,4,5} For example, the Office for National Statistics (ONS) has reported social differences in life expectancy (LE) by the RGSC between 1972–76 and 2001–05.^{6,7,8,9} Further analyses reported inequalities in major causes of death and illness across a range of socio-economic characteristics including socio-economic position, tenure, car ownership and area deprivation;^{10,11,12,13,14,15,16,17} while others separate out the effect of factors connected with the individual, such as lifestyle, housing tenure and social mobility, from the contextual effects of the area.^{18,19,20,21} All these analyses found a clear social gradient, with those exposed to social disadvantage, however defined, experiencing a raised level of mortality or limiting long-term illness (LLTI) than more advantaged groups.

Since the 1990s, analyses of HLE have been widely reported. Ecological studies have investigated the influence of area deprivation on HLE, both in Great Britain^{22,23,24} and abroad.^{25,26} British results show that males and females living in the most deprived fifth of electoral wards spend twice as many years of life in poor general health, both in absolute (i.e. number of years) and relative (i.e. proportion of life) terms, compared with those living in the most affluent fifth of wards.²⁴ Analyses by administrative geography using the decennial census of population in 2001 observed a marked gap in HLE between local authority areas: those areas with higher LE also experienced higher HLE, suggesting individuals in areas with high LE are advantaged both in longevity overall and longevity in states of 'Good' or 'Fairly Good' general health.²⁷

The Department of Health's 'Spearhead group' of LAs consists of those identified as the most deprived in England. The criteria were reported in the Government's Spending Review of 2004. The 'Spearhead group'²⁸ (see Annex, Table A1) consists of those LAs placed in the bottom fifth nationally in three or more of the following five indicators:

- Male LE at birth
- Female LE at birth
- Cancer mortality rate in the under 75s
- Cardiovascular disease mortality rate in the under 75s

- Index of Multiple Deprivation 2004 (local authority summary) average score

The objectives of this article are to report the pattern in HLE by socio-economic position, the scale of inequality in England, and to determine the consistency of this pattern and its scale between the ‘Spearhead group’ and non-Spearhead LAs.

Methods

Data source and study population

The results presented are based on the data available in the ONS Longitudinal Study (LS).^{29,30} The LS is a 1 per cent representative sample of the population of England and Wales, containing linked census and life events records since 1971, including births, deaths and embarkations. The linking of census records enables researchers to take account of historical census characteristics of those LS members with census histories. In this research, use of linked individual data and household level data has facilitated the attribution of social class based on occupation and employment status for those without occupational details recorded at 2001, allowing these study members to be included in the analysis.

The selection criteria which were applied to select the study population for this analysis are shown in Box 1. The study population was followed for mortality and embarkation events occurring in the period 29 April 2001 until the end of December 2003; those LS members who left the country during the follow-up period contributed person years of risk up to the point of embarkation. Health status is determined using responses to the general health question included on the 2001 Census form and is assumed to remain constant throughout the entirety of the follow-up period.

Box 1 Selection criteria

All members of the ONS Longitudinal Study who:

- were enumerated at the Census of population in 2001 as resident in England
- could be assigned a valid RGSC class from their own census records or those of family members
- were traced at the National Health Service Central Register, ensuring the correct linkage of census and death records
- had a 2001 Census record containing a completed general health question with which to determine health status

A total of 510,365 LS members resident in England were enumerated at the 2001 Census: of these, 472,560 were traced at the National Health Service Central Register, could be allocated a social class, and had general health data available. Among the study population, a total of 12,091 deaths and 881 embarkations were recorded, and they contributed a total of 1,238,031 person years of risk.

In this analysis the person years of risk contributed, rather than the number of people included, were used to calculate all mortality and prevalence rates of 'Not Good' general health in order to reflect the duration of time in the given health state assumed, and take account of the ageing of the study population during follow-up.

Allocation of social class

Linked census records from 1971 onwards and the records of family members residing in the LS member's household were used to assign an RGSC class, based on an algorithm of assignment used previously in analyses of LE by social class.⁹ The six RGSC classes used in this analysis, with examples of the occupations included in each class, are shown in Box 2.

Box 2 Registrar General's Social Class based on occupation

Class description	Examples of occupations:
Non-manual	
I Professional	Doctors, chartered accountants, professionally qualified engineers
II Managerial & technical/intermediate	Managers, journalists, school teachers
IIIN Skilled non-manual	Clerks, cashiers, retail staff
Manual	
IIIM Skilled manual	Supervisors of manual workers, plumbers, electricians, goods vehicle drivers
IV Partly skilled	Warehousemen, security guards, machine tool operators, care assistants, waiters and waitresses
V Unskilled	Labourers, cleaners and messengers

In allocating an RGSC social class, priority was given to the study member's own first reporting of occupation and employment status at a census. If an LS member's own social class was not available, social class was allocated on the basis of other household members in the following order: firstly, the member's spouse; secondly, the member's parents (father's or failing that mother's). For those study members aged less than 16 years in 2001, social class was assigned on the basis of parental social class reported in 2001 (father's or failing that mother's). This follows the approach to social class allocation used in analyses of LE by social class reported by ONS using the LS.^{6,7,9}

Calculation of healthy life expectancy

The standard method, based on the Sullivan Life Table (the 'Sullivan method') was used to calculate HLE at birth and at age 65 for each social class for England as a whole and for those living in the 'Spearhead group' and non-Spearhead LAs in 2001. The steps in this calculation are

recorded in Box 3.

Box 3 The Sullivan method for calculating HLE

- 1 For each age/sex group obtain the life table schedules l_x and the expectation of life e_x for the period of interest. Calculate ${}_nL_x = e_x l_x - e_{x+n} l_{x+n}$ where ${}_nL_x$ is the conventional life table measure of the average number of years lived in the age interval x to $x+n$
- 2 Obtain the 'Not Good' health rate ${}_nd_x$ in each age group observed in a study population. Calculate the average number of persons aged x to $x+n$ living in 'Good' or 'Fairly Good' health in each age/sex group as ${}_nLWD_x = {}_nL_x (1 - {}_nd_x)$
- 3 Calculate life expectancy in a state of 'Good' or 'Fairly Good' health as $HLE_x = (\sum_n LWD_x) / l_x$ and the summation is from age x upwards.
- 4 Calculate the variation in the precision due to the variance in the probability of the prevalence part of HLE and due to the variance in the mortality part of HLE

