

Article

Changing trends in mortality by national indices of deprivation, England and Wales: 2001 to 2018

Analysis of the recent changes in the trends of mortality rates in England and Wales, by deprivation (Experimental Statistics).

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1 . Other pages in this release

- [Changing trends in mortality in England and Wales: 1990 to 2018](#)
- [Changing trends in mortality by leading causes of death, England and Wales: 2001 to 2018](#)

2 . Main points

- Between 2001 and 2018, in the most deprived areas of England, mortality rates for males improved at a slower rate after 2011 compared with the earlier period, while female mortality rates worsened.
- In the most deprived areas in Wales, mortality rates worsened for both males and females after 2011.
- In England, there was also a slowdown in mortality improvements for those living in the least deprived areas after 2011; in Wales a slowdown was also evident for males whereas females worsened.

3 . Introduction

This analysis examines the recent changes in the trends of mortality rates in England and Wales, by deprivation. This is an extension of the [Changing trends in England and Wales: 1990 to 2018](#) release, which reports on the statistically significant slowdown in the long-term improvement in age-standardised mortality rates in the early 2010s.

Using [segmented regression](#), a technique that detects the presence of a significant change in trend (breakpoint), a breakpoint in males was found in the early 2010s, while for females two breakpoints were detected, one in the early 1990s and a second in the early 2010s. The breakpoints found in the early 2010s marked the slowdown in mortality.

Based on this evidence, this analysis sets a breakpoint at 2011 and identifies any changes in trend between 2001 to 2011 (pre-2011) and 2011 to 2018 (post-2011) by indices of multiple deprivation (IMD). This analysis focuses on those living in the most deprived areas (decile 1 in England, quintile 1 in Wales) and the least deprived areas (decile 10 in England, quintile 5 in Wales).

For this analysis, we have also used ratios to explain differences pre- and post-2011, however some of these ratios are based on relatively small numbers of deaths so caution is advised. More information regarding IMD and the different versions used across the time series in England and Wales can be found in [Section 9](#). Data for all deciles are also available in the accompanying datasets.

4 . Change in mortality trend for those living in the most and least deprived areas of England

Figure 1 shows that both males and females living in the most and the least deprived areas of England experienced a slowdown in the improvement of mortality rates since 2011. The largest slowdown in mortality improvement before and after 2011 was for males living in the most deprived areas, where mortality rates pre-2011 improved 138.1 times faster than post-2011.

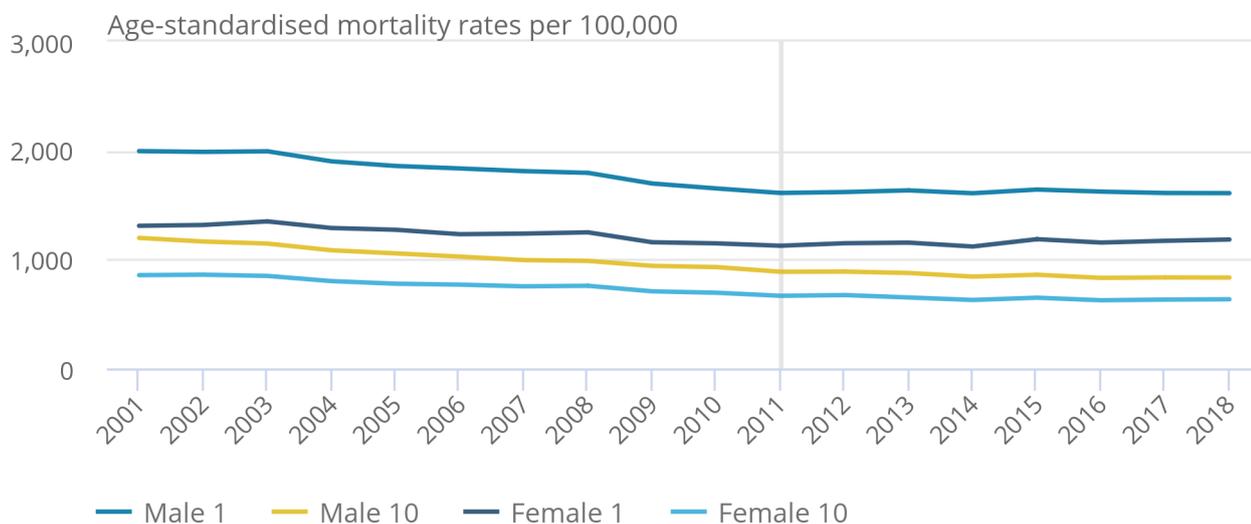
For females, mortality rates increased post-2011 for those living in the most deprived areas, from 1,125.7 deaths per 100,000 in 2011 to 1,183.1 deaths per 100,000 in 2018. This change is in line with findings reported in other Office for National Statistics (ONS) articles [Socioeconomic inequalities in avoidable mortality, England and Wales: 2001 to 2017](#) and [Health state life expectancies by national deprivation deciles, England and Wales: 2015 to 2017](#).

