Office for National Statistics

Statistical bulletin

Health state life expectancies by national deprivation deciles, England: 2018 to 2020

Life expectancy and years expected to live in "Good" health and "Disability-free" using national indices of deprivation to measure socioeconomic inequalities in England.

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1 . Main points

- In 2018 to 2020, males living in the most deprived areas were living 9.7 years fewer than males living in the least deprived areas, with the gap at 7.9 years for females; both sexes have seen statistically significant increases in the inequality in life expectancy at birth since 2015 to 2017.

- Female healthy life expectancy at birth in the most deprived areas was 19.3 years fewer than in the least deprived areas in 2018 to 2020; for males it was 18.6 years fewer but there were no significant changes in the inequality since 2015 to 2017.

- Male disability-free life expectancy at birth in the most deprived areas was 17.6 years fewer than in the least deprived areas in 2018 to 2020; for females it was 16.8 years fewer but there were no significant changes in the inequality since 2015 to 2017.

- Females and males living in the most deprived areas of England saw a significant decrease in life expectancy between 2015 to 2017 and 2018 to 2020.

- In 2018 to 2020, females living in the most deprived areas were expected to live less than two-thirds (66.3%) of their lives in good general health, compared with more than four-fifths (82.0%) in the least deprived areas.

- There were significant decreases in female disability-free life expectancy at birth in both deprived and less deprived areas between 2015 to 2017 and 2018 to 2020; sizable reductions of almost two years occurred in Decile 2 and Decile 7.

Please note health state life expectancy data includes 2020 data, which means 2020 coronavirus (COVID-19) deaths are included. The data cannot show the full impact of COVID-19 deaths on inequalities.

2 . Life expectancy at birth by the English Index of Multiple Deprivation

All figures in this bulletin have been rounded to 1 decimal place, statistical significance has been determined using unrounded figures.

In the period 2018 to 2020, male life expectancy (LE) at birth in the most deprived areas of England was 73.5 years, compared with 83.2 years in the least deprived areas. For females, the equivalent estimates were 78.3 years and 86.3 years, respectively (Figure 1). Area deprivation in this release is based on the Index of Multiple Deprivation (IMD) 2019 (PDF 2,242 KB).

Figure 1: Large differences in life expectancy at birth between the least and most deprived areas of England continue for both males and females

Life expectancy at birth, England, 2018 to 2020

Figure 1: Large differences in life expectancy at birth between the least and most deprived areas of England continue for both males and females

Life expectancy at birth, England, 2018 to 2020
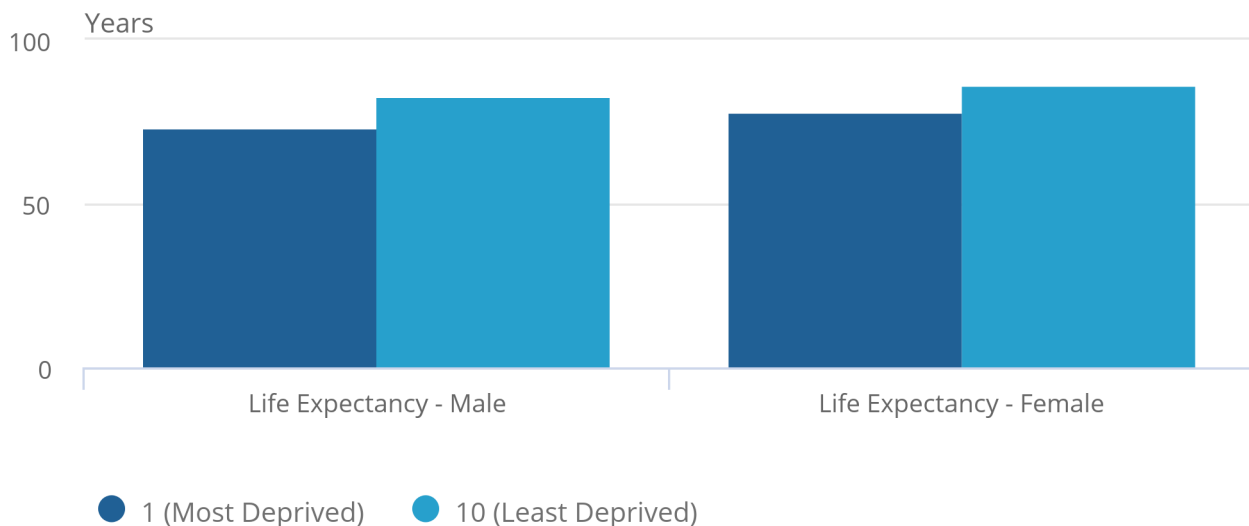
Source: Office for National Statistics

