Office for
National Statistics

Article

Socioeconomic inequalities in avoidable mortality, England and Wales: 2001 to 2017

Avoidable mortality in England and Wales, using measures of multiple deprivation to measure socioeconomic inequalities.

Notice

10 July 2020

This time series will no longer be updated. In the future, England and Wales-specific bulletins will be produced. Please visit Socioeconomic inequalities in avoidable mortality in England and Socioeconomic inequalities in avoidable mortality in Wales for the latest data.

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1 . Main points

- In England, in 2017, 16% of male avoidable deaths were experienced by those living in the most deprived areas, compared with 6% in the least deprived areas; for females it was 14% and 7% respectively.

- In Wales, in 2017, 13% of male avoidable deaths were experienced by those living in the most deprived areas, compared with 5% in the least deprived areas; for females it was 13% and 6% respectively.

- In 2017, the absolute inequality in the rate of avoidable death between the most and least deprived areas in Wales was 368.4 deaths per 100,000 males and 229.9 deaths per 100,000 females; in England, the rates were 358.3 and 205.5 respectively.

- In 2017, males and females living in the most deprived areas in England were 4.5 and 3.9 times more likely to die from an avoidable cause than those living in the least deprived areas respectively.

- In Wales, in 2017, males and females living in the most deprived areas were 3.7 and 3.8 times more likely to die from an avoidable cause than those living in the least deprived areas respectively.

- The absolute difference in the rate of avoidable death caused by cardiovascular diseases between the most and least deprived areas narrowed between 2001 and 2017, but has widened for injuries in both England and Wales.

- Between 2011 and 2017, avoidable deaths caused by injuries in the most deprived areas in England statistically significantly increased by 16% among females and 17% among males.

- In England and Wales, there were greater annual improvements in avoidable mortality rates between 2001 and 2010 compared with 2011 and 2017; this was particularly noticeable among males living in the most deprived areas.

2 . Relationship between avoidable mortality and deprivation in England

When discussing avoidable deaths, the following terms are used:

- amenable (treatable) mortality – deaths that could be avoided through timely and effective healthcare

- preventable mortality – deaths that could be avoided by public health interventions

- avoidable mortality – deaths that are amenable, preventable or both, where each death is counted only once

Avoidable mortality rates were substantially higher in the most deprived areas in England in 2017 compared with the least deprived areas and statistically significantly higher than all other levels of deprivation

In 2017, the avoidable mortality rate for males living in the most deprived areas (decile 1) in England was 517.5 deaths per 100,000, a statistically significant higher rate than the 151.9 deaths per 100,000 among males living in the least deprived areas (decile 10). Like males, female avoidable mortality also showed a significant contrast, ranging from a rate of 312.0 deaths per 100,000 in the most deprived areas compared with 100.4 deaths per 100,000 in the least deprived areas.
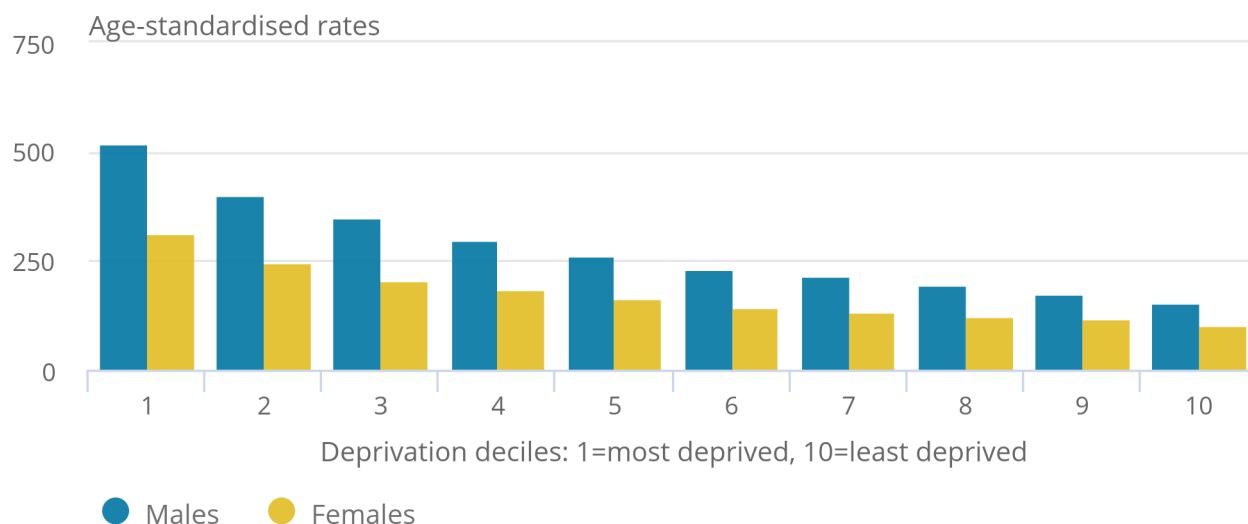
Statistically significant differences were observed between all adjacent deciles for males while the differences for females were all statistically significant apart from between deciles 8 and 9. This means males and females in decile 1 had statistically significant higher mortality rates than the nine other deciles, and males and females in decile 10 had statistically significant lower rates than the nine other deciles.

The largest gap was between areas located within deciles 1 and 2 for both sexes demonstrating mortality rates were contrasting even between relatively-deprived populations.

When comparing males and females in the same deciles, males had a statistically significant higher avoidable mortality rate than females. However, males exposed to lower levels of deprivation (those living in deciles 5 and above) had a statistically significant lower rate of avoidable mortality than females resident in decile 1 areas (Figure 1).

Figure 1: Age-standardised avoidable mortality rates, by sex, England, 2017

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in 2017.

2. Figures for England exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Index of Multiple Deprivation (IMD), which is the official measure of relative deprivation with decile 1 representing the most deprived areas and decile 10 representing the least deprived areas, IMD 2015 was used for 2017.

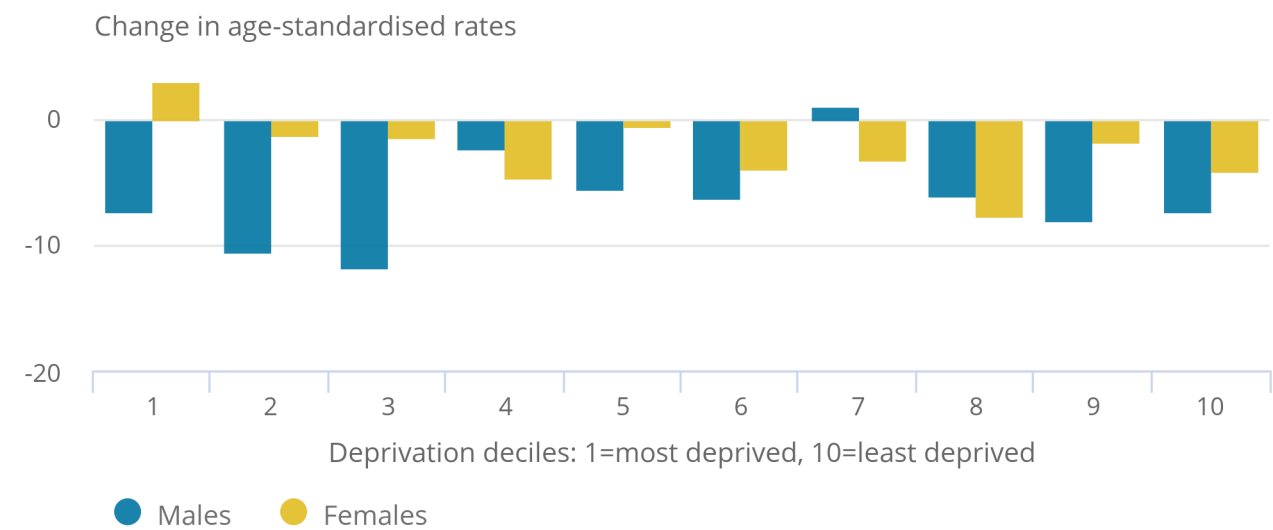## Mortality rates for females in the most deprived areas in England worsen between 2014 and 2017

The changes in age-standardised avoidable mortality rates between 2014 and 2017 were different across sex and levels of deprivation (Figure 2). For males, non-significant improvements in mortality were observed across a majority of deciles with the largest improvement occurring in decile 3, amounting to 11.8 fewer deaths per 100,000. Improvements in mortality for males in the most and least deprived areas were of the same magnitude with 7.3 fewer deaths per 100,000, meaning the absolute difference between 2014 and 2017 was unchanged.