Figure 1: There was a slowdown in mortality improvement since 2011 for both males and females living in the most and least deprived areas

Age-standardised mortality rates for males and females living in the most and least deprived areas of England, all ages, 2001 to 2018

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Age-standardised mortality rates for males and females living in the most and least deprived areas of England, all ages, 2001 to 2018



Source: Office for National Statistics

Notes:

1. The plotline on the figure represents the 2011 breakpoint.
2. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
3. Figures exclude non-residents, based on boundaries as of August 2019.
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.

Change in mortality trend for people aged under 75 years living in the most and least deprived areas of England

Figure 2 shows that both males and females aged under 75 years living in the most and least deprived areas saw a slowdown in mortality improvement since 2011. For males, the largest slowdown in mortality improvement since 2011 was among males living in the most deprived areas; specifically, mortality rates pre-2011 improved over five times faster than post-2011.

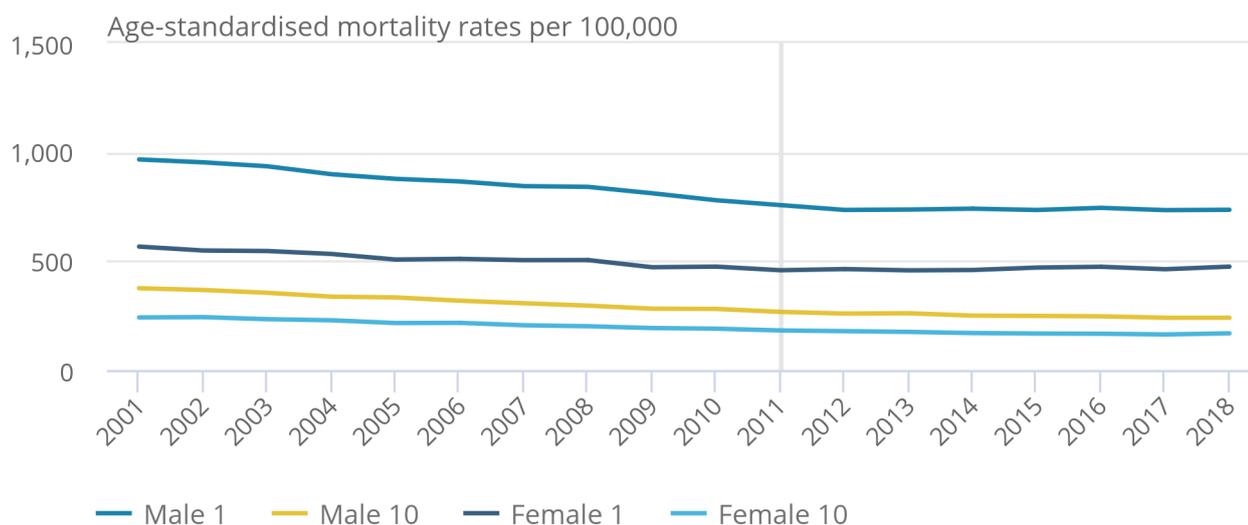
For females aged under 75 years, there was an increase in mortality rates for those living in the most deprived areas from 457.7 per 100,000 in 2011 compared with 474.3 per 100,000 in 2018. These findings correspond with the trends for all ages together (Figure 1).

Figure 2: Males aged under 75 years of age living in the most deprived areas have had the smallest improvements in mortality post-2011

Age-standardised mortality rates for males and females aged under 75 years living in the most and least deprived areas of England, 2001 to 2018

Figure 2: Males aged under 75 years of age living in the most deprived areas have had the smallest improvements in mortality post-2011

Age-standardised mortality rates for males and females aged under 75 years living in the most and least deprived areas of England, 2001 to 2018



Source: Office for National Statistics

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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.