The variance in the mortality part of HLE is given as:

$$\sum_{x=0}^{W-1} \{l_x^2 [(1 - a_x)n(1 - \pi_x) + HLE_{x+n}]^2 S^2(p_x)\} / l_x^2$$

while the variance of the prevalence part is given as:

$$S^2(HLE_x) \approx \frac{1}{l_x^2} \sum_{x=0}^W L_x^2 \frac{\pi_x (1 - \pi_x)}{N_x}$$

where N_x is the number of persons in the age interval taking part in the study

l_x is the probability of survival to age x

L_x is person years lived in the age interval in 'Good' or 'Fairly Good' health

π_x is the proportion of people in age interval in 'Not Good' health

Therefore, the total variance from which the standard errors and CIs are calculated is given as:

$$\sum_{x=0}^{W-1} \{l_x^2 [(1 - a_x)n(1 - \pi_x) + HLE_{x+n}]^2 S^2(p_x)\} / l_x^2 + S^2(HLE_x)$$

The HLE measure is based on self-reported general health, making use of the 2001 Census general health question, as shown in Box 4.

The measure was computed at birth and at age 65 for each sex and social class in each area type (i.e. 'Spearhead group' and non-Spearhead LAs). The HLE estimates are calculated by combining age and sex specific mortality rates (life tables), with age and sex specific rates of 'Good' or 'Fairly Good' general health. HLE at birth is defined as the average number of years a new-born baby

would live in 'Good' or 'Fairly Good' health if he or she experienced the particular social class's age and sex specific mortality and general health prevalence rates (during the period of interest) throughout his or her life beyond birth.

This measure reflects the current mortality and general health experience among those assigned an RGSC social class: they do not indicate how long people in a specific social class can expect to live in future in 'Good' or 'Fairly Good' health. This is because mortality and general health rates are likely to change in the future; a person's socio-economic position may also change during their life.

Box 4 2001 Census general health question

Over the last 12 months would you say your health has on the whole been.....?

- Good
- Fairly Good
- Not Good

Those responding 'Good' and 'Fairly Good' were classified as in 'Good' general health

The extent of self-reporting of general health by household members across the age spectrum is uncertain. While those of working age are likely to have completed the individual census form themselves, it is likely that a significant proportion of those aged 15 years or younger will have had this question completed on their behalf by an adult household member.

Results

The results are described in three sections: firstly, a socio-demographic overview; secondly, HLE is reported by the RGSC class breakdowns for England as a whole; and thirdly, class-specific absolute and relative HLEs in the 'Spearhead group' are compared with those in the non-Spearhead LAs.

Socio-demographic overview

The distribution of deaths and person years of risk within the study population for each social class are presented in Table 1.

Table 1 **Distribution of deaths and person years of risk by social class: England, 2001–03**

RGSC	Men			Women		
	Deaths	Person Years	% Person years	Deaths	Person Years	% Person years
Non-manual	2,183	251,808.3	41.7	2,759	300,057.5	47.3
I Professionals	314	42,346.6	7.0	165	35,179.4	5.6
II Managerial and technical/ Intermediate	1,205	134,629.1	22.3	1,098	140,109.4	22.1
IIINM Skilled non-manual	664	74,832.6	12.4	1,496	124,768.7	19.7
Manual	3,819	352,382.3	58.3	3,330	333,782.4	52.7
IIIM Skilled manual	2,331	220,912.6	36.6	1,339	184,161.2	29.1
IV Partly skilled	1,041	96,910.2	16.0	1,439	113,347.0	17.9
V Unskilled	447	34,559.5	5.7	552	36,274.2	5.7
Total	6,002	604,190.6	100.0	6,089	633,839.9	100.0

The distribution of person years among men shows that the proportion of the study population assigned to a social class at the extremes of the RGSC scale (RGSC classes I and V) approximates to an eighth of the total population; the equivalent proportion among women is about a ninth of the population.

This socio-demographic pattern was largely repeated when examining the class distributions within the ‘Spearhead group’ and the non-Spearhead LAs (Tables 2 and 3). The proportion of men assigned to a manual social class (RGSC classes IIIM, IV and V) in the ‘Spearhead group’ was higher than in the non-Spearhead LAs: more than two-thirds in the former compared with approximately a half in the latter. There was also both a higher concentration of men assigned to the unskilled manual social class (RGSC class V) and a lower concentration of professional men (RGSC class I) in the ‘Spearhead group’ than the average for England as a whole (shown in Table 1).

Table 2 **Distribution of deaths and person years of risk by social class in men: England, 2001–03**

RGSC	'Spearhead group'			Non-Spearhead LAs		
	Deaths	Person Years	% Person years	Deaths	Person Years	% Person years
Non-manual	425	52,172.4	31.3	1,758	199,636.0	45.6
I Professionals	51	7,942.8	4.8	263	34,403.8	7.9
II Managerial and technical/ Intermediate	200	26,156.3	15.7	1,005	108,472.8	24.8
IIINM Skilled non-manual	174	18,073.2	10.8	490	56,759.4	13.0
Manual	1,240	114,544.7	68.7	2,579	237,837.7	54.4
IIIM Skilled manual	756	68,141.5	40.9	1,575	152,771.1	34.9
IV Partly skilled	322	32,812.2	19.7	719	64,098.0	14.7
V Unskilled	162	13,591.0	8.2	285	20,968.6	4.8
Total	1,665	166,717.0	100.0	4,337	437,473.6	100.0

Table 3 **Distribution of deaths and person years of risk by social class in women: England, 2001–03**

RGSC	'Spearhead group'			Non-Spearhead LAs		
	Deaths	Person Years	% Person years	Deaths	Person Years	% Person years
Non-manual	589	63,773.2	38.3	2,170	236,284.4	51.4
I Professionals	26	6,461.6	3.7	139	28,717.8	6.3
II Managerial and technical/ Intermediate	219	27,637.5	15.8	879	112,472.0	24.5
IIINM Skilled non-manual	344	29,674.1	17.0	1,152	95,094.6	20.7
Manual	1,129	110,631.1	63.4	2,201	223,151.7	48.6
IIIM Skilled manual	454	58,000.9	33.3	885	126,160.3	27.5
IV Partly skilled	435	38,388.5	22.0	1,004	74,958.9	16.3
V Unskilled	240	14,241.7	8.2	312	22,032.5	4.8
Total	1,718	174,404.3	100.0	4,371	459,436.1	100.0

For women, the contrast in the class distribution between the 'Spearhead group' and non-Spearhead LAs was less striking, but was consistently in the same direction as for men.

