Office for National Statistics

Statistical bulletin

Health state life expectancies by national deprivation deciles, Wales: 2016 to 2018

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

Notice

27 March 2020

Previously Health state life expectancies by national deprivation deciles for England and Wales has been published in one bulletin "Health state life expectancies by national deprivation deciles, England and Wales". From 27 March 2020 Health state life expectancies by national deprivation deciles for England and Wales will be published in two separate bulletins "Health state life expectancies by national deprivation deciles, England" and "Health state life expectancies by national deprivation deciles, Wales".

Table of contents

1 . Main points

- The gap in life expectancy at birth between the least and most deprived areas in Wales was 9 years for males and 7.4 years for females, with the inequality gap remaining stable for both sexes in 2016 to 2018 compared with 2013 to 2015.

- Females living in the most deprived areas of Wales can expect to live 19.1 years less in "Good" health compared with those in the least deprived, with the gap at 18.2 years for males.

- There were no significant changes in the life expectancy and healthy life expectancy of those living in the most and least deprived areas of Wales in 2016 to 2018 at birth and at age 65 years compared with the 2013 to 2015 period.

- Males aged 65 years living in the most deprived areas of Wales can expect to live 4.4 years less than those in the least deprived areas, with the difference being 4.9 years for females aged 65 years.

- Females aged 65 years living in the least deprived areas of Wales could expect to live 6.8 years further in "Good" health compared with those in the most deprived areas, with the difference at 5.8 years for males aged 65 years.

Statistician's comment

"Today's release highlights the continuing inequality in life expectancy at birth across Wales. The gap in life expectancy at birth between the least and most deprived areas in Wales has remained stable for both sexes since 2013 to 2015, standing at 9 years for males, and 7.4 years for females.

"In terms of years spent in 'good health', those living in the most deprived areas can expect to spend almost two decades less in good health than their counterparts in the least deprived areas. Leading to not only shorter lives for those in deprived areas, but living a larger proportion of it in poorer health."

Ben Humberstone, Head of Health Analysis and Life Events, Office for National Statistics

2 . Life expectancy and healthy life expectancy, by the Welsh Index of Multiple Deprivation

The Welsh Index of Multiple Deprivation 2019 (WIMD 2019) is the official measure of relative deprivation in Wales. Each Lower-layer Super Output Area (LSOA) in Wales is scored according to its level of relative deprivation, which is calculated using eight domains of life including education and health. These LSOA scores can then be ranked and split into groupings such as tenths (deciles) of area deprivation.

The scores are based on the area as a whole, so it is wrong to conclude everyone within an 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 the decile. Those LSOAs at the higher and lower limits of each specific decile may vary considerably from each other.

Figure 1 allows you to explore life expectancy and healthy life expectancy estimates by age and postcode. The postcode look-up will highlight which decile your area falls into, what the average life expectancy is for the age selected, and how long an individual in that breakdown can expect to live in good and poorer states of health.

Life expectancy in this instance refers to period life expectancy, which is the average number of years a person would live, if he or she experienced the particular area's age-specific mortality rates for that time period throughout his or her life.

Healthy life expectancy is an estimate of lifetime spent in "very good" or "good" health, based on how individuals perceive their general health, and is equivalent to the remaining years expected to live in good health.

Figure 1: Life expectancy and healthy life expectancy by age, sex, and deprivation decile in Wales, 2016 to 2018
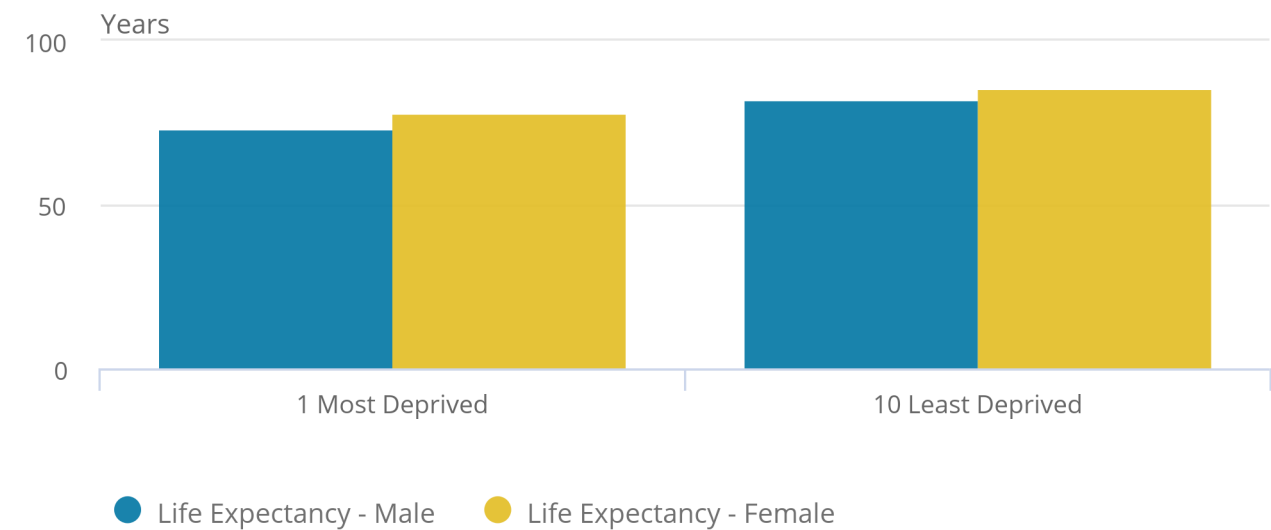
Data download

The widest variation in health outcomes is generally found between Deciles 1 and 10, representing the most and least deprived area groupings; we have mainly commented on the differences between these two groups throughout this bulletin.

Figure 2: Males and females living in the most deprived 10% of areas could expect to live less than 80 years

Life expectancy, Wales, 2016 to 2018

Figure 2: Males and females living in the most deprived 10% of areas could expect to live less than 80 years

Life expectancy, Wales, 2016 to 2018

Years

| 100 |
| 50 |
| 0 |

1 Most Deprived   10 Least Deprived

● Life Expectancy - Male   ● Life Expectancy - Female

Source: Office for National Statistics

Notes:

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

2. Deprivation deciles are based on the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighborhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighborhoods in Wales.