Like males, non-significant improvements were observed in female mortality rates across most deciles. The only exception to this was for females living in the most deprived areas, where the mortality rate actually worsened, increasing by 3.0 deaths per 100,000. This was in contrast to females living in the least deprived areas where the rate of avoidable death between 2014 and 2017 reduced by 4.1 deaths per 100,000, leading to a widening in the absolute difference.

Overall, improvements in male mortality rates exceeded those of females for most deciles (Figure 2), although females fared better in deciles 4, 7 and 8. Similar sex-specific improvements were also observed in health state life expectancies by deprivation where life expectancy changes were generally more favourable for males compared with females.

Figure 2: Change in age-standardised avoidable mortality rates between 2014 and 2017, by sex, England

Figure 2: Change in age-standardised avoidable mortality rates between 2014 and 2017, by sex, England

Source: Office for National Statistics

Notes:

1. Figures refer to the change in age-standardised avoidable mortality rates between 2014 and 2017. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.

2. Figures for England exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Index of Multiple Deprivation (IMD), which is the official measure of relative deprivation with decile 1 representing the most deprived areas and decile 10 representing the least deprived areas, IMD 2015 was used for 2014 to 2017.

Since 2011, avoidable deaths caused by injuries increased by 16% among females and 17% among males in the most deprived areas, while improvements in avoidable deaths caused by cardiovascular diseases show a slowing in the second decade

Causes of avoidable mortality can be categorised into broad groups. We report on three of these broad causes: cardiovascular diseases, injuries and respiratory diseases, as together they constitute a large proportion of avoidable deaths.

The cardiovascular diseases section and the injuries section (which includes intentional and unintentional injuries) of the avoidable mortality definition did not change throughout the period 2001 to 2017, so direct comparisons across the whole time series are possible. As part of the definition change in 2014, some diseases were added to the respiratory diseases section. The effect of this change on the overall respiratory diseases data (XLS, 211KB) for England was small; however, caution is advised when comparing data for 2001 to 2013 and 2014 to 2017.
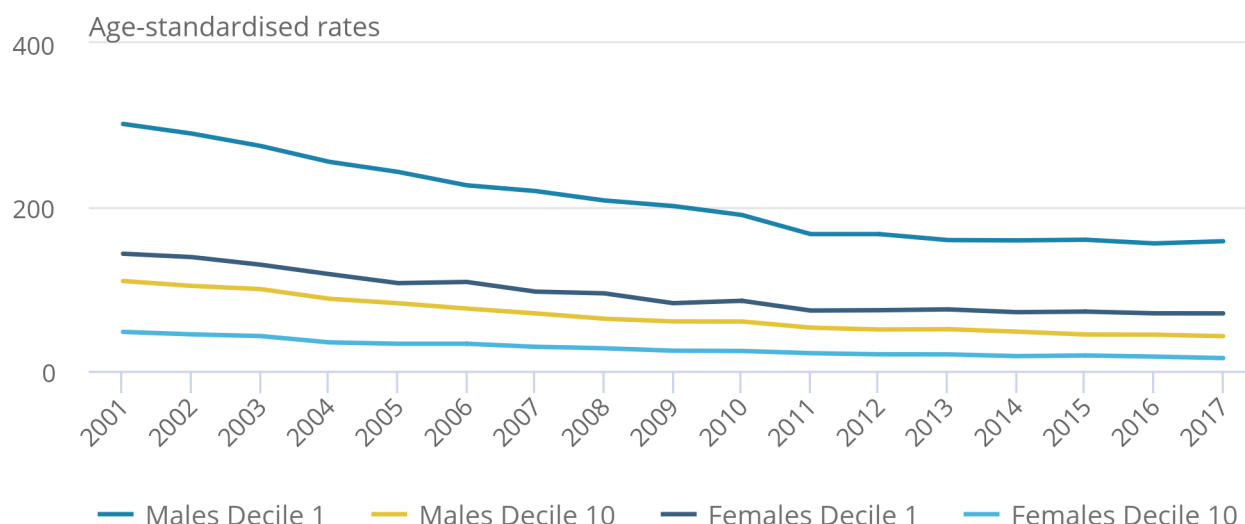
Cardiovascular diseases

Between 2001 and 2017, mortality rates caused by cardiovascular diseases showed a statistically significant reduction for males and females living in both the most and least deprived areas (Figure 3). The largest absolute changes were observed in the most deprived areas with decreases of 143.3 deaths per 100,000 males and 72.9 deaths per 100,000 females. In comparison the absolute changes in the least deprived areas were 67.4 deaths per 100,000 males and 32.0 deaths per 100,000 females. These decreases led to the absolute gap between the most and least deprived areas to be narrower in 2017 than 2001, decreasing by 40% for males and 43% for females.

Even though mortality rates halved in the most deprived areas, they remained statistically significantly higher than the least deprived areas in 2017 (3.7 times higher for males and 4.5 times higher for females). Additionally, in 2017, males had statistically significant higher rates of cardiovascular disease deaths than females when living in the same deprivation decile. However, while males are generally at additional risk of death from cardiovascular diseases, the effect of deprivation is important: this analysis has shown that females in the most deprived areas had statistically significant higher avoidable mortality rates from cardiovascular diseases than males living in the least deprived areas.

Between 2001 and 2010, mortality rates for males and females living in the most and least deprived areas generally decreased year-on-year with an overall statistically significant decline. In contrast, between 2011 and 2017, a slowing down in improvement was observed with year-on-year changes considerably smaller than the earlier period.

Figure 3: Age-standardised avoidable mortality rates for cardiovascular diseases, by sex, England, 2001 to 2017

Age-standardised rates

Males Decile 1 —— Males Decile 10 —— Females Decile 1 —— Females Decile 10

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in each calendar year.

2. Figures for England exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Index of Multiple Deprivation (IMD), which is the official measure of relative deprivation. IMD 2004 was used for data years 2001 to 2005, IMD 2007 was used for years 2006 to 2008, IMD 2010 was used for years 2009 to 2013 and IMD 2015 was used for years 2014 to 2017.

5. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.
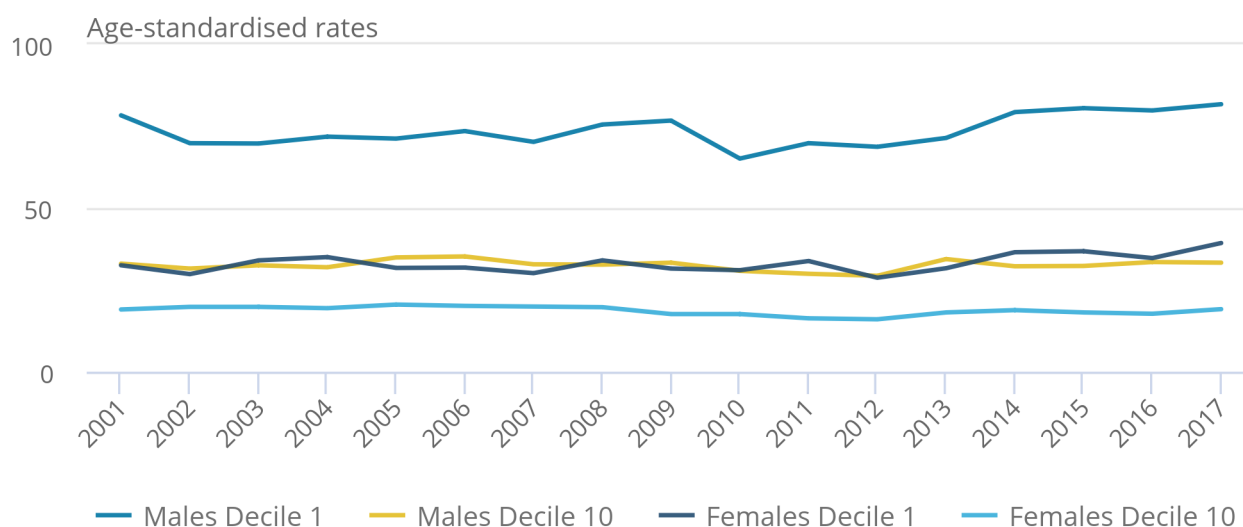
Injuries

Between 2001 and 2017, mortality rates for injuries increased for both sexes living in both the most and least deprived areas, however, these increases were only statistically significant for females in the most deprived areas with a rise of 21% (Figure 4). The increases mostly occurred in the period 2011 to 2017 for both sexes.For example, between 2001 and 2010, an overall statistically significant fall of 17% was observed for males living in the most deprived areas; while most other deciles experienced non-significant falls. In comparison, between 2011 and 2017, statistically significant increases occurred for males (17%) and females (16%) living in the most deprived areas.

These increases have caused the absolute gap to be wider in 2017 than it was in 2010, increasing by 41% for males and 51% for females. Although the gap has widened between 2001 and 2017 for both sexes, it has only increased by 7% for males compared with 50% for females. The increase in the female absolute gap between 2001 and 2017 has mostly risen because rates have remained similar in the least deprived areas, while they have statistically significantly increased in the most deprived areas.

Figure 4: Age-standardised avoidable mortality rates for injuries, by sex, England, 2001 to 2017

Figure 4: Age-standardised avoidable mortality rates for injuries, by sex, England, 2001 to 2017

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in each calendar year.

2. Figures for England exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Index of Multiple Deprivation (IMD), which is the official measure of relative deprivation. IMD 2004 was used for data years 2001 to 2005, IMD 2007 was used for years 2006 to 2008, IMD 2010 was used for years 2009 to 2013 and IMD 2015 was used for years 2014 to 2017.

5. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.

Respiratory diseases

The size of mortality rates for respiratory diseases was sharply contrasting between those living in the most and least deprived areas (Figure 5). For males, the gap in mortality was 60.1 deaths per 100,000 in 2017, increasing by 1% since 2001. Mortality rates have mostly non-significantly fluctuated for males living in the most deprived areas throughout the time series but ended the series with a slightly lower rate. There was much less volatility in the rate of death among males living in the least deprived areas. Although a similar small fall of 4.5 deaths per 100,000 was observed between 2001 and 2017, this represented a fall in the rate of death of 29%.

For females living in the most deprived areas, there was a slight rise in avoidable respiratory disease deaths between 2001 and 2017 and a fall among females living in the least deprived areas. The absolute gap in female respiratory disease deaths widened by 15% between 2001 and 2017, which indicates a particular lack of improvement in respiratory disease deaths in females.

The substantially higher rates observed in the most deprived areas compared with the least deprived areas can be linked to differential smoking prevalence and exposure to air pollution, both of which are higher in more deprived areas, and these two factors combined have a role in increasing risk of respiratory-related mortality.

Figure 5: Age-standardised avoidable mortality rates for respiratory diseases, by sex, England, 2001 to 2017

Figure 5: Age-standardised avoidable mortality rates for respiratory diseases, by sex, England, 2001 to 2017
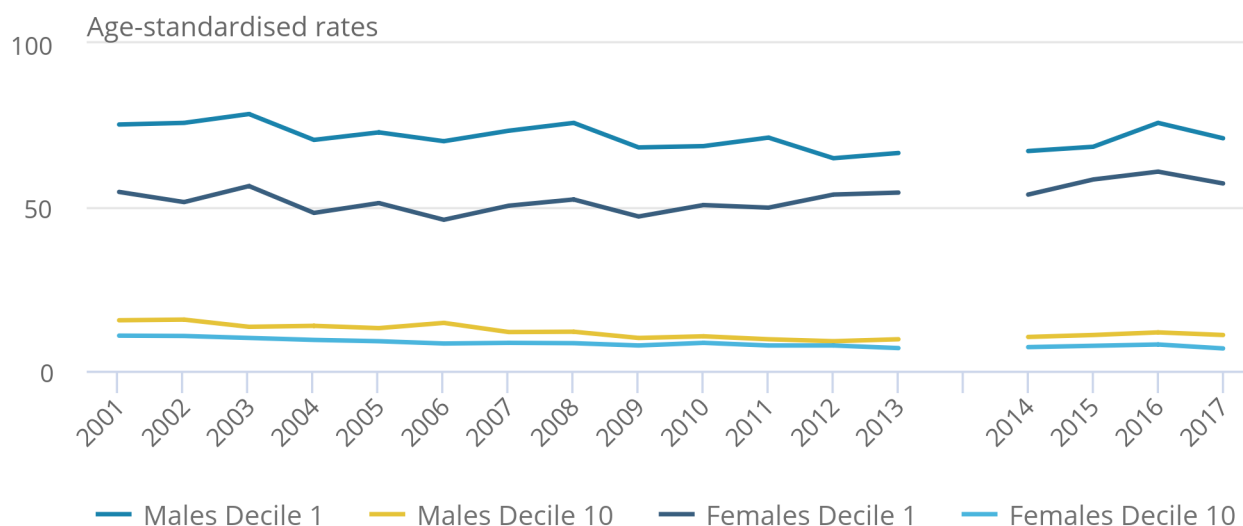
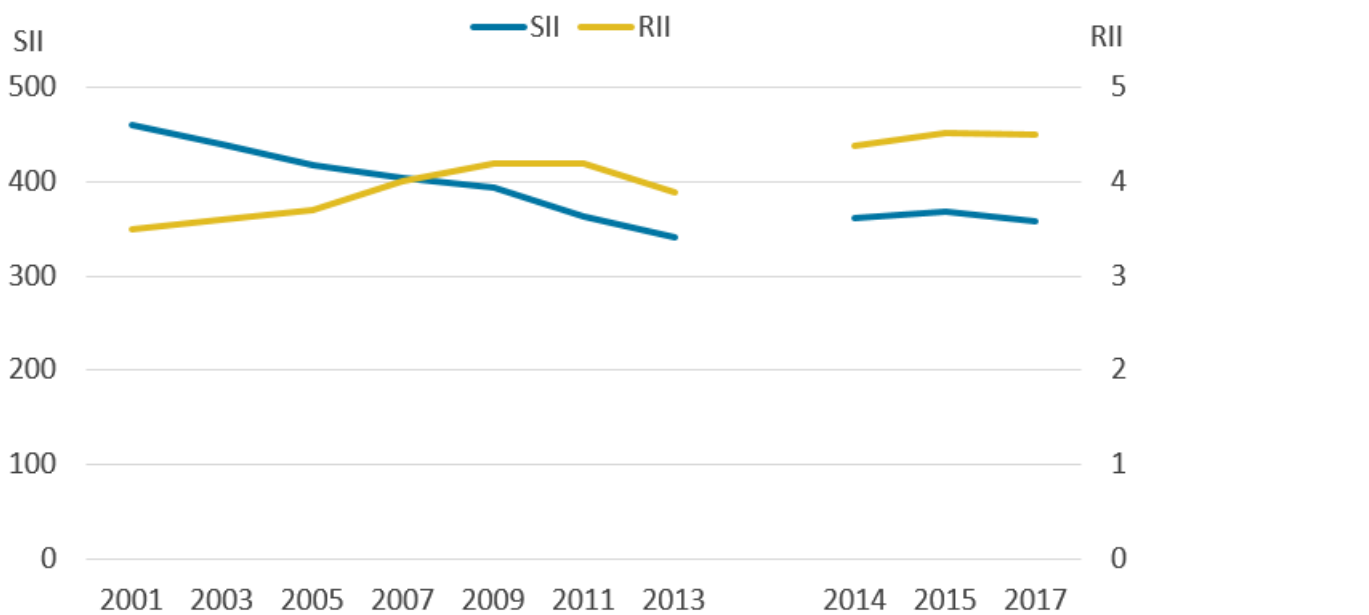**Source: Office for National Statistics**

Notes:

1. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

2. Figures are for deaths registered in each calendar year.

3. Figures for England exclude deaths of non-residents.

4. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

5. Deprivation deciles are based on the Index of Multiple Deprivation (IMD), which is the official measure of relative deprivation. IMD 2004 was used for data years 2001 to 2005, IMD 2007 was used for years 2006 to 2008, IMD 2010 was used for years 2009 to 2013 and IMD 2015 was used for years 2014 to 2017.

6. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.

Males and females in the most deprived areas in England were 4.5 and 3.9 times respectively more likely to die of an avoidable cause in 2017

The slope index of inequality (SII) represents the difference between the hypothetical "most" and "least" deprived on the deprivation scale. Between 2001 and 2013, the inequality in the avoidable mortality rate for males showed a statistically significant fall, decreasing from 461.0 deaths per 100,000 in 2001 to 340.6 deaths per 100,000 in 2013 (Figure 6). Since the definition change introduced in 2014, the SII was higher than in 2013, however, it has non-significantly fluctuated since. The SII in 2017 indicates that males living in the most deprived areas were experiencing an additional 358.3 avoidable deaths per 100,000 compared with the least deprived areas.

The relative index of inequality (RII) reports the ratio of avoidable mortality for the most to the least deprived areas. The RII for males has increased over the past 17 years. In 2001, males in the most deprived areas were 3.5 times more likely to die of an avoidable cause than males in the least deprived areas. In 2015, the RII reached a peak of 4.5 times more likely, from which it has remained unchanged.

Figure 6: Slope index of inequality (SII) and relative index of inequality (RII) for males, England, 2001 to 2017

Source: Office for National Statistics
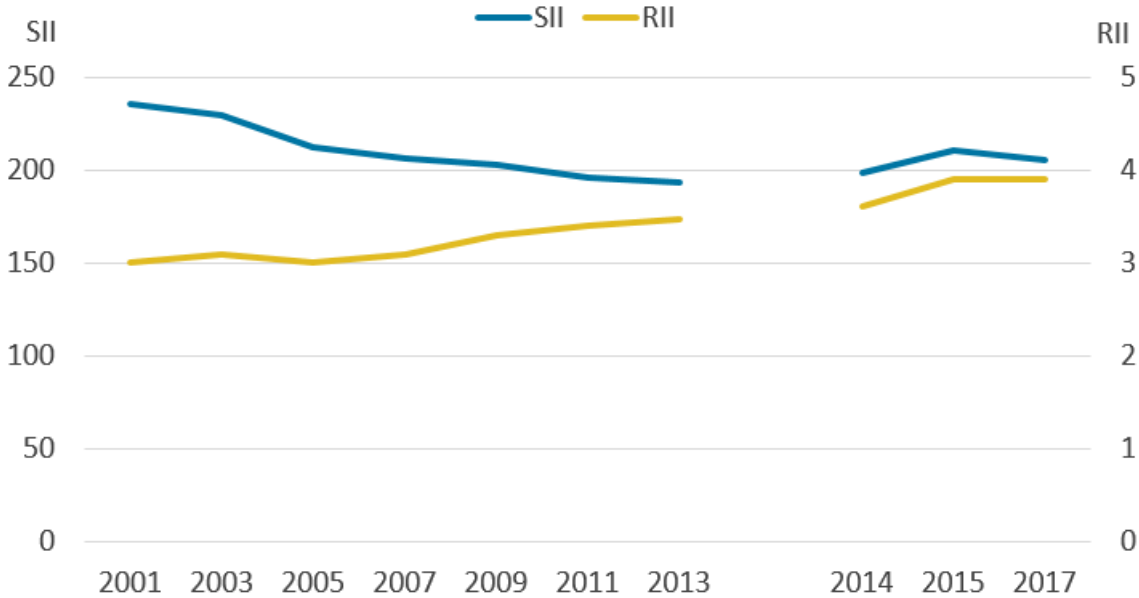
Notes:

1. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

2. Figures are for deaths registered in each calendar year.

3. Figures for England exclude deaths of non-residents.

4. The SII is reported as a positive value to demonstrate increasing mortality rates with increasing deprivation. However, because the relative rank ranges from 0 (most deprived) to 100 (least deprived) the actual SII is negative.

Like males, the SII for females showed a statistically significant reduction between 2001 and 2013 from 235.6 deaths per 100,000 females to 193.2 deaths per 100,000 females. In contrast, the SII increased between 2014 and 2017, although this was not statistically significant; specifically, there were 205.5 additional deaths per 100,000 females in the most deprived areas compared with the least deprived areas in 2017.

In 2001, the RII showed females living in the most deprived areas were 3.0 times more likely to die from an avoidable cause than females living in the least deprived areas. Since then the RII has increased, reaching a peak in 2015 of 3.9 times more likely; this figure has remained unchanged.

Figures 6 and 7 suggest contrasting avoidable mortality risks were present in England over the period 2001 to 2017. On the most part, the absolute gap between the most and least deprived areas has contracted while the relative gaps have grown suggesting that the link between socioeconomic deprivation and avoidable mortality remains a strong determinant of premature health risks across a range of health conditions.

Figure 7: Slope index of inequality (SII) and relative index of inequality (RII) for females, England, 2001 to 2017

Source: Office for National Statistics

Notes:

1. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

2. Figures are for deaths registered in each calendar year.

3. Figures for England exclude deaths of non-residents.

4. The SII is reported as a positive value to demonstrate increasing mortality rates with increasing deprivation. However, because the relative rank ranges from 0 (most deprived) to 100 (least deprived) the actual SII is negative.

3 . Relationship between avoidable mortality and deprivation in Wales

Different measures of area-level deprivation are used in England and Wales so measures of socioeconomic inequality in avoidable mortality were estimated separately and comparisons between the countries are not advised.

When discussing avoidable deaths, the following terms are used:

- amenable (treatable) mortality – deaths that could be avoided through timely and effective healthcare

- preventable mortality – deaths that could be avoided by public health interventions

- avoidable mortality – deaths that are amenable, preventable or both, where each death is counted only once

Statistically significant higher avoidable mortality rates were observed in the most deprived areas in Wales in 2017 compared with the least deprived areas