Healthy life expectancy by social class for England

A statistical overview of HLE at birth and at age 65 by RGSC is tabulated in the Annex, Table A2, and illustrated in Figures 1 and 2 below.

HLE in men at birth and at age 65 showed a more marked social class inequality than LE. At birth professional men could expect to live 6.7 years longer than unskilled men; the equivalent gap in HLE was 12.5 years.

The scale of differential in HLE at birth between the intervening classes in men is more constrained. For example, HLE between Social classes II and IINM showed no significant difference, although classes II and IINM had significantly higher HLE than men assigned to a manual social class (RGSC classes IIIM, IV and V).

At age 65 a gap of 6.4 years in HLE was present between professionals and the unskilled class. Professional men had significantly higher HLE and unskilled men significantly lower HLE, at birth and at age 65, compared with the intervening social classes.

Figure 1 **HLE at birth in years with 95% confidence intervals by sex and RGSC: England, 2001–03**

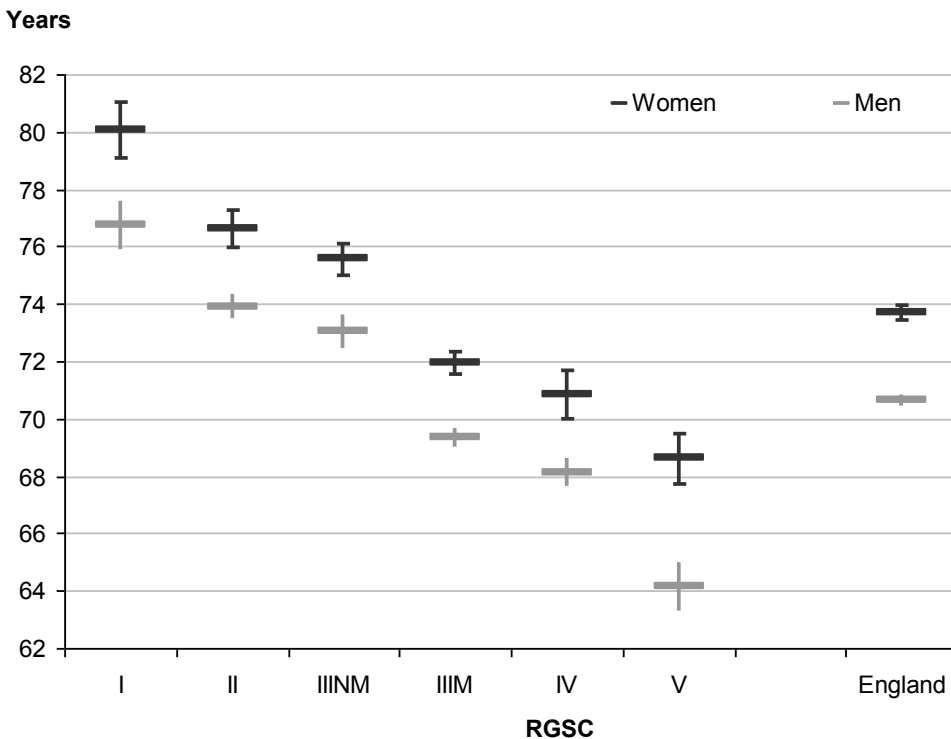
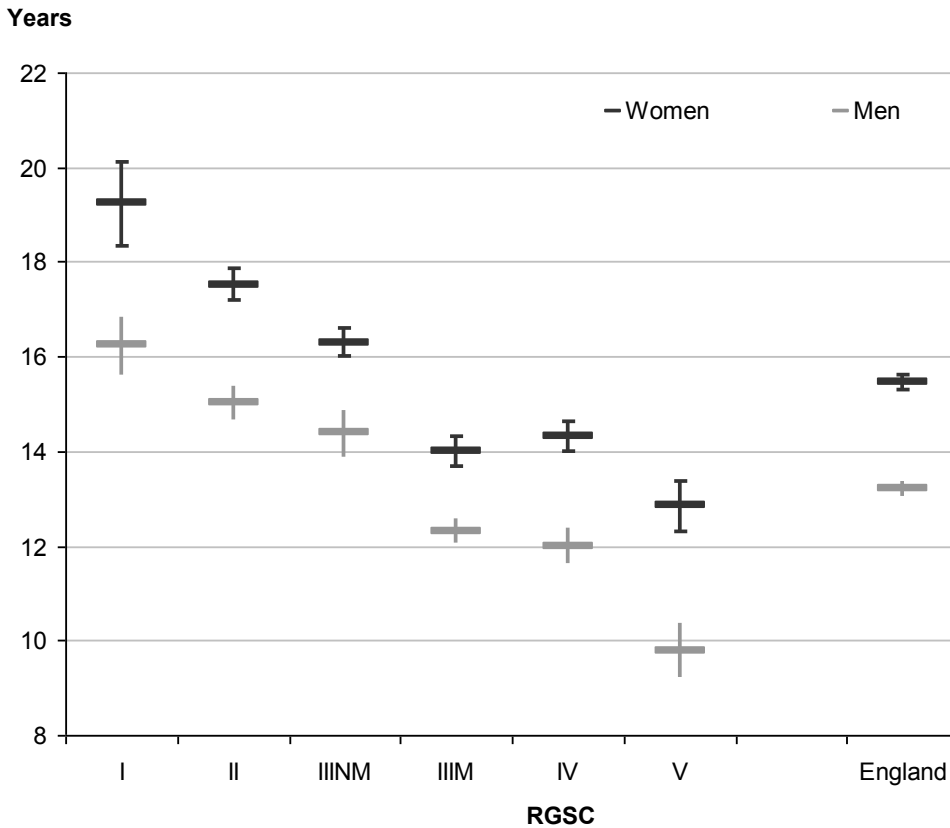


Figure 2 HLE at age 65 in years with 95% confidence intervals by sex and RGSC: England, 2001–03



For women, a similar social pattern is observed. The inequality in HLE at birth and at age 65 substantially exceeds the inequality in LE; professional women at birth could expect to live 80.0 years in ‘Good’ or ‘Fairly Good’ health, while HLE for unskilled women was only 68.6 years. At age 65, the gap in HLE between these classes amounted to 6.4 years.

The gradients in HLE both at birth and at age 65 between professionals and the unskilled are greater than those of LE (Table 4). At birth, approximately twice the magnitude; at age 65, the gradients are larger, but the difference between gradients in LE and HLE are more prominent among men than women.