Life expectancy at birth among males living in the most deprived areas was 73.3 years, compared with 82.1 years for those in the least deprived areas, a difference of 8.9 years in length of life (Figure 2). Life expectancy at birth of females in the most deprived areas was 78.1 years, compared with 85.7 years in the least deprived areas, a difference of 7.6 years (Figure 2).

Males living in the least deprived 30% of areas were expected to live beyond the age of 80 years, while those in all other areas were expected to fall short of this. The gap between adjacent deciles was largest between Deciles 1 and 2 (the two most deprived areas).

The largest difference in female life expectancy between adjacent deciles was between Deciles 1 and 2, with a similar gap as males of almost 1.7 years, highlighting a large disparity between the two most deprived deciles.

Moreover, females living in the most deprived 10% of areas in Wales were expected to live shorter lives than males living in Deciles 5 to 10. This shows that although in general females live longer than males, their exposure to different levels of deprivation does modify this pattern of gender advantage experienced by females. Data for all deciles can be explored further in our datasets.

There were no significant changes in the life expectancy of those living in the most and least deprived areas of Wales between 2013 to 2015 and 2016 to 2018 for those at birth and aged 65 years
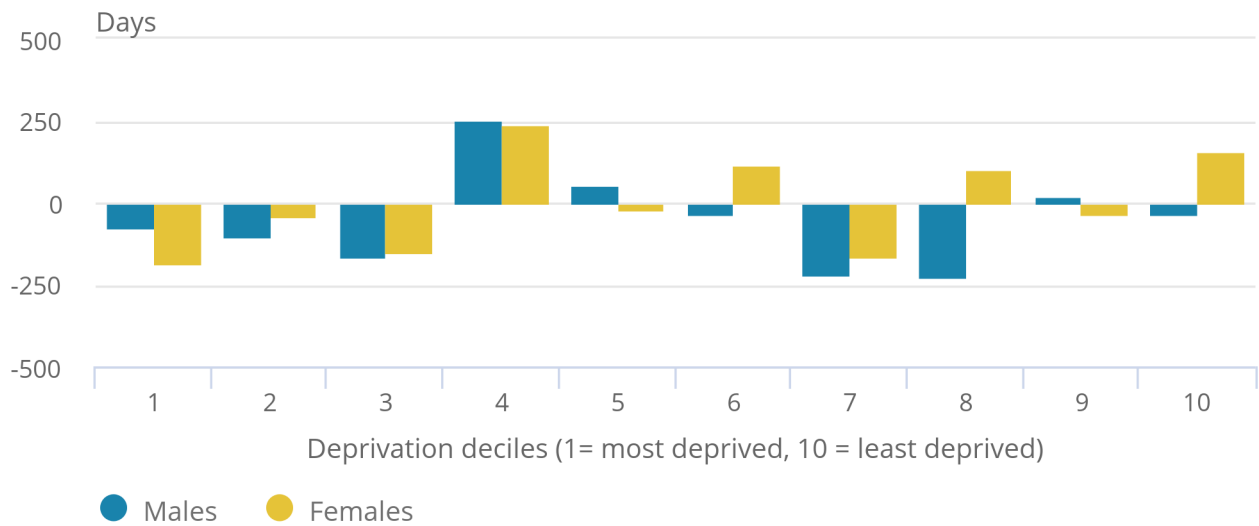
In 2016 to 2018, in the more deprived proportion of deprivation deciles, males and females in Decile 4 saw their life expectancy increase by 255 days and 237 days respectively. Whereas in the less deprived proportion of deprivation deciles, males in Decile 8 saw life expectancy decrease by 228 days (Figure 3).

Figure 3: Males and females in decile 4 experienced the largest improvements in life expectancy compared to 2013 to 2015

Life expectancy change in days, Wales, between 2013 to 2015 and 2016 to 2018

Figure 3: Males and females in decile 4 experienced the largest improvements in life expectancy compared to 2013 to 2015

Life expectancy change in days, Wales, between 2013 to 2015 and 2016 to 2018

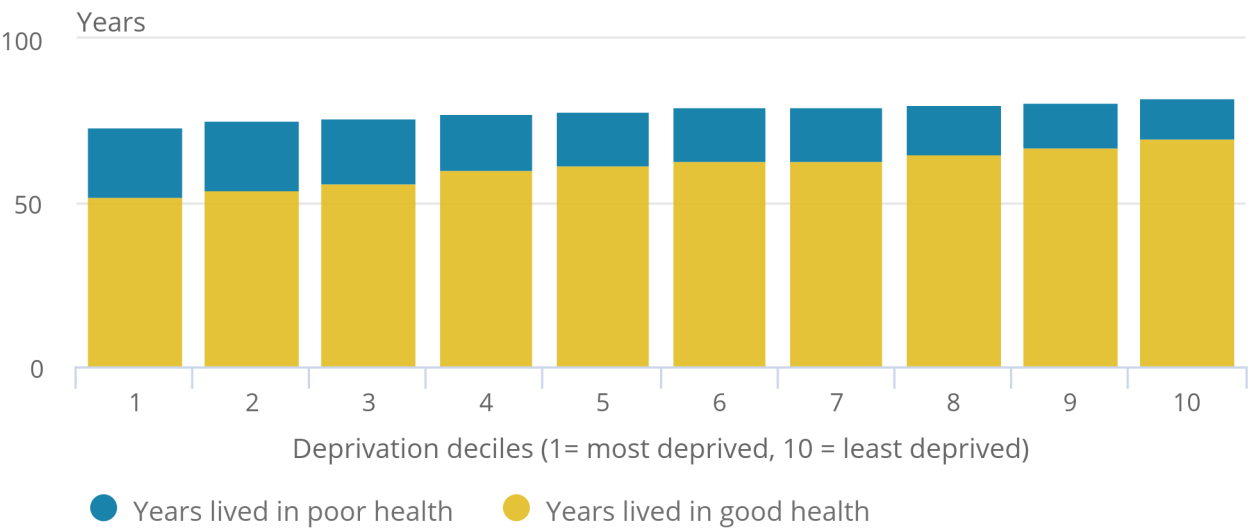

Source: Office for National Statistics

Notes:

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

2. Deprivation deciles are based on the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighborhoods in Wales and Decile 10 represents the least deprived 10 % (or decile) of neighborhoods in Wales.