Notes:

1. Life expectancy (LE) includes all usual residents.

2. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

Areas with higher deprivation also have larger differences in LE between males and females than areas with lower deprivation. For example, in the most deprived areas the difference in LE between females and males is 4.8 years, compared with 3.1 years in the least deprived areas. In addition, males living in the least deprived areas have a LE advantage of almost five years over females living in the most deprived areas.

To further explore data for all deciles, see Section 7.

There were statistically significant decreases in male and female LE at birth in the most deprived areas in 2018 to 2020, compared with 2015 to 2017 (Figure 2). For females, this follows a similar pattern previously seen, where there have been decreases in LE since 2011 to 2013. However, for males this is the first time since 2011 to 2013 LE has significantly decreased.

Males in nearly all deciles saw decreases in LE, but these were only significant in Decile 1 (6 months), Decile 2 (3.6 months) and Decile 4 (2.4 months) (Figure 2). Female LE at birth saw a statistically significant fall of 4.8 months in Decile 1. In less deprived areas, Deciles 5 and over, females experienced increases in LE. These were statistically significant in Decile 5, Decile 7 and Decile 9 (Figure 2).

For both males and females living in the least deprived areas (Decile 10), there were no statistically significant changes in LE in 2018 to 2020 compared with 2015 to 2017. This is first time since 2011 to 2013 where there has not been a change, as LE has been steadily increasing over the past 10 years for both males and females living in the least deprived areas.

The mortality increase in 2020 associated with the coronavirus (COVID-19) pandemic has affected LE changes; the most deprived areas experienced the highest rates of death involving COVID-19.

Figure 2: Males and females living in the most deprived areas saw the largest reductions in life expectancy

Change in life expectancy at birth, England, between 2015 to 2017 and 2018 to 2020

Figure 2: Males and females living in the most deprived areas saw the largest reductions in life expectancy

Change in life expectancy at birth, England, between 2015 to 2017 and 2018 to 2020

Months

Deprivation decile (1=most deprived, 10=least deprived)

● Females   ● Males
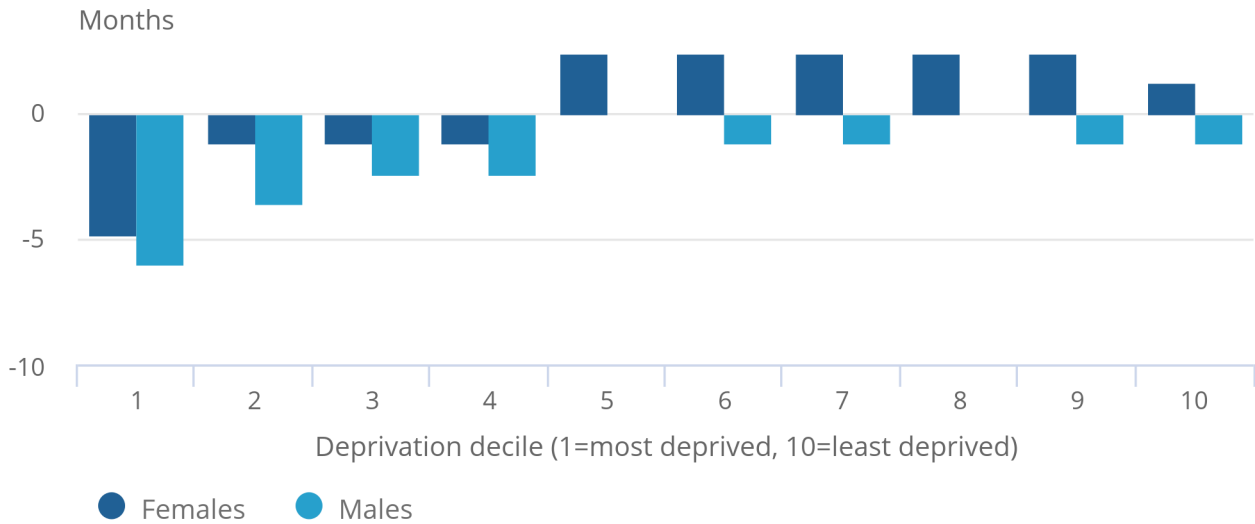
Source: Office for National Statistics

Notes:

1. Life expectancy (LE) includes all usual residents.

2. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

3. Change in LE in months was calculated by multiplying the change in LE in years between 2015 to 2017 and 2018 to 2020, by 12.