Table 4 Gradient in LE and HLE between professionals and the unskilled: men and women in England, 2001–03

Sex	LE at birth	HLE at birth	LE at age 65	HLE at age 65
Men	1.09	1.20	1.31	1.66
Women	1.09	1.17	1.29	1.50

Healthy life expectancy by social class and LA ‘Spearhead’ status

The estimates of HLE at birth and at age 65 for RGSC classes in the ‘Spearhead group’ and non-Spearhead LAs are reported in the Annex, Table A3. The social pattern of HLE in both the ‘Spearhead group’ and Non-Spearhead LAs is largely consistent with the national pattern for England. However, the within-class level of HLE is lower in the ‘Spearhead group’.

Among men in the professional and unskilled social classes, no statistically significant differences in HLE at birth between the ‘Spearhead group’ and non-Spearhead LAs were present. Among men in the other social classes, however, those residing in the ‘Spearhead group’ had a statistically significant lower HLE compared with those residing in non-Spearhead LAs (Figure 3).

Among women, in all social classes other than the professional class, statistically significant lower HLEs at birth were present in the ‘Spearhead group’ (Figure 4).

Figure 3 **HLE at birth in years by RGSC & Spearhead area status: men in England, 2001–03**

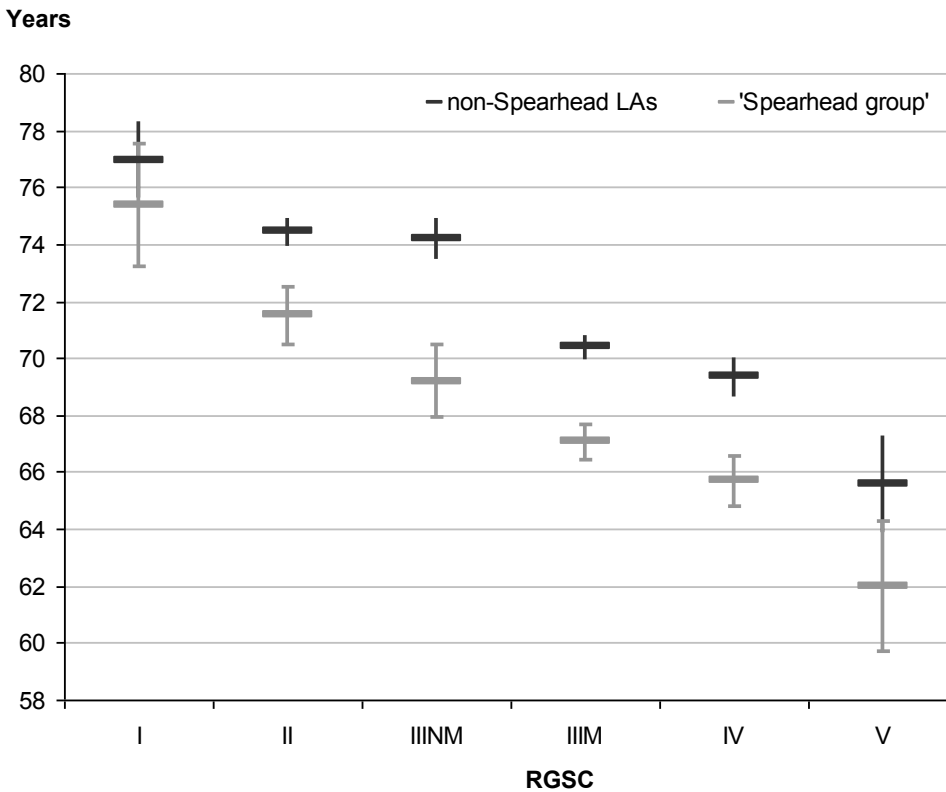
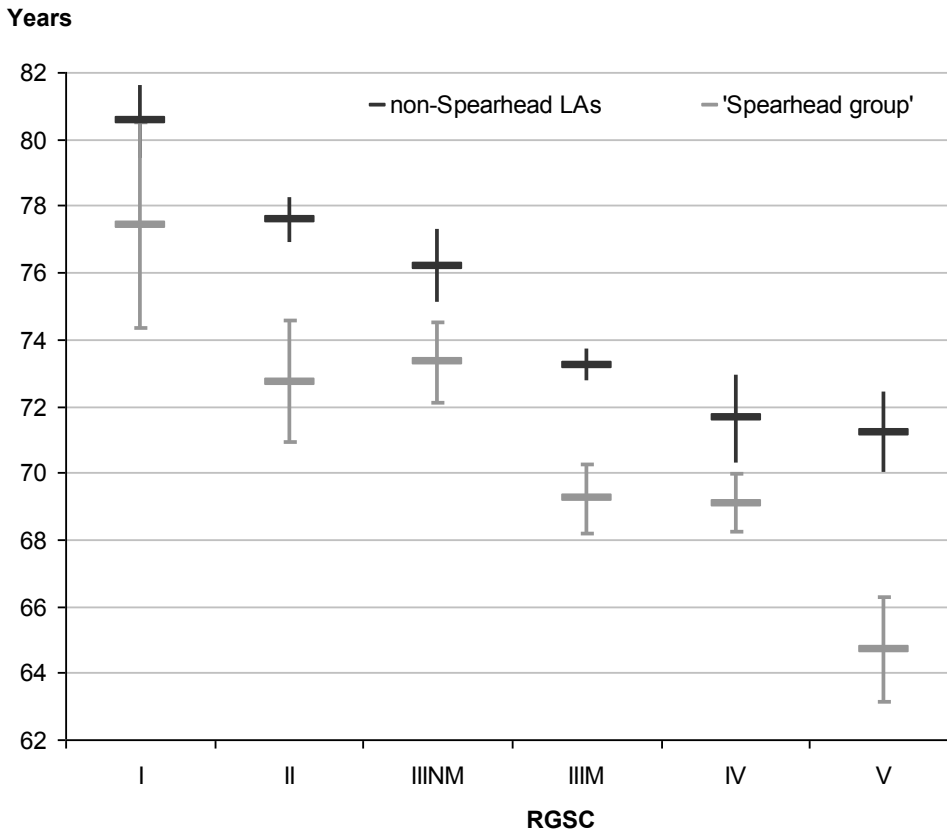


Figure 4 **HLE at birth in years by RGSC & Spearhead area status: women in England, 2001–03**



At age 65, skilled non-manual, skilled manual and partly skilled men had significantly lower HLE if resident in the 'Spearhead group'. Among women at age 65, all social classes other than the professional class had statistically significantly lower HLE in the 'Spearhead group' (Annex 3).