Change in mortality trend for older age groups living in the most and least deprived areas of England

Looking in more detail at the older age groups (75 to 79 years, 80 to 84 years, 85 to 89 years, 90 years and over), Figures 3 and 4 show the [rate of change](#) in age-standardised mortality rates, allowing us to see that worsening mortality rates were evident for males and females living in both the most and least deprived areas.

Figure 3 shows that for males aged 75 to 79 years living in the most deprived decile, mortality rates fell an average of 2.8 deaths per 100,000 each year between 2001 and 2011. For the same group, mortality rates rose an average of 0.3 deaths per 100,000 each year between 2011 and 2018. The same pattern was observed in females for this age group and for ages 85 to 89 years and 90 years and over for both sexes.

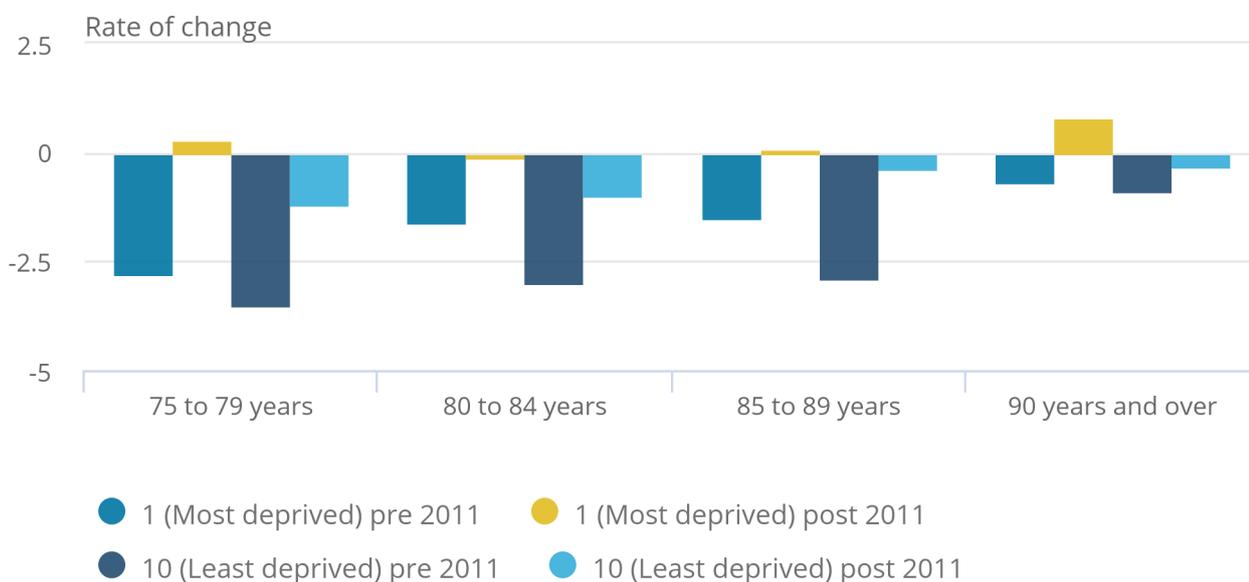
Pre-2011 mortality rates for males aged 80 to 84 years living in the most deprived areas improved nearly 14 times faster than they did post-2011. The same pattern is evident in females aged 80 to 84 years living in the most deprived areas, where mortality rates pre-2011 improved 17 times faster than they did post-2011.

Figure 3: There has been an increase in mortality rates since 2011 for males aged 75 to 79 years and 85 years and over

Rate of change in age-specific mortality rates for males pre- and post-2011 for ages 75 years and over, England

Figure 3: There has been an increase in mortality rates since 2011 for males aged 75 to 79 years and 85 years and over

Rate of change in age-specific mortality rates for males pre- and post-2011 for ages 75 years and over, England



Source: Office for National Statistics

Notes:

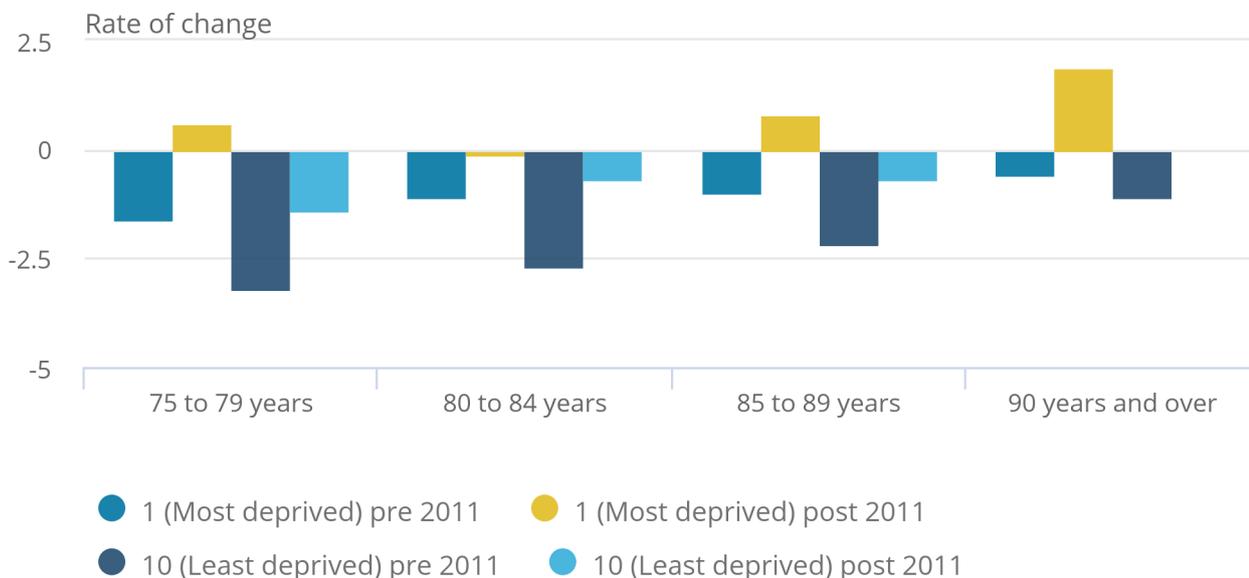
1. Figures refer to the rate of change in age-specific mortality rates (the average increase or decrease per year) between 2001 to 2011 and 2011 to 2018. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.
2. Figures exclude non-residents, based on boundaries as of August 2019.
3. 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.

Figure 4: Mortality rates for females aged 80 to 84 years pre-2011 improved 17 times faster than they did post-2011

Rate of change in age-specific mortality rates for females pre- and post-2011 for ages 75 years and over, England

Figure 4: Mortality rates for females aged 80 to 84 years pre-2011 improved 17 times faster than they did post-2011

Rate of change in age-specific mortality rates for females pre- and post-2011 for ages 75 years and over, England



Source: Office for National Statistics

Notes:

1. Figures refer to the rate of change in age-specific mortality rates (the average increase or decrease per year) between 2001 to 2011 and 2011 to 2018. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.
2. Figures exclude non-residents, based on boundaries as of August 2019.
3. 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.

5 . Change in mortality trend for those living in the most and least deprived areas of Wales

The change in mortality rates pre- and post-2011 for males and females within Wales is shown in Figure 5. For males living in the least deprived areas, there was a slowdown in mortality where rates pre-2011 were improving at a rate six times faster than post-2011.