4. The absence of columns indicates no change in LE rounded to one decimal place.

3 . Healthy life expectancy at birth by the English Index of Multiple Deprivation

In 2018 to 2020, male healthy life expectancy (HLE) at birth in the most deprived areas was 52.3 years, compared with 70.5 years in the least deprived areas. Female HLE at birth in the most deprived areas was 51.9 years, almost 20 years fewer than those living in the least deprived areas (70.7 years).
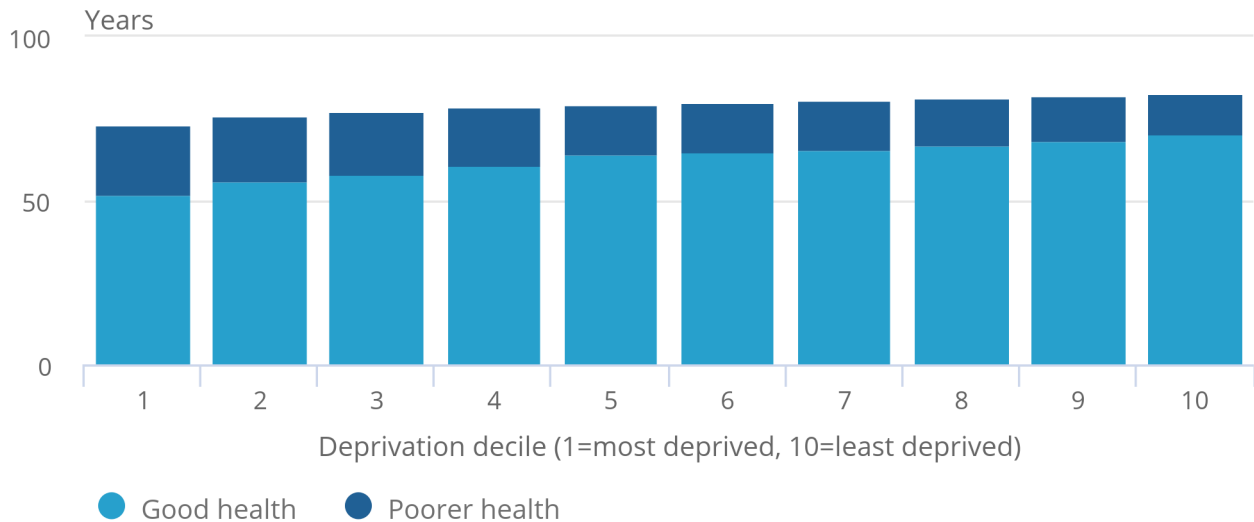
The years lived in poorer states of health (see Glossary for definition) were associated with the level of deprivation exposure for males and females. Years spent in poorer health states decreased progressively from the most deprived areas in Decile 1 (21.2 years for males, 26.4 years for females), to the least deprived areas in Decile 10 (12.7 years for males, 15.6 years for females). With those living in more deprived areas also living shorter lives, this means that they spend a smaller proportion of their lives in good health. See Figure 3 for males and Figure 4 for females.

Figure 3: Males living in the most deprived areas were expected to live less than three-quarters of their lives in good general health

Healthy life expectancy at birth, England, 2018 to 2020

Figure 3: Males living in the most deprived areas were expected to live less than three-quarters of their lives in good general health

Healthy life expectancy at birth, England, 2018 to 2020

Years

Deprivation decile (1=most deprived, 10=least deprived)