3. Statistical significance has been assessed using z-scores. More information about this z-test can be viewed in Appendix 1 of the Sullivan guide.

Figure 4: Only males in Deciles 9 and 10 (least deprived) were expected to live more than 65 years in "Good" health

Healthy life expectancy, Wales, 2016 to 2018

Figure 4: Only males in Deciles 9 and 10 (least deprived) were expected to live more than 65 years in "Good" health

Healthy life expectancy, Wales, 2016 to 2018

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

Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.

Healthy life expectancy at birth for males was lowest at 51.8 years in the most deprived areas and highest at 69.6 years in the least deprived areas, a difference of 17.8 years (Figure 4). The largest adjacent gap for males at birth was 3.9 years between Deciles 3 and 4. The second-largest adjacent gap existed between Deciles 9 and 10 of 2.8 years.
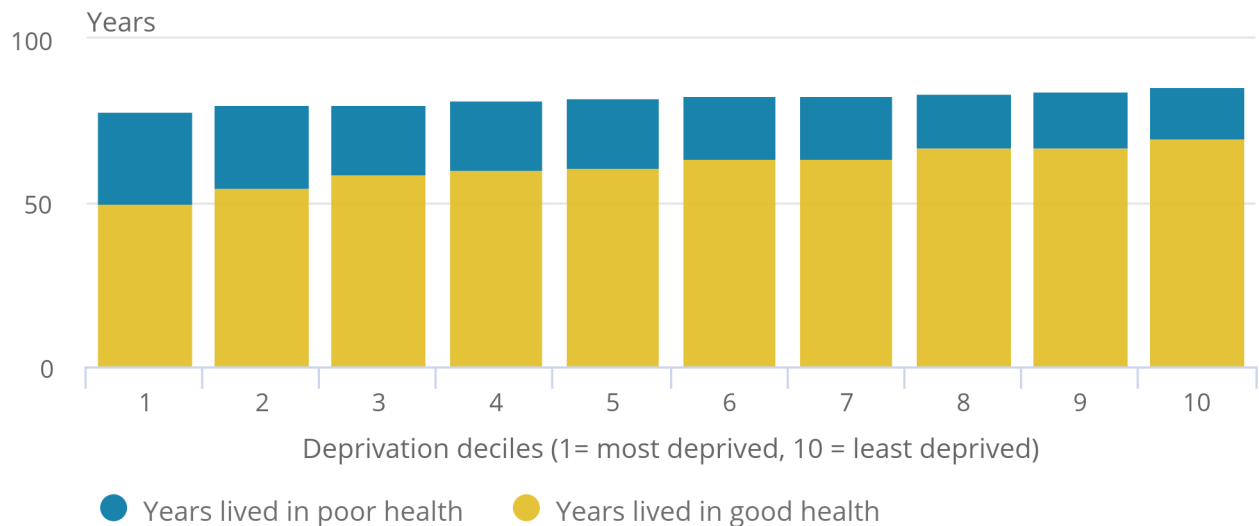
Only males in Deciles 9 and 10 (least deprived) were expected to live more than 65 years in "Good" health, whereas males in the three most deprived deciles were expected to live less than 60 years in "Good" health.

Figure 5: At birth females in the most deprived areas could expect to live 49.7 years in good health, this was 20.1 years less than those in the least deprived areas

Healthy life expectancy, Wales, 2016 to 2018

Figure 5: At birth females in the most deprived areas could expect to live 49.7 years in good health, this was 20.1 years less than those in the least deprived areas

Healthy life expectancy, Wales, 2016 to 2018

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

Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.

Healthy life expectancy at birth for females in the most deprived areas was 49.7 years, 20.1 years less than those in the least deprived areas, where females could expect to live 69.8 years in "Good" health (Figure 5). This was the first time in the current series beginning 2011 to 2013 where females living in the most deprived areas have fallen below 50 years of healthy life on average.
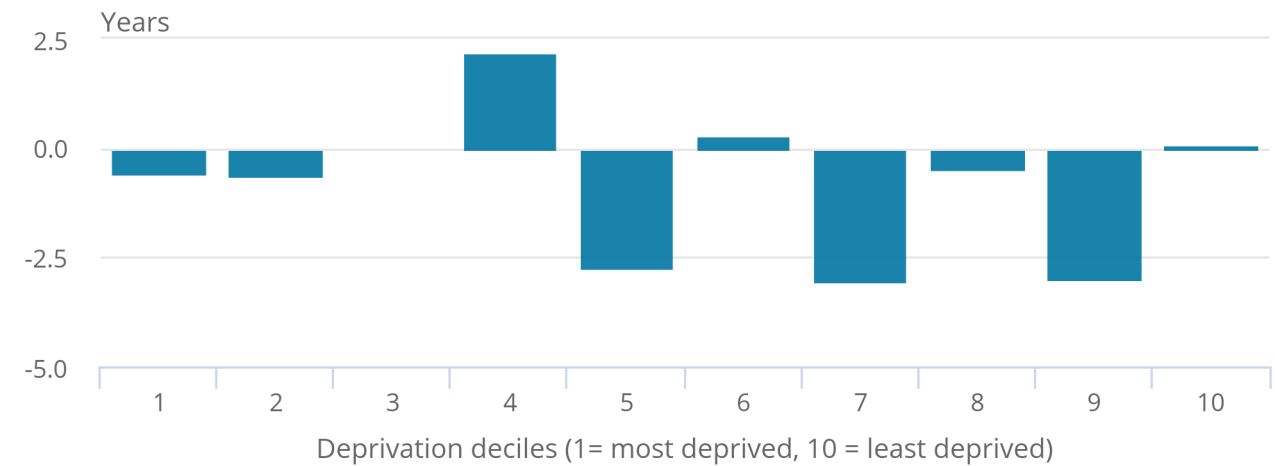
The largest gap between adjacent deciles was 5.3 years in "Good" health between Deciles 1 and 2, suggesting that even among relatively deprived populations, the extent of deprivation exposure is meaningful for female health status in Wales.