The highest HLE at birth was found among professional women living in the non-Spearhead LAs where expectation of life in 'Good' or 'Fairly Good' general health is 80.5 years. The lowest HLE of 62.0 years was found in unskilled men in the 'Spearhead group', representing a gap of 18.5 years in total. In general, the effect of living in the 'Spearhead group' was smaller than the effect of social class, but added to the magnitude of inequality.

The gap in HLE at birth between professional and unskilled men was greater in the 'Spearhead group' than the non-Spearhead LAs (Table 5), at 13.4 years in the former and only 11.4 years in the latter. A similar contrast is observed for women. At age 65, the gap was greater in the 'Spearhead group' only for women. Table 6 compares the differences in HLE for individuals living in the 'Spearhead group' and the non-Spearhead LAs within each social class, separately for men and women at birth and at age 65.

Table 5 **Inequality in HLE at birth and at age 65 by ‘Spearhead’ classification: men and women in English LAs, 2001–03**

non-Spearhead LAs	MEN		WOMEN	
RGSC	HLE at birth	HLE at age 65	HLE at birth	HLE at age 65
Professionals	77.0	16.4	80.5	19.6
Unskilled	65.6	10.3	71.2	13.9
Inequality gap	11.4	6.1	9.3	5.7
‘Spearhead group’	MEN		WOMEN	
RGSC	HLE at birth	HLE at age 65	HLE at birth	HLE at age 65
Professionals	75.4	15.1	77.4	17.2
Unskilled	62.0	9.2	64.7	11.2
Inequality gap	13.4	5.9	12.7	6.0
Difference in gap between areas	2.0	-0.2	3.4	0.3

The second section of Table 6 reports the combined effect of social class and area. For HLE at birth in men and women there were differences of 15 and 16 years respectively between professionals in non-Spearhead LAs and the unskilled living in the ‘Spearhead group’. The difference in the proportion of life spent in ‘Good’ or ‘Fairly Good’ health was between 9 and 12 per cent.

For HLE at age 65 in men and women, a difference of 7 and 8 years was present between professionals living in non-Spearhead LAs and the unskilled living in the ‘Spearhead Group’. The comparable difference in the proportion of life spent in ‘Good’ or ‘Fairly Good’ health was approximately 23 per cent for men and 16 per cent for women.

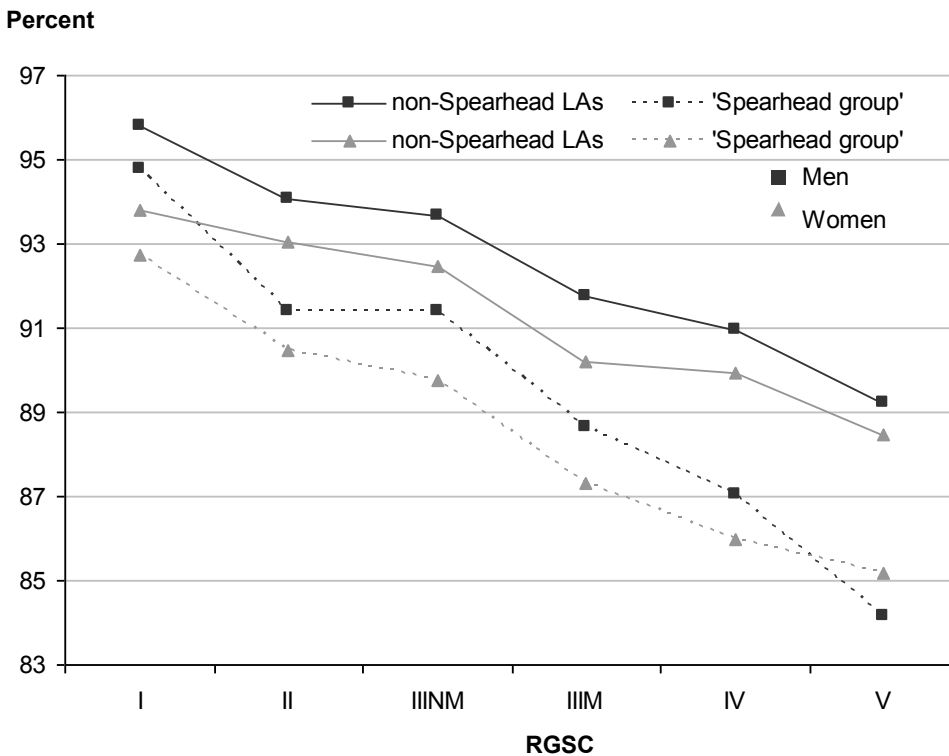
Relative differences in healthy life expectancy by LA ‘Spearhead’ status

The relative inequality between social classes and between the ‘Spearhead group’ and non-Spearhead LAs is also substantial, indicating that those in disadvantaged circumstances have not only a shorter expectation of life, but also a shorter expectation of life in ‘Good’ or ‘Fairly Good’ health (Figure 5).

Table 6 **Differences in HLE at birth and at age 65 by RGSC between 'Spearhead' and non-Spearhead areas: men and women in English LAs, 2001–03**

non-Spearhead – 'Spearhead' areas	Healthy Life Expectancy at Birth		Healthy Life Expectancy at age 65	
	Years of life spent in good health	Proportion of life spent in good health	Years of life spent in good health	Proportion of life spent in good health
RGSC				
Men				
I	1.6	1.0%	1.4	2.3%
II	2.9	2.7%	0.9	5.9%
IIINM	5.0	2.3%	2.0	4.5%
IIIM	3.3	3.1%	1.6	6.6%
IV	3.6	3.9%	1.1	6.2%
V	3.6	5.1%	1.1	7.2%
Women				
I	3.1	3.1%	2.4	-0.3%
II	4.9	4.9%	1.7	5.8%
IIINM	2.9	2.9%	1.6	6.0%
IIIM	4.0	4.0%	1.8	5.9%
IV	2.5	2.5%	1.6	7.4%
V	6.5	6.5%	2.7	7.2%
Inequalities by sex, RGSC and 'Spearhead' classification				
Professional men non-Sp - unskilled men 'Spearhead'	15.0	11.7%	7.3	23.2%
Professional women non-Sp - unskilled women 'Spearhead'	15.8	8.6%	8.4	16.4%
Professional women non-Sp - unskilled men 'Spearhead'	18.5	9.6%	10.5	18.5%