● Good health   ● Poorer health

Source: Office for National Statistics – Annual Population Survey, 2011 Census
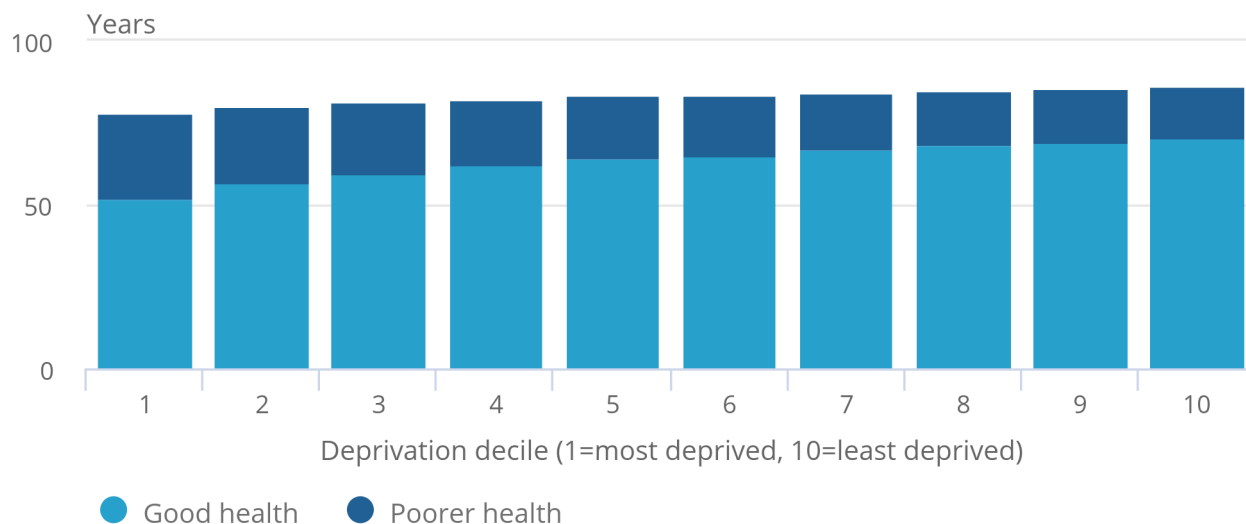
Notes:

1. Mortality data include all usual residents.

2. The health state prevalence estimates used to estimate healthy life expectancy (HLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS excludes residents of communal establishments, except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

3. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

Figure 4: Females living in the most deprived areas were expected to live less than two-thirds of their lives in good general health

Healthy life expectancy at birth, England, 2018 to 2020

Figure 4: Females living in the most deprived areas were expected to live less than two-thirds of their lives in good general health

Healthy life expectancy at birth, England, 2018 to 2020

Source: Office for National Statistics – Annual Population Survey, 2011 Census

Notes:

1. Mortality data include all usual residents.

2. The health state prevalence estimates used to estimate healthy life expectancy (HLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS excludes residents of communal establishments, except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

3. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

Therefore, not only do males and females living in the most deprived areas have shorter life spans overall, but they also live a larger number of years in poorer states of health.

The largest gaps in HLE, between adjacent deciles, were between the two most deprived deciles for both males and females in 2018 to 2020. Males living in Decile 1 were expected to live 4.1 years less in good health, than males in Decile 2. With the difference at 4.9 years for females.

There were no significant changes across all deciles in HLE for males or females between 2015 to 2017, and 2018 to 2020.

4 . Disability-free life expectancy at birth by the English Index of Multiple Deprivation