Figure 6: Healthy life expectancy at birth decreased for females in Deciles 5, 7 and 9 between 2013 to 2015 and 2016 to 2018

Change in female healthy life expectancy, Wales, 2013 to 2015 and 2016 to 2018

Years

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

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

Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2014 (WIMD 2014) for the 2013 to 2015 period and the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) for the 2016 to 2018 period, WIMD is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.
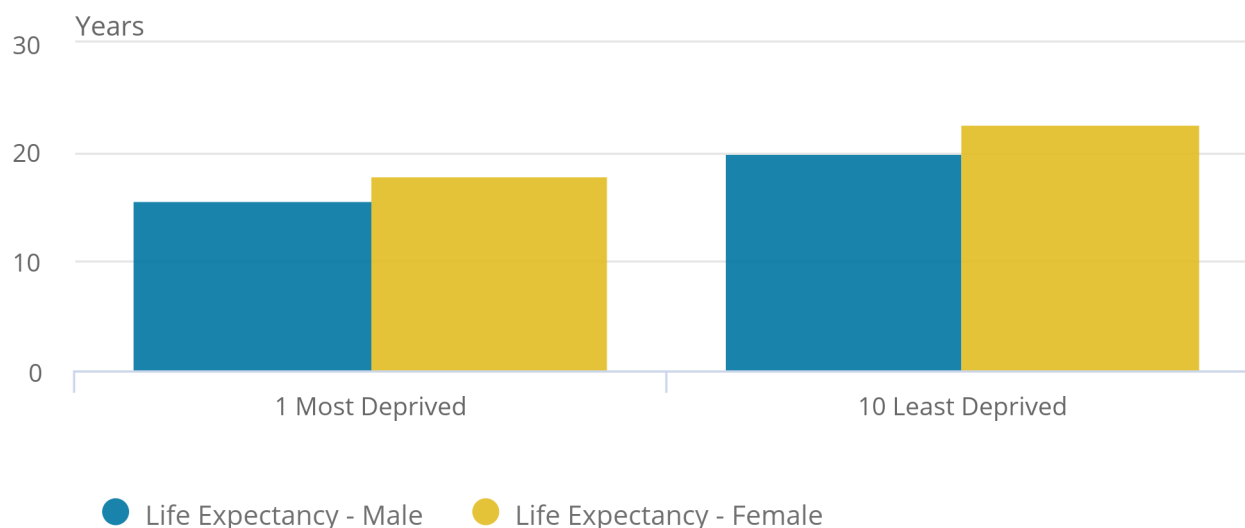
Considering change over time, females living in Deciles 5, 7 and 9 saw healthy life expectancy decrease significantly between 2013 to 2015 and 2016 to 2018. Females in Deciles 7 and 9 saw their HLE drop by 3.0 years, with those in Decile 5 seeing a drop of 2.8 years. In contrast to females, there were no significant changes to healthy life expectancy for males.

Figure 7: The difference in life expectancy at age 65 years between the least and most deprived areas is larger for females at 4.9 years

Life expectancy, Wales, 2016 to 2018

Figure 7: The difference in life expectancy at age 65 years between the least and most deprived areas is larger for females at 4.9 years

Life expectancy, Wales, 2016 to 2018

Source: Office for National Statistics

Notes:

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

2. Deprivation deciles are based on the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived and Decile 10 represents the least deprived.
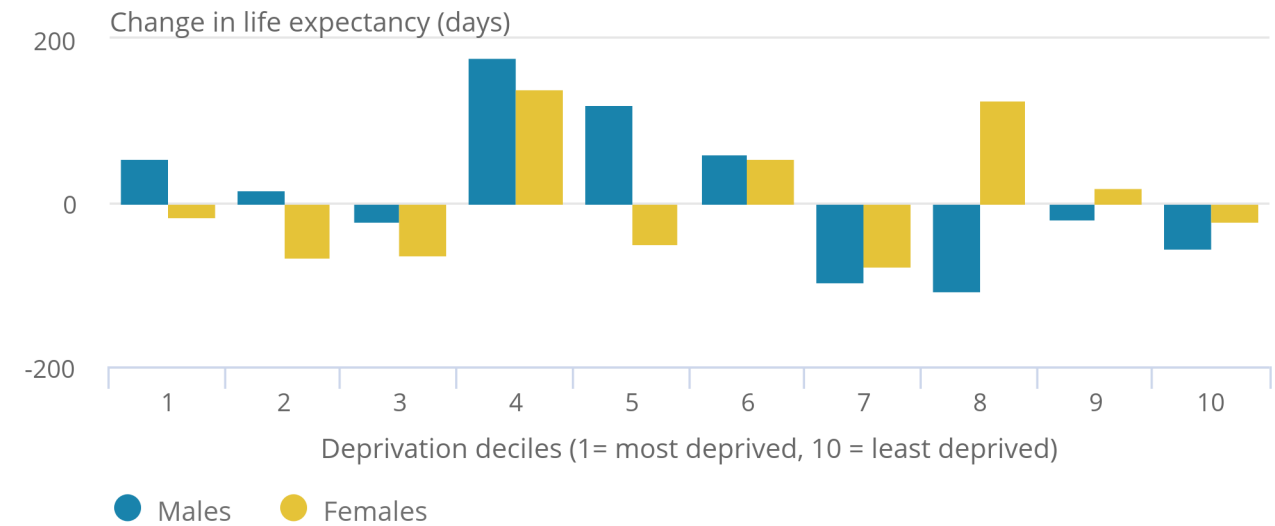
At 65 years of age, males living in the most deprived areas were expected to live 15.6 years, 4.4 years less than those in the least deprived areas, who were expected to live 20.0 years (Figure 7). For females, life expectancy at 65 years of age in the most deprived areas was 17.8 years, compared with 22.7 years among those in the least deprived areas, a gap of 4.9 years (Figure 7).