In 2017, the avoidable mortality rate for males in the most deprived areas (decile 1) in Wales was 528.5 deaths per 100,000, which was statistically significantly higher than 164.1 deaths per 100,000 in the least deprived areas (decile 10). Like males, the female avoidable mortality rate in the most deprived areas in Wales (325.6 deaths per 100,000) was statistically significantly higher than in the least deprived areas (102.8 deaths per 100,000).
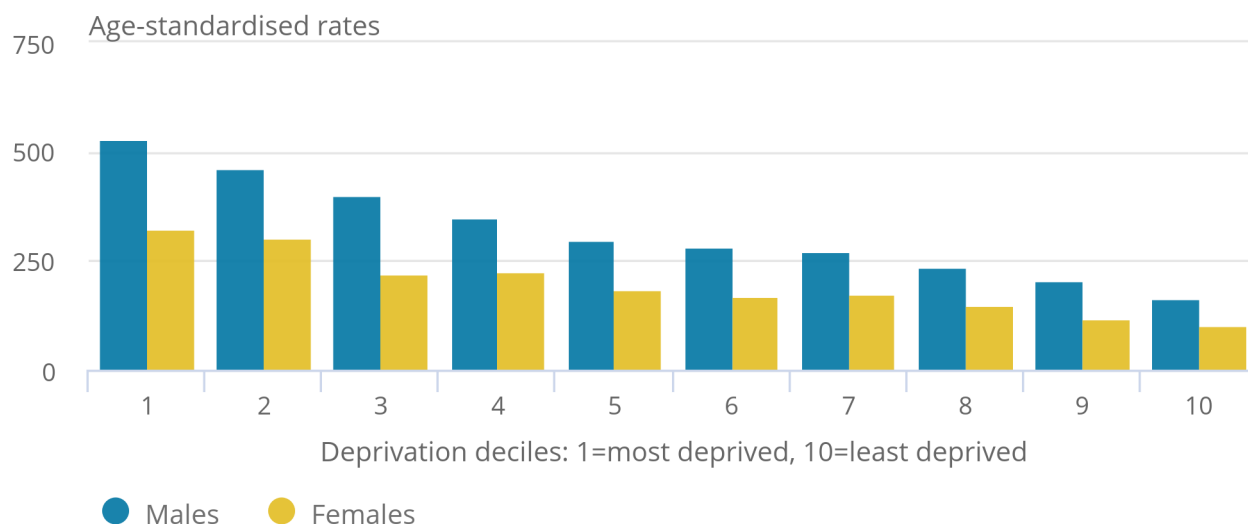
For males, the mortality rates between adjacent deciles reduced as deprivation lessened, with the largest adjacent decile gap observed between deciles 1 and 2. Additionally, the rate in decile 1 was statistically significantly higher than eight other deciles while the rate in decile 10 was statistically significantly lower than all other deciles in 2017.

For females, the mortality rate in the majority of adjacent deciles decreased except for deciles 3 and 4 and 6 and 7 where rates increased. The largest gap between adjacent deciles was between deciles 2 and 3 with the rate statistically significantly decreasing. The rate for females in decile 1 was statistically significantly higher than eight of the other deciles and the rate for females in decile 10 was statistically significantly lower than eight other deciles.

Males had a statistically significantly higher avoidable mortality rate than females across all deciles. However, males exposed to lower levels of deprivation (those living in deciles 8 and above) had a statistically significant lower rate of avoidable mortality than females in decile 1 (Figure 8).

Figure 8: Age-standardised avoidable mortality rates, by sex, Wales, 2017

Age-standardised rates

Deprivation deciles: 1=most deprived, 10=least deprived

● Males ● Females

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in 2017.

2. Figures for Wales exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Welsh Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with decile 1 representing the most deprived areas and decile 10 representing the least deprived areas, WIMD 2014 was used for 2017.

The absolute gap between avoidable mortality rates for females increased between 2014 and 2017 in Wales
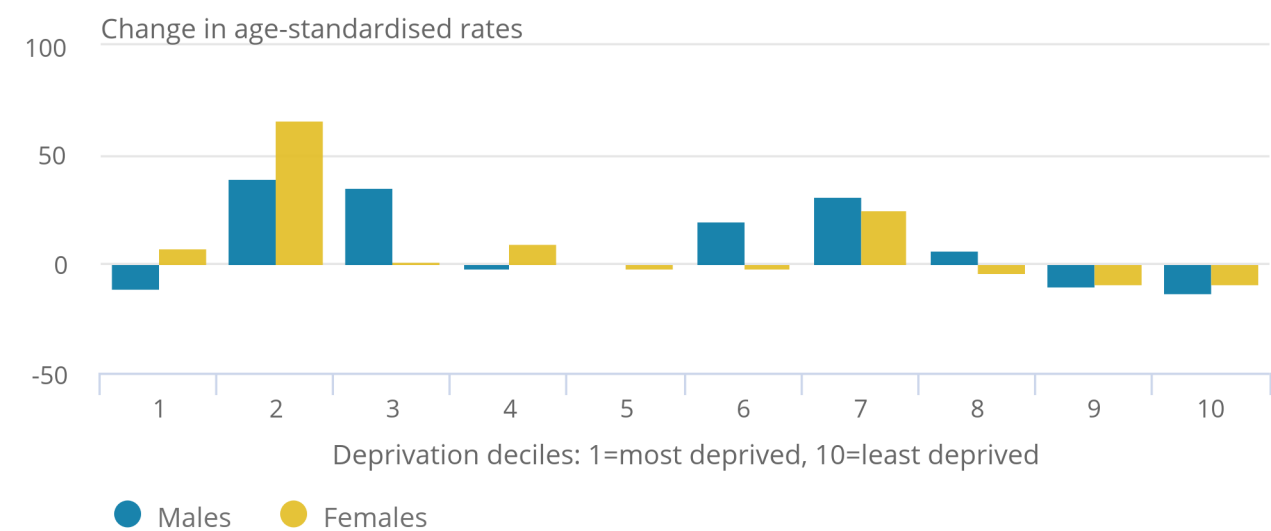
The changes in age-standardised avoidable mortality rates between 2014 and 2017 were different across sex and levels of deprivation in Wales (Figure 9).

For males, improvements were mainly observed in deciles located at the extremes of the scale, with an improvement of 11.4 fewer deaths per 100,000 males in the most deprived areas and 13.3 fewer deaths per 100,000 males in the least deprived areas. Mortality rates across six deciles worsened between 2014 and 2017 with the largest changes observed in the more deprived areas, where decile 2 had an additional 39.2 deaths per 100,000 males and decile 3 had an additional 35.7 deaths per 100,000 males. However, all changes observed between 2014 and 2017 were non-significant. The scale of change in the absolute gap between males living in the most and least deprived areas was negligible between 2014 and 2017.

For females, improvements in mortality rates were observed across five deciles in Wales with the largest improvements in the least deprived areas (decile 9 had 9.1 fewer deaths per 100,000 females and decile 10 had 9.2 fewer deaths per 100,000 females), however, these were not statistically significant. This greatly contrasted with the most deprived areas where decile 1 and decile 2 mortality rates increased between 2014 and 2017 with a statistically significant increase in mortality rates observed for decile 2 (an additional 65.6 deaths per 100,000 females). More than half of this increase is a result of rises in avoidable deaths caused by injuries and respiratory diseases. This led to the gap between the most and least deprived areas widening.

Figure 9: Change in age-standardised avoidable mortality rates between 2014 and 2017, by sex, Wales

Change in age-standardised rates

Source: Office for National Statistics

Notes:

1. Figures refer to the change in age-standardised avoidable mortality rates between 2014 and 2017. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.

2. Figures for Wales exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Welsh Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with decile 1 representing the most deprived areas and decile 10 representing the least deprived areas, WIMD 2014 was used for 2014 to 2017.