In 2018 to 2020, male disability-free life expectancy (DFLE) at birth in the most deprived areas was 51.4 years, and 69.0 years in the least deprived areas. For females, it was 50.3 years and 66.4 years, respectively.
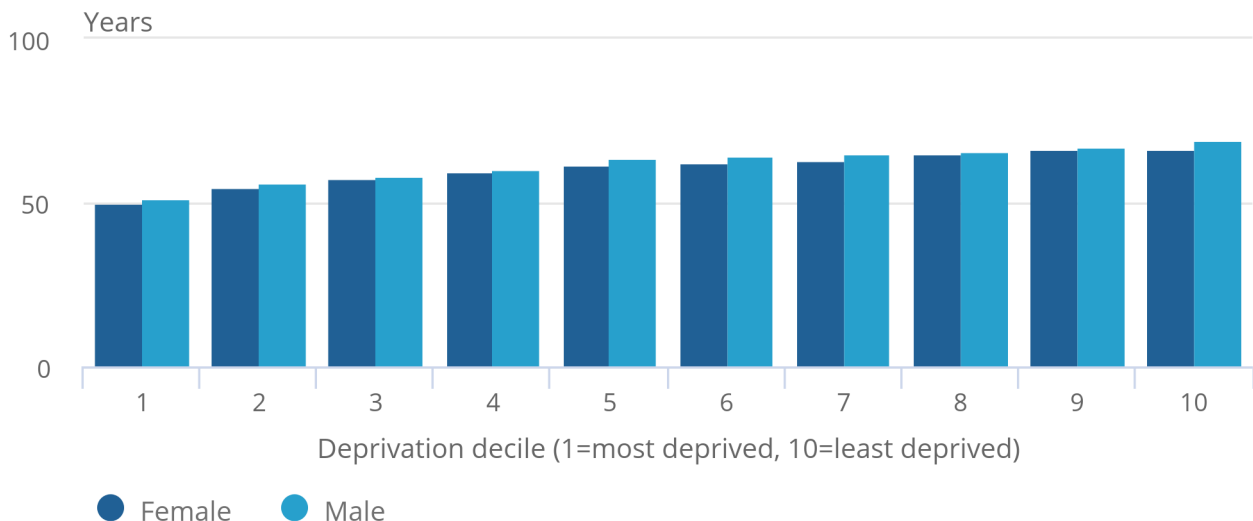
Although males live shorter lives than females across all deciles, they lived a greater number of years "disability-free". Male DFLE at birth was significantly higher than female DFLE in Deciles 2, 5, 6, 7 and 10 (Figure 5).

Figure 5: Male DFLE in the least deprived areas was 2.6 years higher than for females

Disability-free life expectancy at birth, England, 2018 to 2020

Figure 5: Male DFLE in the least deprived areas was 2.6 years higher than for females

Disability-free life expectancy at birth, England, 2018 to 2020

Deprivation decile (1=most deprived, 10=least deprived)

● Female ● Male

Source: Office for National Statistics – Annual Population Survey, 2011 Census

Notes:

1. Mortality data include all usual residents.

2. The health state prevalence estimates used to estimate disability-free life expectancy (DFLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS excludes residents of communal establishments, except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

3. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

Males in Decile 2 saw a significant decrease of 1.3 years in DFLE between 2015 to 2017 and 2018 to 2020. All other decreases were not statistically significant.

There were significant decreases in DFLE at birth for females between these periods, spread across different levels of deprivation (Decile 1, 2, 4, 6 and 7). The largest decreases occurred in Decile 2 (1.9 years) and Decile 7 (1.9 years) (Figure 6).
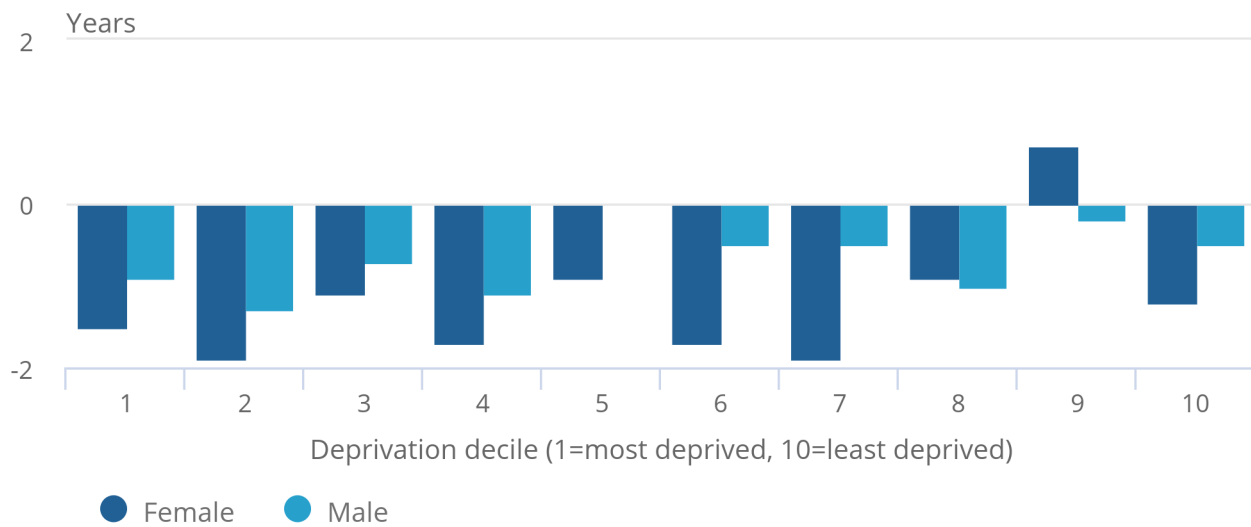
For both males and females, decreases in DFLE are dispersed across levels of deprivation and not limited to deprived areas.