Figure 8: Males aged 65 years in Decile 4 experienced an improvement to their life expectancy of 178.3 days compared to 2013 to 2015

Change in life expectancy (days), Wales, 2016 to 2018

Figure 8: Males aged 65 years in Decile 4 experienced an improvement to their life expectancy of 178.3 days compared to 2013 to 2015

Change in life expectancy (days), Wales, 2016 to 2018

Source: Office for National Statistics

Notes:

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

2. Deprivation deciles are based on the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighborhoods in Wales and decile 10 represents the least deprived 10% (or decile) of neighborhoods in Wales.

The change in life expectancy between 2013 to 2015 and 2016 to 2018 was irregular across levels of deprivation at birth for both males and females. Males in Decile 4 experienced the largest improvement to their life expectancy, with it rising by 178.3 days from 17.1 years in 2013 to 2015, to 17.6 years in 2016 to 2018. Females showed no significant changes in life expectancy between these two periods.

Figure 9: Males living in the least deprived areas at age 65 years could expect to live almost twice as many years in "Good" health than those in the most deprived areas

Healthy life expectancy, Wales, 2016 to 2018

Figure 9: Males living in the least deprived areas at age 65 years could expect to live almost twice as many years in "Good" health than those in the most deprived areas

Healthy life expectancy, Wales, 2016 to 2018

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

● Years lived in poor health   ● Years lived in good health

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

Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.
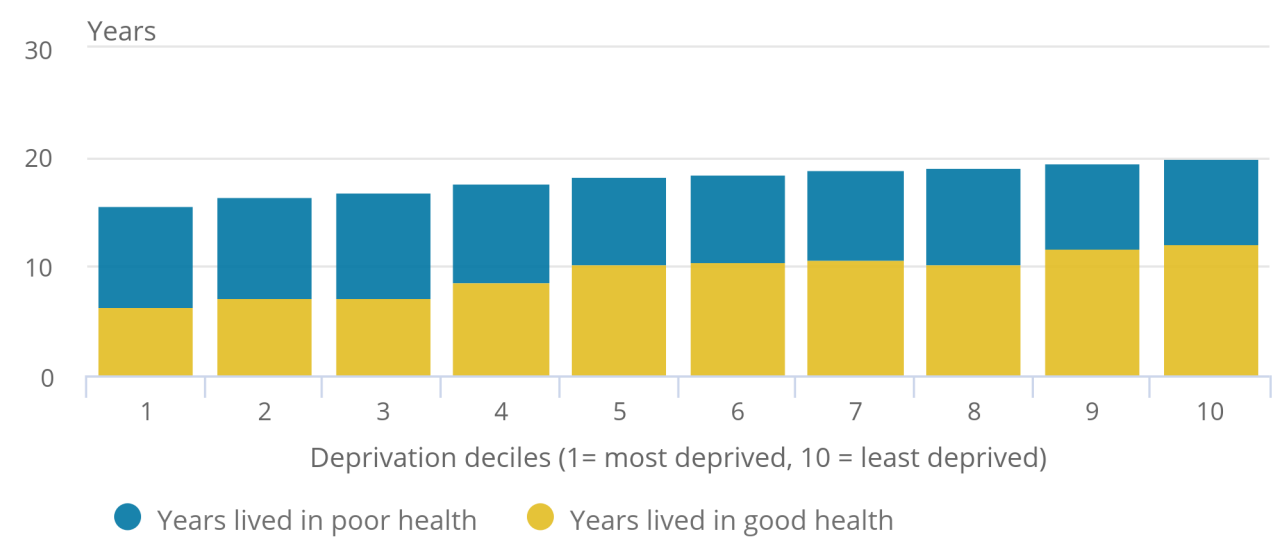
At 65 years of age, males in the most deprived areas were expected to live 6.3 years in good health. This was almost half the length of those living in the least deprived areas at 12.2 years.

Figure 10: The number of remaining years expected to live in poorer health for females aged 65 years ranged from 11.3 years in Decile 1 (most deprived) to 9.4 years in Decile 10 (least deprived)

Healthy life expectancy, Wales, 2016 to 2018

Figure 10: The number of remaining years expected to live in poorer health for females aged 65 years ranged from 11.3 years in Decile 1 (most deprived) to 9.4 years in Decile 10 (least deprived)

Healthy life expectancy, Wales, 2016 to 2018

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

● Years lived in poor health　　● Years lived in good health

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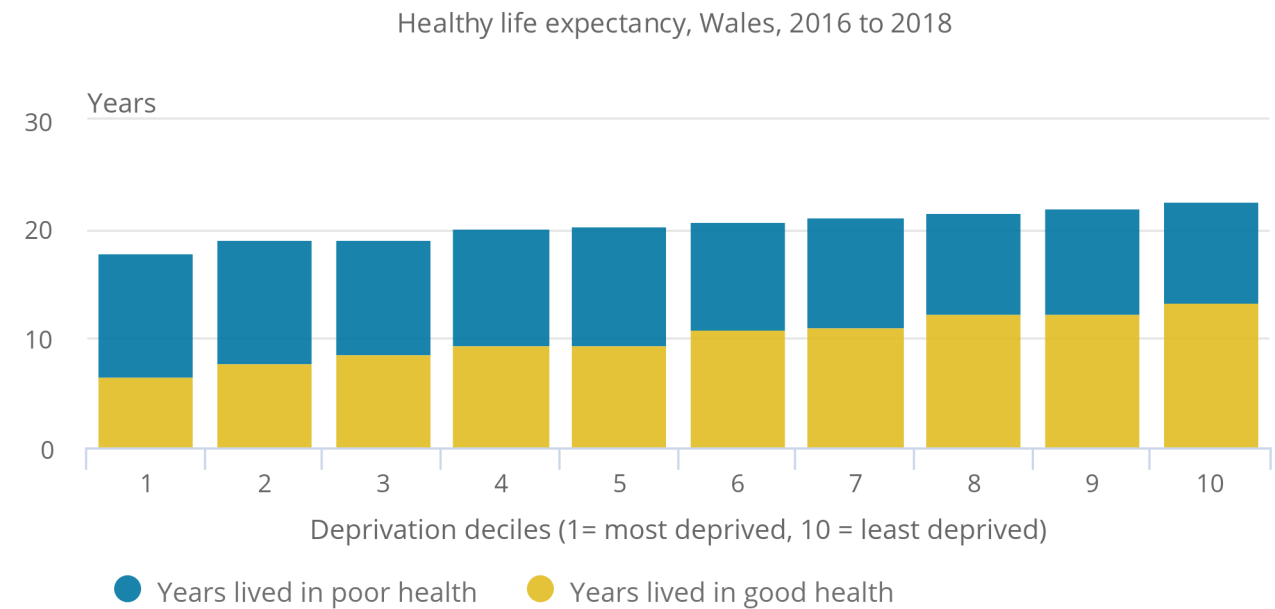
Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.