There were statistically significant decreases in avoidable deaths caused by cardiovascular diseases for both sexes between 2001 and 2017

As with England we report the relationship between deprivation and three broad causes of avoidable mortality: cardiovascular diseases, injuries and respiratory diseases. Throughout 2001 and 2017, the avoidable mortality definition for cardiovascular diseases and injuries did not change so direct comparisons are possible. As part of the definition change in 2014, some diseases were added to the respiratory diseases section. There was no effect on the avoidable mortality rates overall for Wales (XLS, 211KB) ; however, caution is advised when comparing data for 2001 to 2013 and 2014 to 2017.
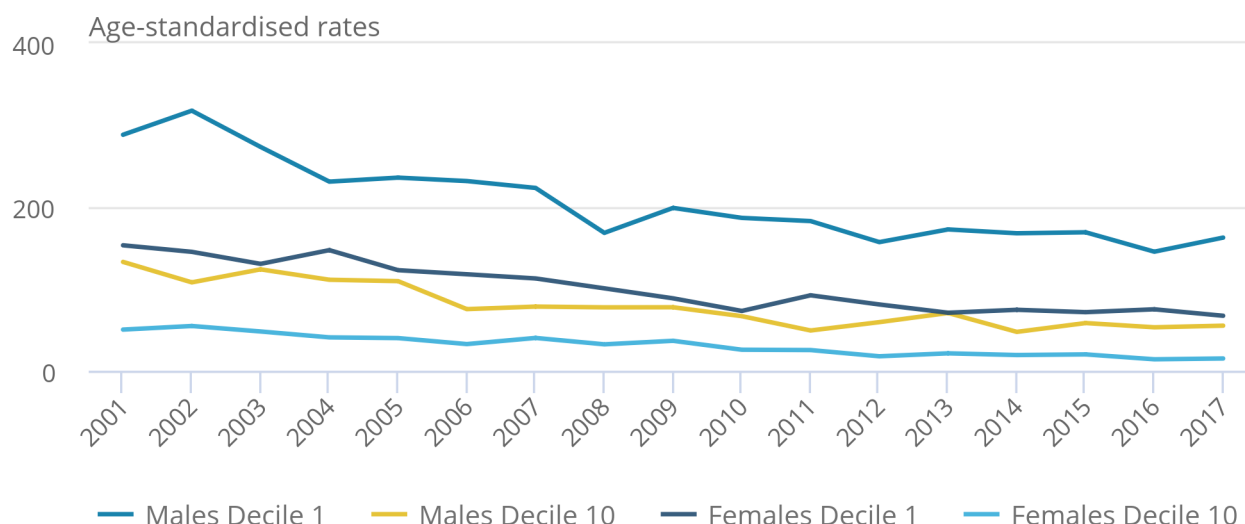
Cardiovascular diseases

Between 2001 and 2017, there was a statistically significant decrease in mortality rates caused by cardiovascular diseases for males and females in the most and least deprived areas. The largest absolute changes were observed in the most deprived areas with decreases of 125.7 deaths per 100,000 males and 86.1 deaths per 100,000 females. In comparison the absolute changes in the least deprived areas were 77.9 deaths per 100,000 males and 35.3 deaths per 100,000 females (Figure 10).

These decreases led the absolute gap to be narrower in 2017 compared with 2001 (31% smaller for males and 49% smaller for females). Despite the statistically significant decreases in the most deprived areas, mortality rates remained statistically significantly higher than in the least deprived areas in 2017 for males and females.

Greater improvements in mortality rates were observed for males and females between 2001 and 2010 compared with 2011 and 2017 with statistically significant decreases in the first period compared with non-significant changes in the latter period. The large reduction in the rate of improvement especially among more deprived populations is an important influence on the general stalling of mortality improvement since 2011.

Figure 10: Age-standardised avoidable mortality rates for cardiovascular diseases, by sex, Wales, 2001 to 2017

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in each calendar year.

2. Figures for Wales exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Welsh Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation. WIMD 2005 was used for data years 2001 to 2006, WIMD 2008 was used for years 2007 to 2009, WIMD 2011 was used for years 2010 to 2013 and WIMD 2014 was used for years 2014 to 2017.

5. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.
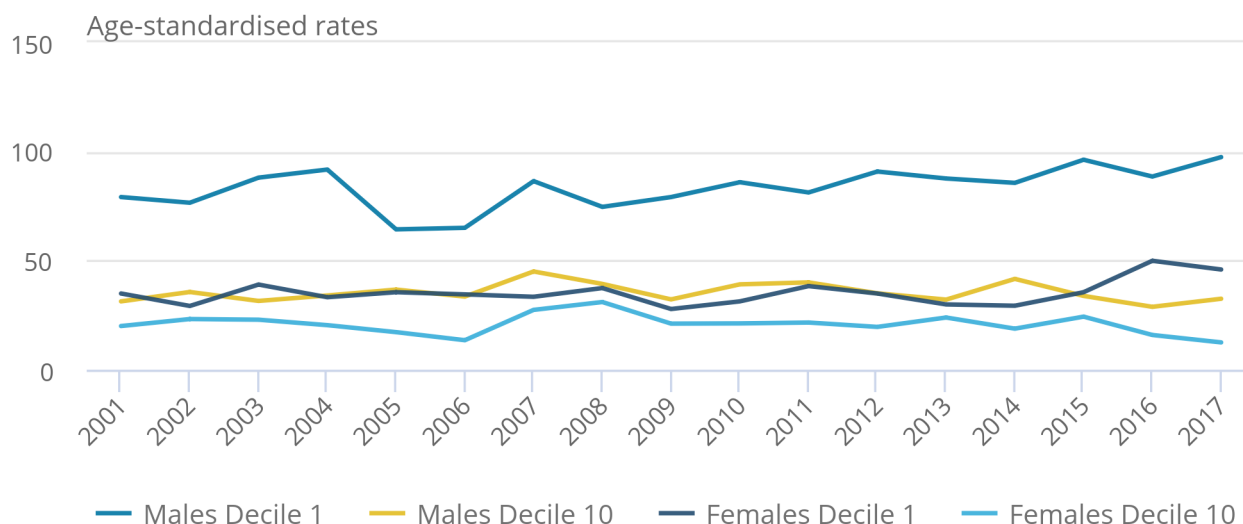
Injuries

Between 2001 and 2017, mortality rates caused by injuries fluctuated with overall non-significant increases for males and females living in the most deprived areas and males living in the least deprived areas. The observed increases led the gap in 2017 to be wider than in 2001, increasing by a third for males and more than double for females (Figure 11).

In the period 2001 to 2010, there were a mixture of non-significant fluctuations for both sexes in the most and least deprived areas and this trend continued in 2011 to 2017. These fluctuations mean there is little evidence of sustained improvement for both sexes across all levels of deprivation in avoidable injury deaths.

Figure 11: Age-standardised avoidable mortality rates for injuries, by sex, Wales, 2001 to 2017

Figure 11: Age-standardised avoidable mortality rates for injuries, by sex, Wales, 2001 to 2017

Source: Office for National Statistics

Notes:

1. Figures are for deaths registered in each calendar year.

2. Figures for Wales exclude deaths of non-residents.

3. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

4. Deprivation deciles are based on the Welsh Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation. WIMD 2005 was used for data years 2001 to 2006, WIMD 2008 was used for years 2007 to 2009, WIMD 2011 was used for years 2010 to 2013 and WIMD 2014 was used for years 2014 to 2017.

5. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.

Respiratory diseases

Between 2001 and 2017, there were non-significant decreases in mortality rates caused by respiratory diseases in the least deprived areas for males and females. However, in the most deprived areas non-significant increases were observed. Interestingly, respiratory diseases are the only condition where the mortality rates for females in the most deprived areas either exceed or are similar to those observed in their male counterparts with the mortality rate for males in decile 1 being non-significantly lower than females in 2017 (Figure 12).

Notwithstanding the fluctuating picture across levels of area deprivation during the time series, the absolute gap was wider in 2017 than it was in 2001 increasing by 23% for males and 62% for females.