Figure 6: Females saw significant reductions in years lived without disability in several deciles

Change in disability-free life expectancy at birth, England, 2015 to 2017 and 2018 to 2020

Figure 6: Females saw significant reductions in years lived without disability in several deciles

Change in disability-free life expectancy at birth, England, 2015 to 2017 and 2018 to 2020

Source: Office for National Statistics – Annual Population Survey, 2011 Census

Notes:

1. Mortality data include all usual residents.

2. The health state prevalence estimates used to estimate disability-free life expectancy (DFLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS excludes residents of communal establishments, except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

3. Deprivation deciles are based on the Index of Multiple Deprivation 2019 (IMD 2019). Decile 1 represents the most deprived 10% (or decile) of small areas in England, and Decile 10 represents the least deprived 10%.

4. The absence of columns indicates no change in DFLE rounded to one decimal place.

5 . The Slope Index of Inequality for life expectancy and health state life expectancies

The Slope Index of Inequality (SII) is used to assess the absolute inequality in life expectancy (LE) and each health state life expectancy (HSLE), for both healthy life expectancy (HLE) and disability-free life expectancy (DFLE).

The SII is an absolute measure and can be interpreted in the same way as the range between the least and most deprived areas. It also considers inequality across the whole distribution, as well as giving greater weight to larger populations and less weight to smaller populations. This means that the higher the SII, the more unequal the population is with regards to the outcome of interest.

In 2018 to 2020, the inequality gap in male LE stood at 9.7 years; 1.8 years wider than the female gap (7.9 years).

Contrastingly, the inequality gap for female HLE in 2018 to 2020 was wider (19.3 years) than the male gap (18.6 years). The SII in female DFLE at birth in 2018 to 2020 was 16.8 years, compared with 17.6 years for males (Figure 7).

Figure 7: Slope Index of Inequality in female healthy life expectancy at birth was almost two decades

Slope Index of Inequality, life expectancy and health state life expectancies, England, 2018 to 2020
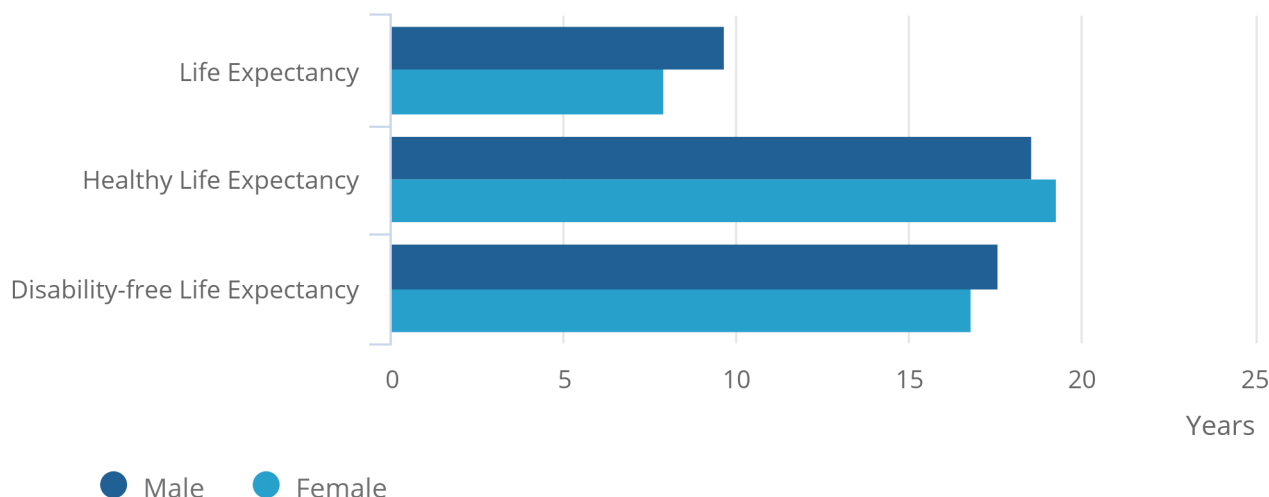
Source: Office for National Statistics – Annual Population Survey, 2011 Census