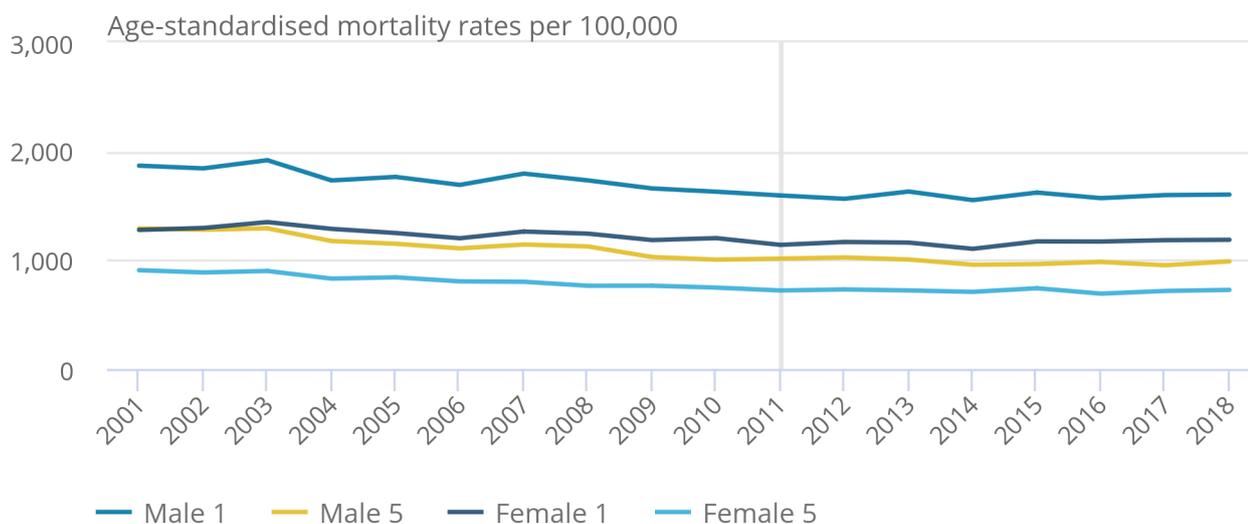
For females living in the most and least deprived areas, and for males living in the most deprived areas, there was an increase in mortality rates. These findings are in line with previous findings reported in [Health state life expectancies by national deprivation deciles](#).

Figure 5: Mortality rates for males living in the least deprived areas improved six times faster pre-2011 than post-2011

Age-standardised mortality rates for males and females living in the most and least deprived areas of Wales, all ages, 2001 to 2018

Figure 5: Mortality rates for males living in the least deprived areas improved six times faster pre-2011 than post-2011

Age-standardised mortality rates for males and females living in the most and least deprived areas of Wales, all ages, 2001 to 2018



Source: Office for National Statistics

Notes:

1. The plotline on the figure represents the 2011 breakpoint.
2. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
3. Figures exclude non-residents, based on boundaries as of August 2019.
4. Deprivation quintiles are based on the Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with quintile 1 representing the most deprived areas and quintile 5 representing the least deprived areas.

Change in mortality trend for people aged under 75 years living in the most and least deprived areas of Wales

For both males and females aged under 75 years living in the most deprived areas there was an increase in mortality rates post the 2011 breakpoint.

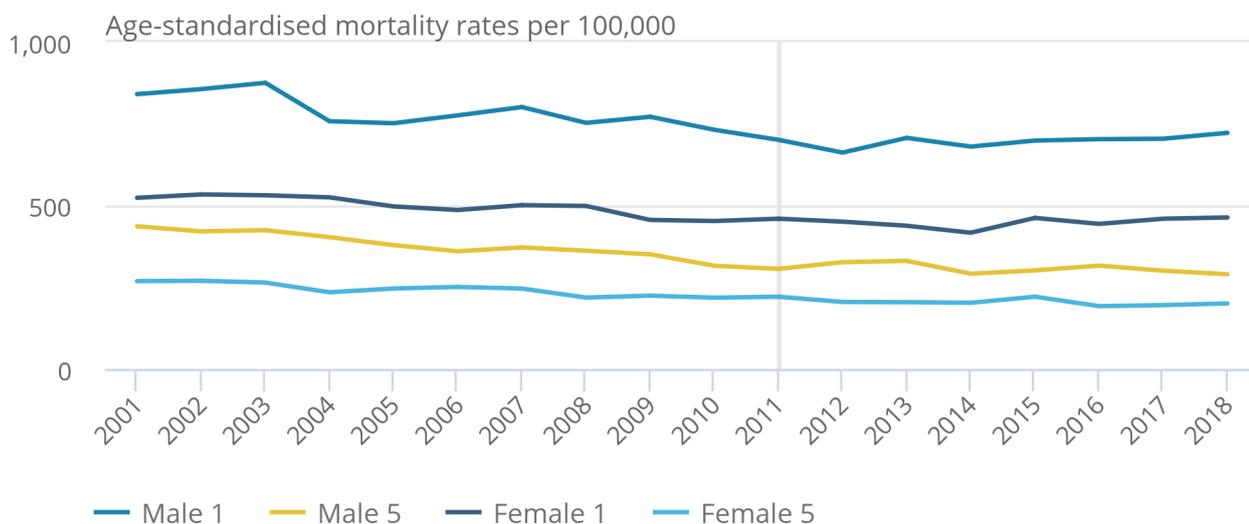
For those living in the least deprived areas, there was a slowdown in mortality improvements; pre-2011 male mortality rates were improving 3.9 times faster than post-2011, whereas female mortality rates were improving 1.3 times faster pre-2011 than post-2011.