Figure 12: Age-standardised avoidable mortality rates for respiratory diseases, by sex, Wales, 2001 to 2017

Figure 12: Age-standardised avoidable mortality rates for respiratory diseases, by sex, Wales, 2001 to 2017
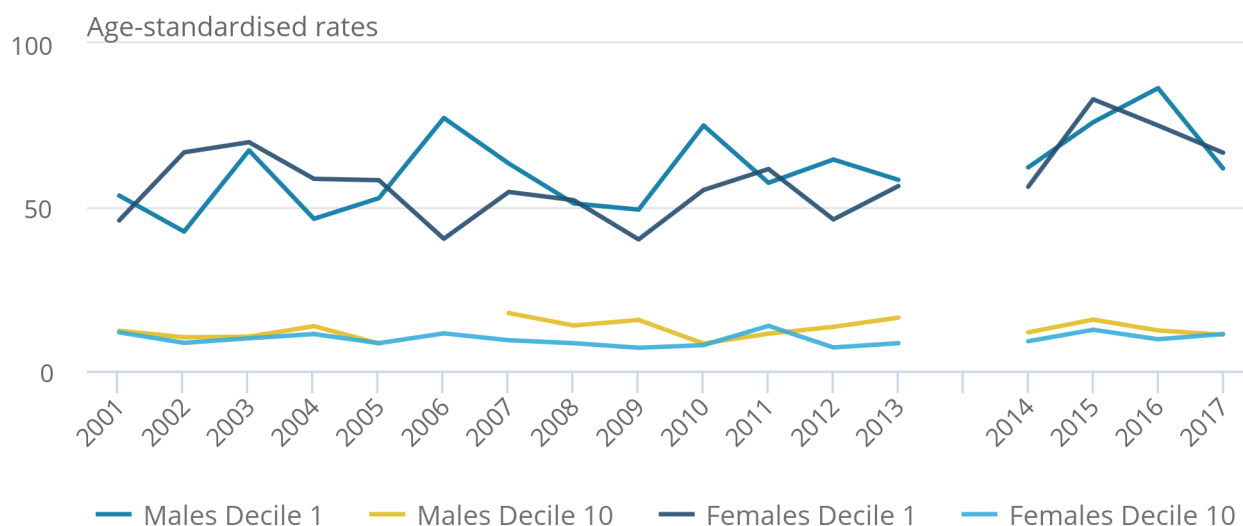
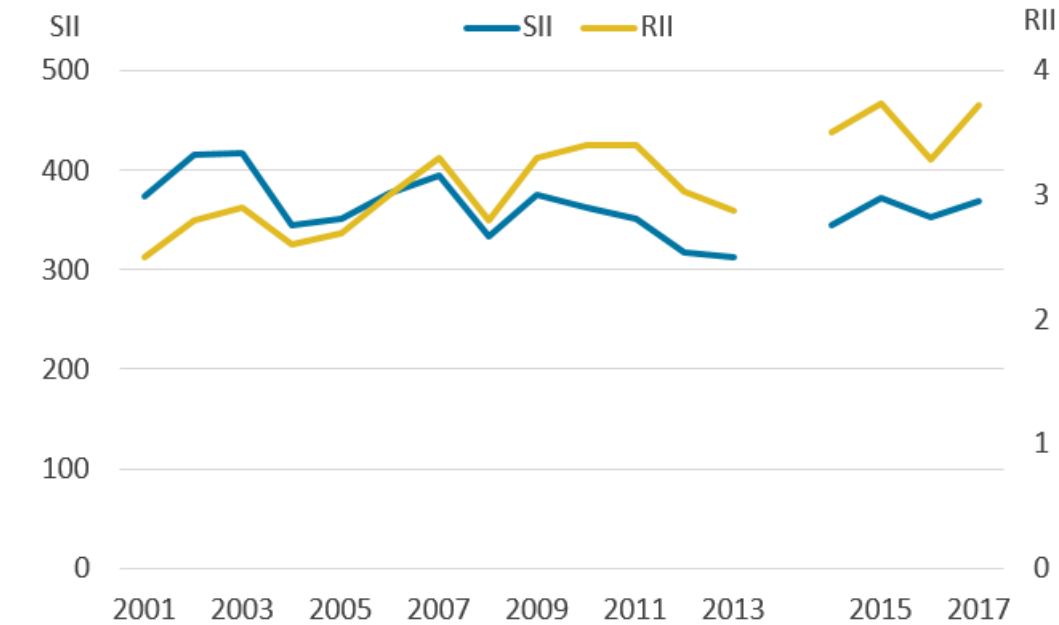**Source: Office for National Statistics**

Notes:

1. Age-standardised mortality rates based on fewer than 10 deaths are not presented due to low reliability which is why data is missing in 2006 for decile 10 males.

2. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

3. Figures are for deaths registered in each calendar year.

4. Figures for Wales exclude deaths of non-residents.

5. Age-standardised mortality rates are expressed per 100,000 population and standardised to the 2013 European Standard Population. Age-standardised mortality rates are used to allow comparison between populations that may contain different proportions of people of different ages.

6. Deprivation deciles are based on the Welsh Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation. WIMD 2005 was used for data years 2001 to 2006, WIMD 2008 was used for years 2007 to 2009, WIMD 2011 was used for years 2010 to 2013 and WIMD 2014 was used for years 2014 to 2017.

7. Decile 1 represents the most deprived areas and decile 10 represents the least deprived areas.

The inequality in the risk of dying from an avoidable cause of death between the most and least deprived areas was 3.7 times more likely for males and 3.8 times more likely for females in Wales in 2017

The slope index of inequality (SII) represents the difference between the hypothetical "most" and "least" deprived on the deprivation scale. The inequality in mortality rates for males fluctuated throughout the time series with an overall non-significant decrease between 2001 and 2013 from 374.3 deaths per 100,000 males to 313.4 deaths per 100,000 males. However, non-significant increases were observed between 2014 and 2017 with the SII in 2017 indicating there were 368.4 additional deaths per 100,000 males living in the most deprived areas compared with the least deprived areas, which was a similar figure to the SII in 2001 (Figure 13). This suggests the gains made in reducing the absolute inequality during the first decade have largely reversed in the second decade.

The relative index of inequality (RII) reports the ratio of avoidable mortality for the most to the least deprived areas. Over the past 17 years, the RII for males in Wales also fluctuated. There was an overall increase from 2.5 times more likely to die from an avoidable cause of death if living in the most deprived areas than in the least deprived areas in 2001 to 3.7 times more likely in 2017 (Figure 13).

Figure 13: Slope index of inequality (SII) and relative index of inequality (RII) for males, Wales, 2001 to 2017

Source: Office for National Statistics

Notes:

1. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

2. Figures are for deaths registered in each calendar year.

3. Figures for Wales exclude deaths of non-residents.

4. The SII is reported as a positive value to demonstrate increasing mortality rates with increasing deprivation. However, because the relative rank ranges from 0 (most deprived) to 100 (least deprived) the actual SII is negative.

Like males, the SII for females decreased between 2001 and 2013 from 231.0 deaths per 100,000 females to 165.1 deaths per 100,000 females, however, these decreases were statistically significant. From 2014 to 2016, increases were observed followed by a non-significant decrease in 2017 to 229.9 deaths per 100,000 females. Despite these overall decreases, the SII in 2017 was similar to the SII in 2001 indicating lack of improvement in reducing the absolute inequality between the most and least deprived areas.

Even though the RII for females fluctuated from 2001 to 2013, it returned to its 2001 value in 2013 with females living in the most deprived areas 2.5 times more likely to die from an avoidable cause than those living in the least deprived areas. From 2014 to 2016, the RII increased and has remained unchanged in 2017 at 3.8 times more likely, which was a consequence of the SII growing sharply (Figure 14).

The results for both males and females suggest contrasting mortality risks have been present in Wales throughout the 21st Century and represent considerable opportunity for health improvement through a reduction in deaths considered avoidable amongst the most deprived populations.