Figure 5 Per cent of Life Expectancy at birth spent in 'Good' or 'Fairly Good' health by RGSC and 'Spearhead' classification: men and women in English LAs, 2001–03

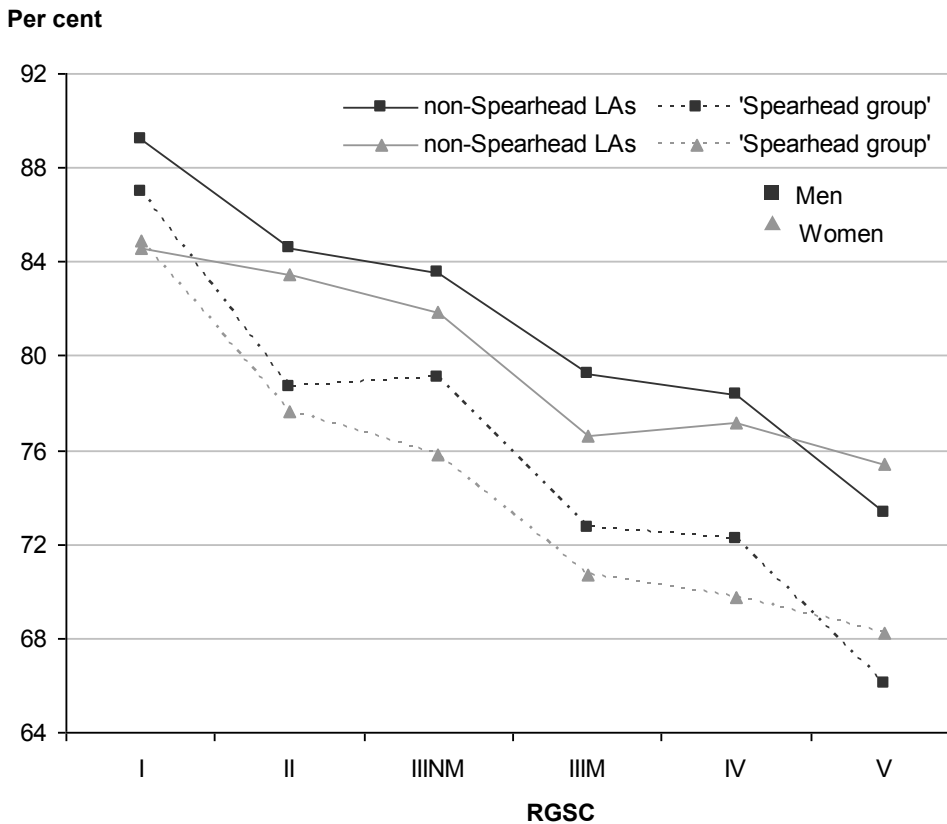


The results across social classes generally show that men, although living shorter lives than women, spend a higher proportion of their LE in states of 'Good' or 'Fairly Good' health, in each type of area. Both sexes predominantly conform to a pattern of deterioration in the proportion of LE spent in 'Good' or 'Fairly Good' health with increasing socio-economic disadvantage. The influence of area of residence is clearly present: for each social class, men and women experience higher proportions of life spent in 'Good' or 'Fairly Good' health if they live in a non-Spearhead LA; the magnitude of difference is most pronounced among unskilled men and women and least pronounced among professionals.

The magnitude of inequality between professionals and the unskilled in the proportion of life spent in 'Good' or 'Fairly Good' health also varied between the 'Spearhead group' and non-Spearhead LAs: among men, a difference of 6.6 per cent was present in non-Spearhead LAs, compared with 10.6 per cent in the 'Spearhead group'; among women, the equivalent differences were 5.3 per cent and 7.6 per cent respectively.

The deterioration in the proportion of LE spent in 'Good' or 'Fairly Good' health with increasing socio-economic disadvantage found at birth also applies at age 65; a clear relative disadvantage was present among men and women assigned to the manual social classes (RGSC classes IIIM, IV and V) compared with their counterparts assigned to the non-manual social classes (RGSC classes I, II and IIINM). Figure 6 shows HLE relative to LE for men and women at age 65 by social class in the 'Spearhead group' and non-Spearhead LAs.

Figure 6 Per cent of Life Expectancy at age 65 spent in 'Good' or 'Fairly Good' health by RGSC and 'Spearhead' classification: men and women in English LAs, 2001–03



At age 65, unskilled women experience higher proportions of their LE in 'Good' or 'Fairly Good' health compared with men; however, this is reversed for the other social classes in both the 'Spearhead group' and non-Spearhead LAs. The relative HLE of professional women was similar in the 'Spearhead group' to the non-Spearhead LAs, and in professional men, the difference between areas was slightly larger. For the other social classes a strong area type effect was present, with men and women living in the 'Spearhead group' clearly disadvantaged in the terms of the proportion of life expectancy spent in 'Good' or 'Fairly Good' health.

The scale of inequality between professionals and the unskilled manual class in relative HLE is higher at age 65 than at birth; the difference in the gap is also greater in the 'Spearhead group'. For men a difference of 20.9 per cent was found between professionals and the unskilled class; for women, the equivalent difference was 16.6 per cent.

Discussion

In this analysis HLE based on subjective well-being, as recorded by the 2001 Census question on general health, has been compared across RGSC social classes and a grouping of local authorities based on the Department of Health's Spearhead classification.

Healthy life expectancy by social class

The differences observed in HLE at birth and at age 65 between people assigned to the professional and unskilled manual social classes are statistically significant and substantial,

demonstrating a clear social inequality in the amount of life, the quality of those years lived, the absolute number of healthy life years, and thus the relative proportion of life spent in 'Good' or 'Fairly Good' health.