Figure 6: Mortality rates have increased post-2011 for males and females living in the most deprived areas

Age-standardised mortality rates for males and females aged under 75 years living in the most and least deprived areas of Wales, 2001 to 2018

Figure 6: Mortality rates have increased post-2011 for males and females living in the most deprived areas

Age-standardised mortality rates for males and females aged under 75 years living in the most and least deprived areas of Wales, 2001 to 2018



Source: Office for National Statistics

Notes:

1. The plotline on the figure represents the 2011 breakpoint.
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3. Figures exclude non-residents, based on boundaries as of August 2019.
4. Deprivation quintiles are based on the Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with quintile 1 representing the most deprived areas and quintile 5 representing the least deprived areas.

Change in mortality trend for older age groups living in the most and least deprived areas of Wales

For males in all older age groups, there were slowdowns in mortality improvements for those living in the most deprived areas. The largest slowdown was evident in those aged 75 to 79 years where mortality rates were improving 55.5 times faster pre-2011 than post-2011.

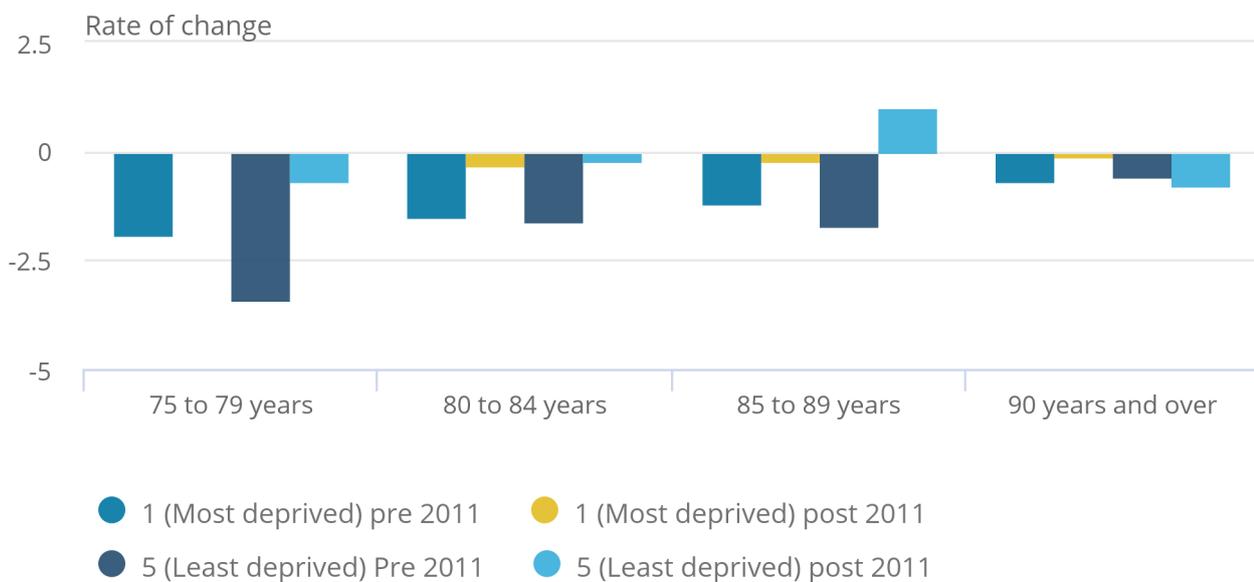
There were also slowdowns evident for males living in the least deprived areas, and for those aged 85 to 89 years there was an increase in mortality rates in those areas.