Healthy life expectancy among females in the most deprived areas was 6.5 years, under half that of females living in the least deprived areas who could expect to live 13.3 years in good health.

Years lived in poorer states of health for females at age 65 years ranged from 11.3 years in the most deprived areas to 9.4 years in the least deprived areas. Moreover, although female life expectancy at age 65 years in the most deprived areas was 4.9 years shorter than in the least deprived areas, they spend 1.9 years longer in a poorer state of health than those living in the least deprived areas (Figure 10).

3 . The Slope Index of Inequality for life expectancy and healthy life expectancy

The Slope Index of Inequality (SII) is used to assess the absolute inequality in life expectancy and each health state life expectancy.

The SII can be interpreted in the same way as the range between the least and most deprived areas but also takes into account 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 regard to the outcome of interest.

The gap in male and female healthy life expectancy at birth spans more than 18 years for males and 19 years for females

In 2016 to 2018, the inequality in male life expectancy at birth stood at 9.0 years, a higher inequality than that seen for females, which stood at 7.4 years. Healthy life expectancy at birth had a more substantial gap; females experienced a larger inequality, at 19.1 years compared with 18.2 years for males (Figures 11 and 12).

Figure 11: Slope index of inequality in male healthy life expectancy at birth: Wales, 2016 to 2018

Data download

Notes:

1. 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.

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

Figure 12: Slope Index of Inequality in female healthy life expectancy at birth: Wales, 2016 to 2018

Data download

Notes:

1. 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.

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

There were no significant changes in the inequality of life expectancy at birth or at age 65 years for both males and females

Inequality in male life expectancy at birth remained fairly stable, with the SII at 9 years for 2016 to 2018 compared with 9.1 years for the 2013 to 2015 period (Table 1). The SII in female life expectancy at birth increased from 6.9 years to 7.4 years over the same time period, but again this 0.5 of a year increase was not statistically significant.

At 65 years of age, males experienced a reduction in their SII, with it falling from 4.7 for 2013 to 2015 to 4.3 in 2016 to 2018, although this was not significant. Females experienced a small non-significant increase in their SII, with it rising from 4.5 to 4.6.

Table 1: There were no significant changes in the inequality of life expectancy at birth or at age 65 years for both males and females
Wales, 2016 to 2018

	2013 to 2015		2016 to 2018			
	SII (Years)	Range (Years)	SII (Years)	Range (Years)	SII Difference	Range Difference
Males at Birth						
LE	9.1	8.8	9	8.9	-0.1	0.1
HLE	18.8	18.5	18.2	17.8	-0.6	-0.7
Males at age 65						
LE	4.7	4.7	4.3	4.4	-0.4	-0.3
HLE	6.1	6.1	5.9	5.8	-0.2	-0.3
Females at Birth						
LE	6.9	6.6	7.4	7.6	0.5	1
HLE	20.6	19.5	19.1	20.1	-1.5	0.6
Females at age 65						
LE	4.5	4.9	4.6	4.9	0.1	0
HLE	6.7	6	6.7	6.8	0	0.8

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

Notes

1. Life expectancy includes all usual residents. Back to table

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. Back to table

3. SII is calculated by taking the difference between the extremes of a population weighted regression line of best fit. Back to table

4. Range is calculated by taking the difference between Decile 1 and Decile 10. Back to table

5. Figures may not sum because of rounding. Back to table

4 . Changes in WIMD 2019 (from WIMD 2014) on life expectancy and healthy life expectancy at birth and aged 65 years

In general life expectancy in 2016 to 2018 follows a similar course across deciles when using either WIMD 2014 or WIMD 2019

In 2019, the Welsh Index of Multiple Deprivation (WIMD) was updated, with the WIMD 2019 replacing the WIMD 2014. The WIMD 2019 uses broadly the same methodology as the WIMD 2014, information on the changes can be found in the WIMD 2019 technical report.
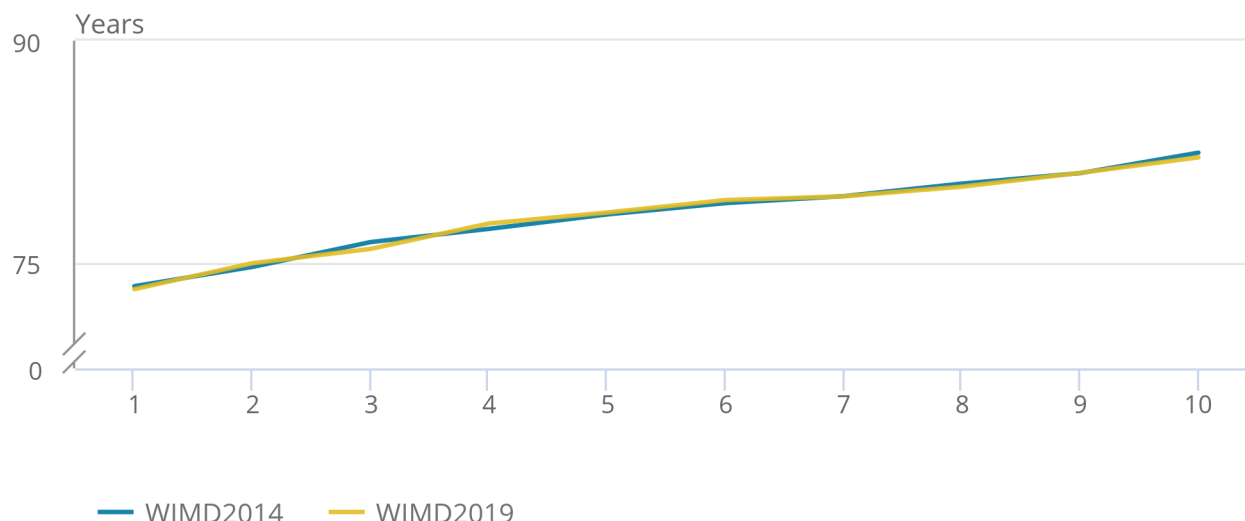
Figures 13 and 14 illustrate how life expectancy estimates across the WIMD deciles follow a similar trajectory when using either version of the WIMD (WIMD 2014 and WIMD 2019).