The results of this study suggest a broad four group classificatory pattern of HLE by socio-economic position for men and women at birth and at age 65:

- **Group 1 – Professional social class:** statistically significant higher HLE than all other social classes both in absolute years and relative to longevity
- **Group 2 – Managerial and technical and skilled non-manual social classes:** HLEs in these classes were largely similar to each other; were statistically significantly lower than professionals, but higher than the manual social classes
- **Group 3 – Skilled manual and partly skilled social classes:** most differences in HLE between these two classes were not statistically significant in women; however, among men differences were present in the non-Spearhead LAs and overall at the England level at birth, but not at age 65. These social classes had statistically significant higher HLE than those of the unskilled social class
- **Group 4 – Unskilled:** HLEs were statistically significantly lower than all other social classes

A clear gender divide in HLE was observed with women experiencing higher HLEs at birth and at age 65 than men in every social class. The level of social disparity in HLE is more marked among men than among women, both at birth and at age 65; with smaller gradients observed among women. This may reflect a different level of exposure to occupational hazards brought about by a more distinct occupational membership within specific manual social classes on the part of women, or dissimilar labour market participation profiles leading to lower durations of hazardous occupational exposures. In addition, the lower gradients in HLE found among women may reflect greater heterogeneity in the material circumstances of women assigned to the unskilled social class, compared with that of men, which can arise from differential socio-economic profiles of the spouses or partners.

Healthy life expectancy by social class and LA 'Spearhead' status

The influence of area on class specific HLE at birth has three distinct features:

- firstly, within class HLE was lower in the 'Spearhead group' of areas;
- secondly, HLE at birth was statistically significantly lower in the 'Spearhead group' of areas for women in all social classes other than professionals, while for men significant differences were restricted to the intervening social classes;
- thirdly, the disparity in HLE between the 'Spearhead group' of areas and the non-Spearhead LAs among women assigned to the unskilled social class was particularly marked and highly statistically significant, suggesting the combination of disadvantaged socio-economic position and residency in a disadvantaged area influences women's general health and mortality risk more than that of men.

The resilience, in terms of health status, of the professional class to unfavourable area circumstances found in this analysis is consistent with a threshold of social advantage effect found in previous analyses, which, once achieved, in terms of material affluence and social status, dominates or compensates for the health hazards associated with the area of residence.

HLEs at birth were statistically significantly higher for women than for men in the non-Spearhead LAs for all social classes; however, in the 'Spearhead group' of areas higher HLEs in women are only present among the skilled non-manual, skilled manual and partly skilled social classes. This suggests that an interaction effect between sex and area in the level of HLE may be operating.

Consequently, the comprehensive within class statistically significant higher HLEs experienced by women at the England level were only repeated for HLE at birth in the non-Spearhead LAs. The presence of sex differences in HLE in the 'Spearhead group' is dependent on socio-economic position.

The additive effect of sex, social class and area led to substantial absolute differences in HLE. A professional woman living in one of the non-Spearhead LAs at birth can expect to live 18.6 years longer in 'Good' or 'Fairly Good' health than a man assigned to the unskilled social class living in the 'Spearhead group' of areas.

The sex divide in the proportion of life spent in 'Good' or 'Fairly Good' health is largely inverted to the pattern in absolute differences. Men live shorter lives compared to women, but spend a higher proportion healthy. Consequently, the greater longevity of women is accompanied by longer durations in states of poor health. This suggests that the health and social care needs of women will exceed that of men in each social class and area.

Conclusion

This analysis reports HLE by socio-economic position and 'Spearhead' status, and establishes clear inequalities in the duration of subjective well-being. A predominant linear relationship is present with HLEs increasing with rising social class; however within class HLEs for men and women are lower in the 'Spearhead group' compared with the non-Spearhead LAs, and statistically significantly lower among the intervening social classes for men, and among women all social classes other than the professional class.

The classification of HLE into four distinct social groupings is useful in two respects: firstly, it extends the traditional measure of inequality between the extremes of the social scale by uncovering the presence of inequality between the adjacent social classes; and secondly, it helps to identify the different level of likely service need presented by these distinct groupings.

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Annex

Table A1 Spearhead Local Authority composition 2007

GOR	LA Code	LA Name	GOR	LA Code	LA Name
North East	35UD	Blyth Valley	YATH ¹	00CC	Barnsley
North East	35UG	Wansbeck	YATH ¹	00CX	Bradford
North East	20UB	Chester-le-Street	YATH	00CE	Doncaster
North East	20UD	Derwentside	YATH ¹	00FA	Kingston upon Hull, City of
North East	20UF	Easington	YATH ¹	00FC	North East Lincolnshire
North East	20UG	Sedgefield	YATH ¹	00CF	Rotherham
North East	20UJ	Wear Valley	YATH ¹	00DB	Wakefield
North East	00CH	Gateshead	YATH ¹	17UC	Bolsover
North East	00EB	Hartlepool	East Midlands	34UB	Corby
North East	00EC	Middlesbrough	East Midlands	00FN	Leicester
North East	00CJ	Newcastle upon Tyne	East Midlands	32UD	Lincoln
North East	00CK	North Tyneside	East Midlands	00FY	Nottingham
North East	00EE	Redcar and Cleveland	West Midlands	00CN	Birmingham
North East	00CL	South Tyneside	West Midlands	00CQ	Coventry
North East	00EF	Stockton-on-Tees	West Midlands	44UC	Nuneaton and Bedworth
North East	00CM	Sunderland	West Midlands	00CS	Sandwell
North West	16UC	Barrow-in-Furness	West Midlands	00GL	Stoke-on-Trent
North West	16UD	Carlisle	West Midlands	41UK	Tamworth
North West	00EX	Blackburn with Darwen	West Midlands	00CU	Walsall
North West	00EY	Blackpool	West Midlands	00CW	Wolverhampton
North West	00BL	Bolton	London	00AB	Barking and Dagenham
North West	30UD	Burnley	London	00AL	Greenwich
North West	30UG	Hyndburn	London	00AM	Hackney
North West	30UJ	Pendle	London	00AN	Hammersmith and Fulham
North West	30UM	Rossendale	London	00AP	Haringey
North West	00BM	Bury	London	00AU	Islington
North West	00BX	Knowsley	London	00AY	Lambeth
North West	00BY	Liverpool	London	00AZ	Lewisham
North West	00BN	Manchester	London	00BB	Newham
North West	00BP	Oldham	London	00BE	Southwark

North West	30UK	Preston	London	00BG	Tower Hamlets
North West	00BQ	Rochdale			
North West	00BR	Salford			
North West	00BZ	St. Helens			
North West	00ET	Halton			
North West	00BT	Tameside			
North West	00EU	Warrington			
North West	00BW	Wigan			
North West	00CB	Wirral			

¹Yorkshire and the Humber

Table A2 **Life expectancy and HLE at birth and at age 65 by Registrar General's Social Class: England, 2001-03**