Figure 7: Males aged 75 to 79 years living in the most deprived areas had the largest slowdown in mortality

Rate of change in age-specific mortality rates for males pre- and post- 2011 for ages 75 years and over by sex, Wales

Figure 7: Males aged 75 to 79 years living in the most deprived areas had the largest slowdown in mortality

Rate of change in age-specific mortality rates for males pre- and post- 2011 for ages 75 years and over by sex, Wales



Source: Office for National Statistics

Notes:

1. Figures refer to the rate of change in age-specific mortality rates (the average increase or decrease per year) between 2001 to 2011 and 2011 to 2018. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.
2. Figures exclude non-residents, based on boundaries as of August 2019.
3. Deprivation quintiles are based on the Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with quintile 1 representing the most deprived areas and quintile 5 representing the least deprived areas.

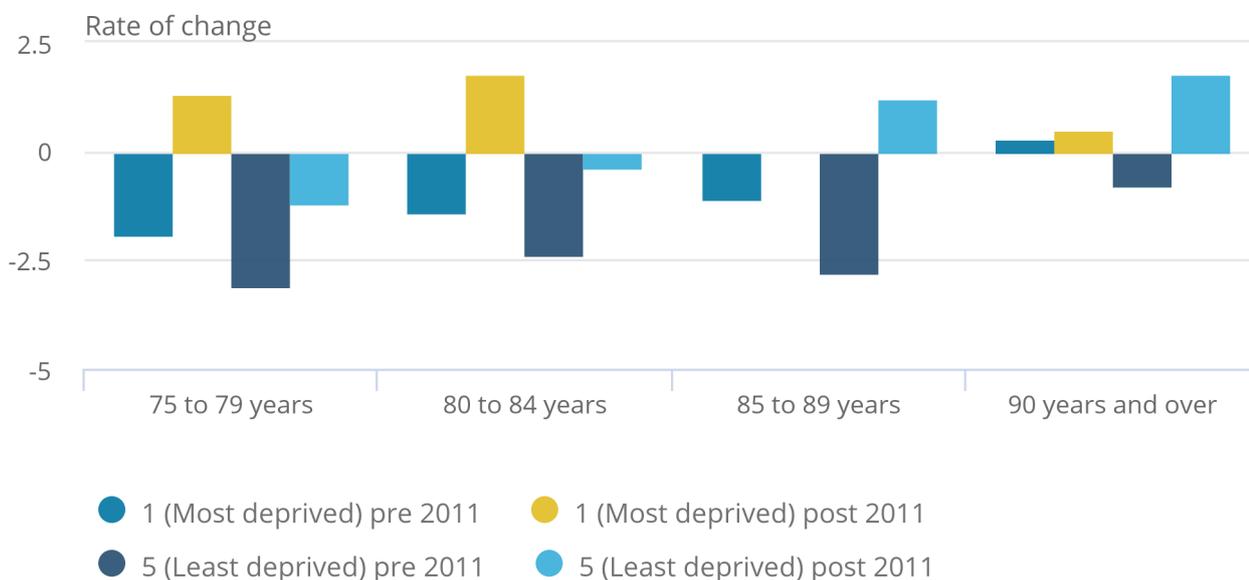
For females there were increases in mortality post-2011 for those aged 75 to 84 years and those aged 90 years and over living in the most deprived areas, and for those aged 85 to 89 years and 90 years and over living in the least deprived areas. All other age groups (85 to 89 years in the most deprived areas, and 75 to 84 years in the least deprived areas) saw a slowdown in mortality improvement. The largest slowdown in mortality improvement was in females living in the most deprived areas for those aged 85 to 89 years, where mortality was improving 72.6 times faster pre-2011 than post-2011.

Figure 8: Females aged 85 to 89 years living in the most deprived areas had the largest slowdown in mortality improvements

Rate of change in age-specific mortality rates for females pre- and post-2011 for ages 75 years and over by sex, Wales

Figure 8: Females aged 85 to 89 years living in the most deprived areas had the largest slowdown in mortality improvements

Rate of change in age-specific mortality rates for females pre- and post-2011 for ages 75 years and over by sex, Wales



Source: Office for National Statistics

Notes:

1. Figures refer to the rate of change in age-specific mortality rates (the average increase or decrease per year) between 2001 to 2011 and 2011 to 2018. The positive figures refer to a worsening in mortality while negative figures reflect an improvement in mortality.
2. Figures exclude non-residents, based on boundaries as of August 2019.
3. Deprivation quintiles are based on the Index of Multiple Deprivation (WIMD), which is the official measure of relative deprivation with quintile 1 representing the most deprived areas and quintile 5 representing the least deprived areas.