Figure 14: Slope index of inequality (SII) and relative index of inequality (RII) for females, Wales, 2001 to 2017

Office for National Statistics
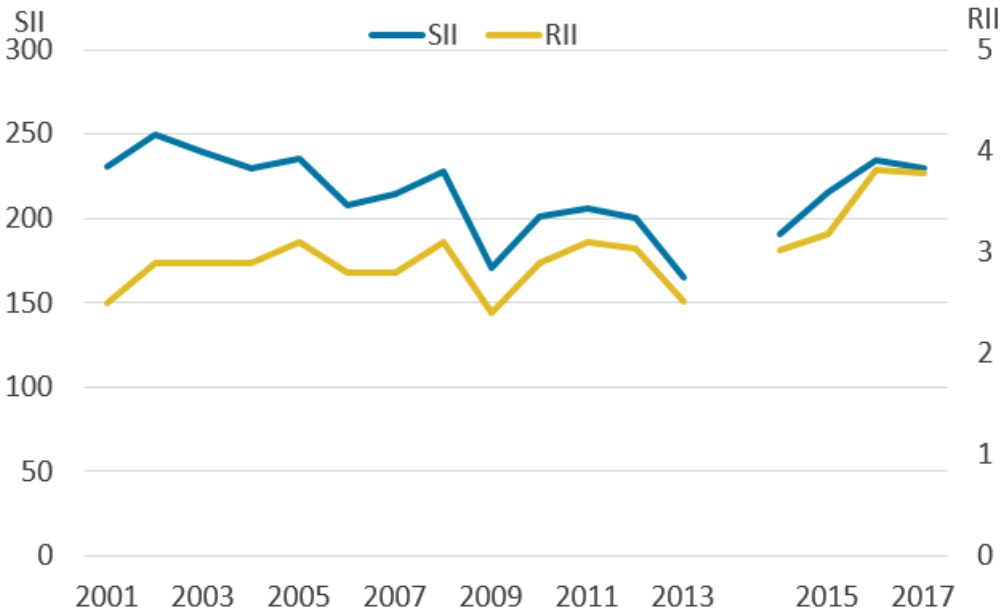
Notes:

1. Data years 2001 to 2013 and 2014 to 2017 are based on different avoidable mortality definitions. As a result, the data for these years are not directly comparable.

2. Figures are for deaths registered in each calendar year.

3. Figures for Wales exclude deaths of non-residents.

4. The SII is reported as a positive value to demonstrate increasing mortality rates with increasing deprivation. However, because the relative rank ranges from 0 (most deprived) to 100 (least deprived) the actual SII is negative.

4 . Socioeconomic inequalities in avoidable mortality, England and Wales: 2001 to 2017

Socioeconomic inequalities in avoidable mortality: England analysis – annual age-standardised mortality rates by deprivation decile, sex and cause as well as absolute (slope index of inequality) and relative (relative index of inequality) measures of inequality in England.

Socioeconomic inequalities in avoidable mortality: Wales analysis – annual age-standardised mortality rates by deprivation decile, sex and cause as well as absolute (slope index of inequality) and relative (relative index of inequality) measures of inequality in Wales.

5 . Glossary

Amenable mortality

A death is amenable (treatable) if, in the light of medical knowledge and technology available at the time of death, all or most deaths from that cause (subject to age limits if appropriate) could be avoided through good quality healthcare.

Preventable mortality

A death is preventable if, in the light of understanding of the determinants of health at the time of death, all or most deaths from that cause (subject to age limits if appropriate) could be avoided by public health interventions in the broadest sense.

Avoidable mortality

Avoidable deaths are all those defined as preventable, amenable (treatable) or both, where each death is counted only once; where a cause of death is both preventable and amenable, all deaths from that cause are counted in both categories when they are presented separately.

Statistical significance

The term "significant" refers to statistically significant changes or differences. Significance is determined by the 95% confidence intervals, where non-overlapping confidence intervals between figures demonstrate that the difference is unlikely to be due to random fluctuation.

Age-standardised mortality rates

Age-standardised mortality rates are used to allow comparisons between populations, which may contain different proportions of people of different ages.

Slope index of inequality (SII)

The SII models the absolute inequality (the difference between the hypothetical most and least deprived populations) using weighted linear regression, which takes account of the inequality across all adjacent deciles of relative deprivation, rather than focusing only on the differencing of the two extremes.

Relative index of inequality (RII)

The RII acts as a ratio showing how much more likely an outcome of interest (in this case avoidable mortality) occurs in the hypothetical most deprived populations compared with the hypothetical least deprived populations.

6 . Measuring these data

This article looks at the socioeconomic inequalities in avoidable mortality in England and Wales from 2001 to 2017. The analyses use age-standardised mortality rates by deprivation decile, sex and cause as well as absolute (slope index of inequality) and relative (relative index of inequality) measures of inequality. Figures are calculated using death registration data for England and Wales held by the Office for National Statistics (ONS).

Defining avoidable mortality

With advances in medical technology and wider public health interventions, deaths from conditions previously not avoidable may have since become avoidable. This means the avoidable mortality definition requires review and if appropriate, revisions. In 2015, a public consultation was conducted to review the definition of avoidable mortality. As a result, a revised avoidable mortality definition (PDF, 657KB) was implemented for data years 2014 onwards. Previously published data before 2014 have not been reproduced using the revised avoidable mortality definition.

Information about avoidable mortality including the full definitions can be found in the Quality and Methodology Information report and the accompanying datasets, which also include further breakdowns of data for amenable and preventable mortality.

We would like to clarify that our definition of avoidable mortality is different to the measure of avoidable deaths in hospital, which NHS trusts in England are required to publish figures on. We use a defined set of underlying causes of death that have been approved through consultation with users and expert guidance:

- those where it is reasonable to expect deaths to be avoided through good quality healthcare, even after the condition has developed (amenable mortality)

- those where it is possible to prevent the condition from occurring in the first place (incidence reduction) through wider public health interventions, such as those targeted at reducing the incidence of smoking (preventable mortality)

- the avoidable deaths in hospital measure is based on a record review of a sample of deaths deemed to be due to problems in care; avoidable deaths in hospital data are not intended to be comparable and are not currently collated centrally

Socioeconomic deprivation

Socioeconomic deprivation is measured using Indices of Multiple Deprivation, which provide an overall relative measure of deprivation for each Lower layer Super Output Area (LSOA). An LSOA is a small area with an average population of 1,500 people. The overall deprivation scores are ranked for all LSOAs within a country and can be divided into 10 groups (deciles) where decile 1 represents the most deprived LSOAs and decile 10 represents the least deprived LSOAs. The IMD is a score based on the area as a whole and not everyone within a LSOA necessarily experiences the same level or type of deprivation.

Different measures of area-level deprivation are used for England (Index of Multiple Deprivation, IMD) and Wales (Welsh Index of Multiple Deprivation, WIMD) so measures of socioeconomic inequality in avoidable mortality were estimated separately for England and Wales and comparisons between the countries are not advised.

Further information about this article can be found in the Quality and Methodology Information report.

7 . Strengths and limitations

The strengths of the socioeconomic inequalities in avoidable mortality article include:

- data are compiled using information supplied when a death is registered, which gives complete population coverage and ensures the estimates are of high-precision and representative of the underlying population at risk

- coding for cause of death is carried out according to the World Health Organisation (WHO) International Classification of Diseases ICD-10 and internationally-agreed rules

- statistics on avoidable mortality are presented based on the year these deaths were registered rather than the year of occurrence; this method is used because there is a requirement for consistent and timely data, despite a potential limitation in data quality caused by registration delays

The limitations of the socioeconomic inequalities in avoidable mortality article include:

- as the time series uses two different avoidable mortality definitions (2001 to 2013 and 2014 onwards) the ability to conduct time series analyses is constrained as the figures are not directly comparable except in circumstances where the causes of death included in the definition have not changed

- in a very small number of cause of death breakdowns, the number of deaths is either too small to report an age-standardised rate or too small to report a rate with reliability

- it is our practice not to calculate rates based on such small numbers, as they are imprecise and susceptible to inaccurate interpretation; age-standardised rates based on 10 to 19 deaths are marked with a "u" to warn users that their reliability is low

- provisional 2018 data were not used for this article therefore the time series is not fully up-to-date.

8 . You may also be interested in

- [Avoidable mortality in the UK](#)

- [Health state life expectancies by national deprivation deciles, England and Wales](#)

- [Changing trends in mortality in England and Wales: 1990 to 2017 (Experimental Statistics)](#)

- [Changing trends in mortality: a cross-UK comparison, 1981 to 2016](#)

- [Changing trends in mortality: an international comparison: 2000 to 2016](#)

- [Deaths registered in England and Wales (series DR): 2017](#)