At Birth	Social Class	Life expectancy		Healthy life expectancy		HLE as a proportion of LE (%)
		Years	Years	Lower 95 % confidence interval	Upper 95 % confidence interval	
Men	I	80.2	76.7	75.9	77.6	95.6
	II	78.9	73.9	73.5	74.3	93.6
	IIINM	78.4	73.0	72.5	73.6	93.2
	IIIM	76.4	69.3	69.0	69.7	90.8
	IV	75.9	68.1	67.6	68.6	89.7
	V	73.5	64.2	63.3	65.0	87.3
England		77.1	70.7	70.5	70.9	91.6
UK 2001-03*		75.9	67.1	66.9	67.4	88.4
Women	I	85.5	80.0	79.1	81.0	93.7
	II	82.8	76.6	75.9	77.3	92.6
	IIINM	82.2	75.5	75.0	76.1	91.9
	IIIM	80.6	71.9	71.6	72.3	89.3
	IV	79.9	70.8	70.0	71.7	88.7
	V	78.7	68.6	67.7	69.5	87.2
England		81.3	73.7	73.4	74.0	90.6
UK 2001-03*		80.5	69.9	69.6	70.1	86.8
At age 65						
Men	I	18.3	16.2	15.6	16.9	88.9
	II	17.9	15.0	14.7	15.4	83.7
	IIINM	17.4	14.4	13.9	14.9	82.7
	IIIM	16.0	12.3	12.1	12.6	77.2
	IV	15.7	12.0	11.6	12.4	76.5
	V	13.9	9.8	9.2	10.4	70.5
England		16.5	13.2	13.0	13.4	79.8
UK 2001-03*		16.1	12.0	11.8	12.2	74.5
Women	I	22.7	19.2	18.3	20.1	84.7
	II	21.3	17.5	17.2	17.9	82.4
	IIINM	20.2	16.3	16.0	16.6	80.5
	IIIM	18.7	14.0	13.7	14.3	74.7
	IV	19.1	14.3	14.0	14.6	74.9

	V	17.6	12.8	12.3	13.4	72.8
England		19.7	15.4	15.3	15.6	78.2
UK 2001-03*		19.1	14.0	13.9	14.2	73.3

Note: UK 2001-03* Based on ONS standard HLE calculations published in HSQ 29, 59–62

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Table A3 **Life expectancy and HLE at birth and at age 65, by RGSC in the 'Spearhead group' and non-Spearhead LAs: men and women in English LAs, 2001–03**

At Birth	Life Expectancy				Healthy life expectancy				HLE as per cent of LE	HLE as per cent of LE
	Years		Years		Lower 95 % confidence interval		Upper 95 % confidence interval			
	non-Sp	SG	non-Sp	SG	non-Sp	SG	non-Sp	SG		
Men										
I	80.3	79.5	77.0	75.4	75.6	73.2	78.3	77.5	95.8	94.8
II	79.1	78.2	74.4	71.5	73.9	70.5	74.9	72.5	94.1	91.4
IIINM	79.2	75.7	74.2	69.2	73.5	67.9	74.9	70.4	93.7	91.4
IIIM	76.7	75.6	70.4	67.0	70.0	66.5	70.8	67.6	91.7	88.6
IV	76.2	75.4	69.3	65.7	68.7	64.8	70.0	66.5	91.0	87.1
V	73.5	73.6	65.6	62.0	63.9	59.7	67.3	64.3	89.2	84.2
All classes	77.6	75.9	71.9	67.5	71.6	67.1	72.1	67.9	92.6	88.9
England	77.1		70.6		70.4		70.9		91.6	
UK 2001-03*	75.9		67.1		66.9		67.4		88.4	
Women										
I	85.8	83.5	80.5	77.4	79.4	74.3	81.6	80.5	93.8	92.7
II	83.4	80.4	77.6	72.7	76.9	70.9	78.3	74.5	93.1	90.5
IIINM	82.4	81.7	76.2	73.3	75.1	72.1	77.3	74.5	92.5	89.8
IIIM	81.2	79.3	73.2	69.2	72.7	68.2	73.7	70.2	90.2	87.3
IV	79.6	80.4	71.6	69.1	70.3	68.2	72.9	69.9	89.9	86.0
V	80.5	75.9	71.2	64.7	70.0	63.1	72.4	66.2	88.5	85.2
All classes	81.9	79.8	75.0	70.2	74.7	69.7	75.3	70.8	91.6	88.0
England	81.3		73.7		73.4		74.0		90.6	
UK 2001-03*	80.5		69.9		69.6		70.1		86.8	
At age 65										
Men										
I	18.4	17.3	16.4	15.1	15.8	13.6	17.1	16.6	89.2	87.0
II	17.9	18.1	15.2	14.3	14.8	13.4	15.5	15.1	84.6	78.7
IIINM	17.7	16.2	14.8	12.8	14.3	11.9	15.4	13.8	83.5	79.1
IIIM	16.2	15.5	12.8	11.2	12.6	10.8	13.1	11.6	79.2	72.7
IV	15.8	15.6	12.4	11.3	11.9	10.6	12.8	12.0	78.4	72.2
V	14.0	13.9	10.3	9.2	9.5	8.3	11.0	10.1	73.3	66.1

All classes	16.8	15.9	13.7	11.8	13.5	11.5	13.9	12.1	81.7	74.3
England	16.5		13.2		13.0		13.4		79.8	
UK 2001-03*	16.1		12.0		11.8		12.2		74.5	
Women										
I	23.2	20.3	19.6	17.2	18.7	14.2	20.5	20.2	84.6	84.9
II	21.4	20.9	17.8	16.2	17.5	15.4	18.2	17.0	83.4	77.6
IIINM	20.4	19.8	16.7	15.0	16.3	14.4	17.0	15.7	81.9	75.8
IIIM	19.0	18.1	14.6	12.8	14.2	12.3	15.0	13.4	76.6	70.7
IV	19.2	19.0	14.8	13.2	14.5	12.7	15.2	13.8	77.2	69.7
V	18.5	16.5	13.9	11.2	13.2	10.4	14.7	12.0	75.4	68.2
All classes	20.1	18.8	16.1	13.7	15.9	13.4	16.3	14.0	80.1	72.8
England	19.7		15.4		15.3		15.6		78.2	
UK 2001-03*	19.1		14.0		13.9		14.2		73.3	

non-Sp = non-Spearhead LAs; SG = 'Spearhead group'

UK 2001-03* Based on ONS standard Health Expectancies calculations published in HSQ 29, 59-62

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