Notes:

1. Mortality data include all usual residents.

2. The health state and disability prevalence estimates used to estimate healthy life expectancy (HLE) and disability-free life expectancy (DFLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS excludes residents of communal establishments, except NHS housing and students in halls of residence where inclusion takes place at their parents' address.

3. Slope Index of Inequality (SII) is calculated by taking the difference between the extremes of a population weighted regression line of best fit.

There was a significant widening in the disparity in male and female LE at birth between the least and most deprived areas between 2015 to 2017, and 2018 to 2020. This was 0.3 years for males and 0.5 years for females (Table 1).

The changes observed in male and female HLE and DFLE at birth between 2015 to 2017 and 2018 to 2020, were not statistically significant (Table 1).

Table 1: Slope Index of Inequality in life expectancy and healthy life expectancy at birth for males and females England, between 2015 to 2017 and 2018 to 2020

	2015 to 2017	2018 to 2020		
	SII (Years)	SII (Years)	SII Difference	Range Difference
Males at birth				
LE	9.4	9.7	0.3	* 0.4
HLE	19.1	18.6	-0.5	-0.5
DFLE	17.0	17.6	0.6	0.4
Females at birth				
LE	7.4	7.9	0.5	* 0.5
HLE	18.8	19.3	0.5	0.4
DFLE	15.6	16.8	1.2	0.3

Source: Office for National Statistics – Annual Population Survey, 2011 Census

Notes

1. The health state and disability prevalence estimates used to estimate healthy life expectancy (HLE) and disability-free life expectancy (DFLE) are sourced from Annual Population Survey (APS) data and data from the 2011 Census. The APS 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 calculated by taking the difference between Decile 1 (most deprived) and Decile 10 (least deprived). The range difference is then calculated by taking the difference between the ranges from 2015 to 2017 and 2018 to 2020.

3. Slope Index of Inequality (SII) is calculated by taking the difference between the extremes of a population weighted regression line of best fit.

4. * denotes a statistically significant increase in the SII between 2015 to 2017 and 2018 to 2020, based on non-overlapping confidence intervals.

6 . Health state life expectancies data

[Health state life expectancies by national deprivation deciles, England: 2018 to 2020](link)
Dataset | Released on 25 April 2022
Life expectancy (LE), healthy life expectancy (HLE), disability-free life expectancy (DFLE), Slope Index of Inequality (SII) and range by national deprivation deciles (IMD 2019), England, 2015 to 2017 and 2018 to 2020.

7 . Glossary

Period life expectancy

The life expectancy (LE) estimates reported in this bulletin are period-based. Period life expectancy, at a given age, is the average number of years a person would live if he or she experienced the age-specific mortality rates for that time period and decile throughout his or her life.

Health state life expectancy

A generic term for summary measures of health that add a quality dimension to estimates of life expectancy. This is done by dividing expected lifespan into time spent in different states of health. In this release, health state life expectancy encompasses measures based on health-related well-being (healthy life expectancy) and functional health status (disability-free life expectancy).

Healthy life expectancy

An estimate of lifetime spent in "very good" or "good" health, based on how individuals perceive their general health.

Poorer states of health

An individual perceiving their general health as "fair", "bad" or "very bad".

Disability-free life expectancy

An estimate of lifetime free from a limiting, persistent illness which limits day-to-day activities. It is based upon a self-rated assessment of how health conditions and illnesses reduce an individual's ability to carry out day-to-day activities, including washing and dressing and shopping for essentials.

Confidence intervals

A measure of the uncertainty around a specific estimate. It is expected that the interval will contain the true value on 95 occasions if repeated 100 times. As intervals around estimates widen, the level of uncertainty about where the true value lies increases. The confidence intervals for the SII are calculated using a simulation program. Simulation is a method used to estimate the degree of uncertainty for measures where the statistical distributions underpinning the measure are too complex to analyse mathematically.