Figure 13: Male life expectancy at birth, follows a similar course across deciles when calculated using both WIMD 2014 and WIMD 2019

Life expectancy, Wales, 2016 to 2018

Figure 13: Male life expectancy at birth, follows a similar course across deciles when calculated using both WIMD 2014 and WIMD 2019

Life expectancy, Wales, 2016 to 2018

Years

— WIMD2014   — WIMD2019

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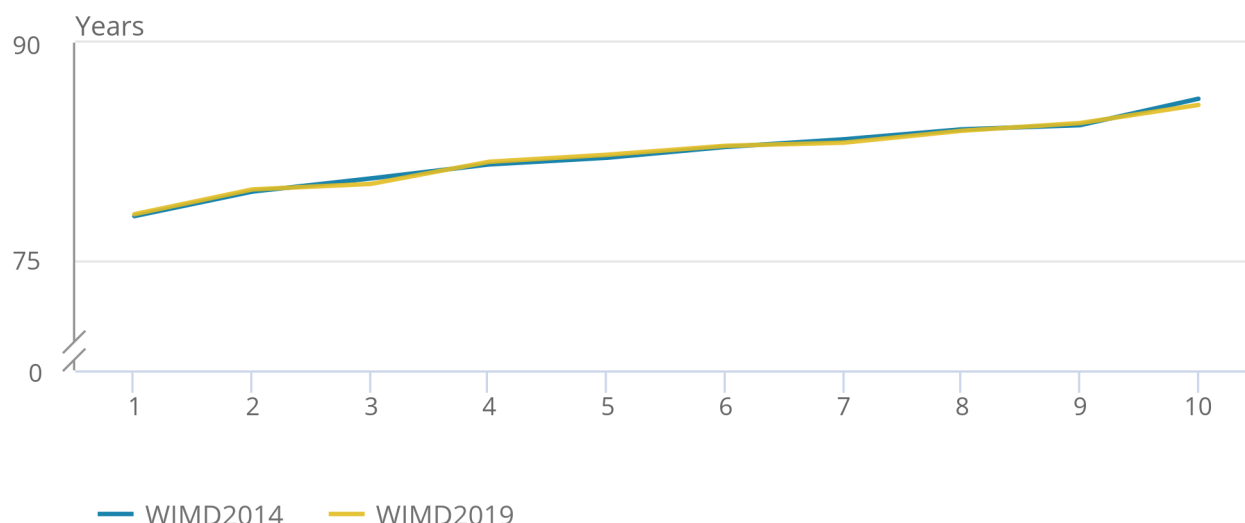
Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2014 (WIMD 2014) and the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.

Figure 14: Female life expectancy at birth follows a similar course across deciles when calculated using both WIMD 2014 and WIMD 2019

Life expectancy, Wales, 2016 to 2018

Figure 14: Female life expectancy at birth follows a similar course across deciles when calculated using both WIMD 2014 and WIMD 2019

Life expectancy, Wales, 2016 to 2018

— WIMD2014   — WIMD2019

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

Notes:

1. Life expectancy (LE) includes 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 Welsh Index of Multiple Deprivation 2014 (WIMD 2014) and the Welsh Index of Multiple Deprivation 2019 (WIMD 2019) which is the official measure of relative deprivation. Decile 1 represents the most deprived 10% (or decile) of neighbourhoods in Wales and Decile 10 represents the least deprived 10% (or decile) of neighbourhoods in Wales.

There were some differences in the change of life expectancy over time when calculated with either WIMD 2014 or WIMD 2019

There were no significant differences to life expectancy estimates at birth or aged 65 years for the 2016 to 2018 period when calculated with either WIMD 2014 or WIMD 2019.

When life expectancy in 2016 to 2018 was calculated with WIMD 2014 there was an increase of 313.5 days for females in Decile 10 at birth compared with 2013 to 2015 data. In contrast there were no significant changes to life expectancy in 2016 to 2018 when calculated with WIMD 2019.

There were no significant differences to healthy life expectancy estimates at birth or aged 65 years when calculated with either WIMD 2014 or WIMD 2019 for the 2016 to 2018 period.

When using WIMD 2014 to calculate the change to healthy life expectancy for males at birth in Decile 9 between 2013 to 2015 and 2016 to 2018, healthy life expectancy fell, from 67.7 years in 2013 to 2015, to 64.9 years in 2016 to 2018. In contrast, when healthy life expectancy was calculated using WIMD 2019, the fall in life expectancy in 2016 to 2018 was less severe, with it dropping to 66.8 years.

[Data are available calculated using both WIMD 2019 and WIMD 2014 for comparisons](#) .

5 . Health state life expectancies data

[Health state life expectancies by Welsh Index of Multiple Deprivation (WIMD 2019), Wales, all age](#)s
Dataset | Released on 27 March 2020
Life expectancy (LE), healthy life expectancy (HLE), disability-free life expectancy (DFLE) by national deprivation deciles (WIMD 2019), Wales: 2011 to 2018.