6 . Changing trends in mortality by indices of deprivation data

[Changing trends in mortality in England and Wales by indices of deprivation](#)

Dataset | Released 10 March 2020

Annual age-standardised and age-specific mortality rates by indices of deprivation for England and Wales, 2001 to 2018.

7 . Glossary

Age-specific mortality rates

Age-specific mortality rates are used to allow comparisons between specified age groups.

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. The 2013 European Standard Population is used to standardise rates.

Rate of change

To compute the rate of change we have calculated the percentage difference in mortality rates pre-2011 (2001 to 2011) and post-2011 (2011 to 2018). This is then divided by the number of comparison periods within the time period analysed.

8 . Measuring the data

The publication [Changing trends in mortality in England and Wales: 1990 to 2018](#) reports on the statistically significant slowdown in the long-term improvement in age-standardised mortality rates for England and Wales in the early 2010s. This article identifies that the breakpoint in males was found in the early 2010s. For females, two breakpoints were detected, one in the early 1990s and a second in the early 2010s marking the slowdown in mortality. Based on this evidence this analysis sets a breakpoint at 2011 and identifies any changes in trend by deprivation.

Important information for interpreting these mortality statistics:

- Death statistics are compiled from information supplied when deaths are certified and registered as part of civil registration, a legal requirement.
- Figures represent the number of deaths registered in each calendar year: this includes some deaths that occurred in the years prior to the calendar year, while a proportion of deaths occurring in this year will not be registered until subsequent years.
- Figures represent the number of deaths registered in each calendar year; this includes some deaths that occurred in the years prior to the calendar year, while a proportion of deaths occurring in this year will not be registered until subsequent years (more information can be found in [Impact of Registration Delays](#)).
- Please note all rate of change and ratios calculated within this article are based on unrounded age-standardised and age-specific mortality rates.

What are deprivation deciles?

National deciles of area deprivation are created through ranking small geographical populations known as Lower layer Super Output Areas (LSOAs) based on their deprivation score from most to least deprived and grouping them into 10 divisions based on the subsequent ranking.

The Indices of Multiple Deprivation (IMD) 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 or quintile may vary considerably from each other.

Deprivation has been calculated separately for LSOAs in [England](#) and for LSOAs in [Wales](#) as their deprivation measures are derived differently and are not therefore comparable. The indices used to measure England and Wales over the time period used within this publication are set out in Tables 1 and 2.

Table 1: Index of Multiple Deprivation used to analyse 2001 to 2018 data, England

IMD	Data years
IMD 2004	2001 to 2005
IMD 2007	2006 to 2008
IMD 2010	2009 to 2012
IMD 2015	2013 to 2017
IMD 2019	2018

Table 2: Index of Multiple Deprivation used to analyse 2001 to 2018 data, Wales

WIMD	Data years
WIMD 2005	2001 to 2006
WIMD 2008	2007 to 2009
WIMD 2011	2010 to 2012
WIMD 2014	2013 to 2017
WIMD 2019	2018

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in the [Mortality statistics in England and Wales QMI](#) and the [User guide to mortality statistics](#).

9 . Strengths and limitations

Strengths

Information is 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.

Limitations

This analysis sets a breakpoint at 2011 for deprivation indices, which was identified in the analysis of [Changing trends in mortality in England and Wales: 1990 to 2018](#). However, this might not be the actual breakpoint for deprivation if the segmented regression was run on indices data.

Confidence intervals were not able to be created for rate of change analysis, which means we are unable to say whether findings are statistically significant.

10 . Related links

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

Article | Released 7 August 2018

Analysis of age-specific and age-standardised mortality rates for the UK, England, Wales, Scotland and Northern Ireland from 1981 to 2016.

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

Article | Released 7 August 2018

Analysis of period life expectancies and mortality in selected countries globally from 2000 to 2016.

[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.

[Socioeconomic inequalities in avoidable mortality, England and Wales: 2001 to 2017](#)

Article | Released 1 May 2019

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

[Trends in life expectancy in EU and other OECD countries](#)

Report | Released 28 February 2019

This report outlines that these changes in mortality trends are also evident in other countries.

[What is happening to life expectancy in the UK?](#)

Article | Released 22 October 2019

The Kings Fund think tank provide commentary on the change in life expectancy.