Statistical significance

The term "significant" refers to statistically significant changes or differences. Significance has been determined using the 95% confidence intervals, where instances of non-overlapping confidence intervals between estimates indicate the difference is unlikely to have arisen from random fluctuation.

Indices of Multiple Deprivation

The Indices of Multiple Deprivation 2019 (IMD19) are a score based on the area as a whole. Not everyone within a Lower Layer Super Output Area (LSOA) necessarily experiences the same level or type of deprivation. For example, some unemployed individuals live in less deprived LSOAs, while some higher-income individuals live in more deprived LSOAs. Similarly, deciles are a broad grouping and the levels of deprivation and the underlying factors determining the LSOA-level deprivation score, will vary within it. Those LSOAs at the higher and lower end of each specific decile may vary considerably from each other. Deciles are calculated by ranking the LSOAs from most deprived to least deprived and dividing them into 10 equal groups. These range from the most deprived 10% (Decile 1) of small areas nationally, to the least deprived 10% (Decile 10) of small areas nationally.

Slope Index of Inequality

The Slope Index of Inequality (SII) was used to assess the absolute inequality in LE and each health state life expectancy between the least and most deprived deciles. This indicator measures the gaps by taking account of the inequality across all adjacent deciles of relative deprivation, rather than focusing only on the differencing of the two extremes.

8 . Measuring the data

This statistical bulletin presents estimates of life expectancy, healthy life expectancy and disability-free life expectancy for England by deprivation deciles.

Data sources

Life expectancy uses death registrations data held by the Office for National Statistics (ONS), which are compiled from information supplied when deaths are certified and registered as part of civil registration. Mid-year population estimates by age, sex and geographical area are used in combination with death registrations to calculate age-specific mortality rates used in life tables.

In addition, health state life expectancies use data collected as part of the Annual Population Survey (APS) and Census 2011 data. Health state prevalence rates are obtained from the three-year reweighted APS data set used in healthy life expectancy and disability-free life expectancy calculations.

As the method requires imputation and modelling, Census 2011 data are used to produce imputation adjustment factors and census-based health state prevalence.

See our Health state life expectancies, UK QMI for further details on the:

- data sources

- method for estimating health state life expectancies

- method for calculating the Slope Index of Inequality

- method for calculating confidence interval details for SII indicators

9 . Strengths and limitations

Strengths

- Health state life expectancies are estimated using the same sources of data, namely death registrations, the Annual Population Survey (APS) and the 2011 Census.

- Estimates based on abridged life tables have been shown to closely align with those based on complete life tables.

- The mortality data used give complete population coverage and ensure the estimates are of high precision, and representative of the underlying population at risk.

- The provision of health state life expectancy summary measures provides a quality-of-life dimension to length of life, which is useful for assessing health and social care needs and fitness for work to changing state pension ages.

Limitations

- Survey data are not routinely collected for those aged under 16 years and only sparsely for those aged 85 years and over, requiring imputation of prevalence for these age groups.

- Census 2011-based imputation adjustments and prevalence used in the modelling are temporal and therefore prone to change as they are applied further away from the census.

- The measures of health status are subjective self-reports and may be affected in their perception by demographic, cultural and socioeconomic factors.

10 . Related links

English Index of Multiple Deprivation: index guidance (PDF 2,242 KB)
Bulletin | Released 26 September 2019
Report outlining the English Index of Multiple Deprivation.

Method changes to life and health state expectancies
Methods paper | 29 November 2016
Report outlining the changes to life expectancy, healthy life expectancy and disability-free life expectancy.

Proposed method changes to UK health state life expectancies
Methods paper | 7 December 2017
This report assesses three methods for future estimation of health state life expectancies and is consulting on these methods.

Health state life expectancies, UK: 2018 to 2020
Bulletin | Released 4 March 2022
The number of years people are expected to spend in different health states in constituent countries and local areas of the UK.

Life expectancy for local areas of the UK: between 2001 to 2003 and 2018 to 2020
Bulletin | Released 23 September 2021
Subnational trends in the average number of years people will live beyond their current age measured by "period life expectancy".

Health state life expectancies by national deprivation deciles, England: 2017 to 2019
Bulletin | Released 22 March 2021
Life expectancy and years expected to live in "Good" health and disability-free using national indices of deprivation to measure socioeconomic inequalities in England.