[Health state life expectancies by Welsh Index of Multiple Deprivation (WIMD 2019), Wales, at birth and age 65 years](#)
Dataset | Released on 27 March 2020
Life expectancy (LE), healthy life expectancy (HLE), disability-free life expectancy (DFLE), slope index of inequality (SII) and range at birth and age 65 years by national deprivation deciles (WIMD 2019), Wales, 2011 to 2018.

[Health state life expectancies by Welsh Index of Multiple Deprivation (WIMD 2014), Wales, all ages](#)
Dataset | Released on 27 March 2020
Life expectancy (LE), healthy life expectancy (HLE), disability-free life expectancy (DFLE) by national deprivation deciles (WIMD 2014), Wales: 2016 to 2018.

6 . Glossary

Period life expectancy

The life expectancy estimates reported in this bulletin are period-based. Period life expectancy at a given age for an area is the average number of years a person would live, if he or she experienced the particular area's age-specific mortality rates for that time period 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 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.

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, such as washing and cleaning or 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 Slope Index of Inequality (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 Welsh Indices of Multiple Deprivation 2019 (WIMD 2019) are a score based on the area as a whole and 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 the decile. 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 life expectancy 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.

7 . Measuring the data

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

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in the [Health state life expectancies, UK QMI](#).

Data sources

Life expectancy uses death registrations data held by the Office for National Statistics, 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. The [APS](#) is a continuous survey of households in the UK, containing annual data. Each three-year pooled APS dataset contains approximately 170,000 households and 320,000 individuals. The primary purpose of the APS is to provide estimates for labour market and socio-economic analyses at subnational level and the APS is the recommended source of statistical information for analysis at unitary authority and local authority district level.

Health state prevalence rates are obtained from the three-year reweighted APS dataset 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.

Method for estimating life expectancy

The life expectancy estimates reported in this bulletin are period-based life expectancies. Unlike the other life expectancy publications, the subnational life expectancy estimates use an abridged life table method. A life table is a demographic tool used to analyse death rates (also called mortality rates) and calculate life expectancies at various ages.

Abridged life tables use the age-specific mortality rates for an area aggregated over three years, for example 2016 to 2018, which is based on the age-group death count divided by the age-group population count. A [template](#) is available, which shows how the abridged life table is deployed to derive life expectancy estimates.

Abridged life tables are used in preference to complete life tables for smaller populations, such as local authorities, because death counts can be too sparse for examining mortality for single years of age, and mid-year population estimates are not available or sufficiently reliable to produce these by single year of age.

Method for estimating health state life expectancies

Health state life expectancies are calculated using the Sullivan life table method. The data required are age- and sex-specific prevalence of the population in "Good" health (healthy) and "Ffree from activity restriction" (disability-free) obtained from the APS, and age-specific mortality rates from the abridged period life table.

Health state prevalence rates are obtained from a specially created three-year reweighted APS dataset. Prevalence rates are imputed for those aged less than 1, 1 to 4, 5 to 9, 10 to 14, 85 to 89 and 90 years and above. A census adjustment is applied to these ages, which applies the proportional difference in younger ages found at the 2011 Census to the rate observed in the APS for those aged 16 to 19 years, and to older ages to that observed in the age group 80 to 84 years. This is because the survey does not cover younger age groups and only sparsely amongst the very old.

The resulting age, sex and area specific prevalence estimates are then adjusted using linear regression to produced fitted age, sex and area specific prevalence rates to use in the Sullivan life table.

The Sullivan health state life expectancies reflects the current health of a real population adjusted for mortality levels and independent of age structure. It represents the number of remaining years, at a particular age, which an individual can expect to live in a healthy or disability-free state.

Method for calculating 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:

$$X = ^{cj} + (0.5f)$$

This formula calculates the relative deprivation rank for use in the Slope Index of Inequality (SII) calculation.

The SII (a line of best fit) was then estimated by regressing the outcome measures (life expectancy, healthy life expectancy and disability-free life expectancy) separately against the relative deprivation rank (x), weighted by the population in each decile. Method for calculating confidence interval details for SII indicators 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.

For each decile, the life expectancy, healthy life expectancy and disability-free life expectancy have been calculated along with their standard error. These standard errors give information about the degree of uncertainty around each of the health state life expectancy values: essentially it describes a statistical distribution for each decile.

Using a random number-generating algorithm, a random value is taken from each decile life expectancy and healthy life expectancy distribution and the SII recalculated. This is repeated many times (for example, 10,000), to build up a distribution of SII values based on random sampling from the decile life expectancy distributions. The 2.5% and 97.5% values from this distribution of SII values is then reported as the 95% confidence interval for the SII, rather than that based on 10 observations representing the deciles.

8 . Strengths and limitations

The strengths of the Health state life expectancies by national deprivation deciles release are:

- health state life expectancies are estimated using the same sources of data, namely 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 provide 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

The limitations of the Health state life expectancies by national deprivation deciles release are:

- the APS sample sizes for some local authority populations are small, leading to volatility in estimates and wide confidence intervals

- survey data are not routinely collected for those aged under 16 years and only sparsely for those aged 85 years and above, 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

9 . Related links

Welsh Index of Multiple Deprivation: index guidance
Methodology | Updated 27 November 2019
Report outlining the Welsh Index of Multiple Deprivation.

Health state life expectancies, UK: 2016 to 2018
Bulletin | Released 12 December 2018
The number of years people are expected to spend in different health states among local authority areas in the UK.

Health state life expectancies by national deprivation deciles, England and Wales: 2015 to 2017
Bulletin | Released 27 March 2019
Life expectancy and years expected to live in "Good" health using national indices of deprivation to measure socioeconomic inequalities in England and Wales.

National life tables, UK: 2016 to 2018
Bulletin | Released 25 September 2019
Trends in the average number of years people will live beyond their current age measured by period life expectancy, analysed by age and sex for the UK and its constituent countries.