Trends in Mortality by NS-SEC at Older Ages in England and Wales, 1982–86 to 2002–06

Coverage: England and Wales  
Date: 22 February 2013  
Geographical Area: Country  
Theme: Health and Social Care

Key points

• The National Statistics Socio-economic Classification (NS-SEC) is a system designed to group occupations by their underlying social advantage. For example, medical doctors are grouped under the most advantaged NS-SEC class (Higher Managerial and Professional class 1) while bus drivers are grouped in the least advantaged class in work (Routine class 7). Advantage here refers to preferential reward structures, career development opportunities and greater autonomy in how the work is undertaken.

• Age-specific mortality rates fell between 1982–86 and 2002–06 for both males and females: among males at ages 60 and above, the decline in the rate of death was sizeable and generally significant in both NS-SEC classes 1 and 7.

• At ages 60 to 84, a consistent socio-economic pattern for mortality was present between 1982-86 and 2002-06 for both males and females. The rate of death was highest among the routine and manual class, followed by the intermediate class, with the managerial and professional class having the lowest rates.

• Statistically significant differences in absolute mortality at ages 60–84 between the managerial and professional and routine and manual classes were present in both the earliest (1982–86) and latest (2002–06) time periods, suggesting the social inequality in mortality at these ages has persisted over time.

• There was no evidence of either a significant increase or decrease in social inequality in mortality between managerial and professional and routine and manual classes over time; however,
relative differences in mortality were observed, with a larger relative decline in the mortality rate for the managerial and professional class compared to the routine and manual class.

- At ages 60–84, mortality rates for females in the least advantaged NS-SEC class 7 were more comparable to those for males in the most advantaged NS-SEC class 1 across the study period, illustrating the gender inequality in mortality. This gender gap, however, narrowed from 1982–86 to 2002–06 for both the most and least advantaged NS-SEC classes.

Introduction

This bulletin reports newly published age-specific mortality rates for all causes by the National Statistics Socio-Economic Classification (NS-SEC) for adults aged 40 years and above in England and Wales, over a series of five-year periods from 1982–86 to 2002–06. It highlights differences in mortality between the most and least advantaged NS-SEC classes in England and Wales, by age and sex.

This complements a previously released bulletin ‘Trends in life expectancy by NS-SEC 1982–2006’, which also measured social inequalities in health in England and Wales over the same time period using a related health indicator; life expectancy; which is based on age-specific mortality rates.

There are also a full set of age-specific mortality rates (276.5 Kb Excel sheet) associated with this bulletin.

Results:

Interpretation of Results

Tables and figures presented in this bulletin are based on the full set of results available in the accompanying reference table (276.5 Kb Excel sheet). This presents age-specific mortality rates for males and females for five-year age-groups from 15–19 up to 90+ in England and Wales, by both 7-class and the broader 3-class NS-SEC.

For convenience, mortality rates in this commentary are presented as integers with no units, and should be interpreted as the number of deaths for every 1,000 person years at risk. For example, a mortality rate of ‘51.6’ should be interpreted as ‘51.6 deaths per 1,000 person years at risk’. See the Methods section for more information on how age-specific mortality rates were calculated. In addition, differences in mortality are expressed in both absolute and relative terms. An explanation of these terms can also be found in the Methods section.

- Age-specific mortality rates for NS-SEC classes 1 and 7, 1982–86 compared with 2002–06

Figure 1a shows male mortality rates for age-groups from 40–44 to 90+, in the most advantaged NS-SEC analytic class ‘Higher managerial and professional’ (NS-SEC1) and least advantaged class ‘Routine’ (NS-SEC7), for the earliest and latest time periods studied (1982–86 and 2002–06). Figure 1b shows the same comparison for females.
Figure 1a. Age-specific mortality rate for males: NS-SEC1 and NS-SEC7, 1982-86 and 2002-06

England & Wales

Mortality rate (deaths per 1000 person years at risk)

Source: Office for National Statistics

Notes:
1. *significant drop in mortality in 2002–06 from 1982–86, NS-SEC1
2. +significant drop in mortality in 2002–06 from 1982–86, NS-SEC7

Download chart

XLS XLS format
(28 Kb)
Figure 1b. Age-specific mortality rate for females: NS-SEC1 and NS-SEC7, 1982-86 and 2002-06

England & Wales

![Mortality rate graph](image)

Source: Office for National Statistics

Notes:
1. *significant drop in mortality in 2002–06 from 1982–86, NS-SEC1
2. +significant drop in mortality in 2002–06 from 1982–86, NS-SEC7

Download chart

XLS  XLS format
(28 Kb)

Figures 1a and 1b show that mortality rates increased with age for both males and females, with the increase between adjacent age-groups following an exponential pattern with rising age. For example, in 1982–86, mortality for males aged 40–44 in NS-SEC1 was only 1.7 deaths per 1,000 person years at risk, compared with 24.6 at ages 65–69, and 251.7 at ages 90+.

Figure 1a also shows that male mortality rates significantly dropped in 2002–06 compared with 1982–86 for the majority of older age-groups (age-groups 60–64 and above), for both NS-SEC1 and NS-SEC7.
NS-SEC7. For males in NS-SEC1, mortality rates were significantly lower in 2002–06 than in 1982–86 for those in age-groups 60–64 through to 80–84. For instance, the mortality rate of 13.9 for males aged 65–69 in 2002–06 was significantly lower than 24.6 in 1982–86. Similarly, for males in NS-SEC7, mortality rates were significantly lower in 2002–06 than in 1982–86 for those in age-groups 50–54 through to 80–84.

Figure 1b shows that female trends were similar to those for males. However, significant declines in mortality in 2002–06 from 1982–86 were confined to females in NS-SEC1 aged 75–79 (19.8 in 2002–06, from 35.8 in 1982–86), and in NS-SEC7 aged 65–69 (14.8 from 21.7), 70–74 (24.0 from 31.6) and 80–84 (74.4 from 96.6).

As can be seen from the accompanying reference table (276.5 Kb Excel sheet), similar falls in mortality over time were also present for the other NS-SEC classes. Therefore, mortality rates have generally improved over time, males at older ages. Improvement in mortality for females was seen, but to a lesser extent.

In addition, noticeable differences in mortality were observed at older ages between NS-SEC1 and NS-SEC7 in each time period for both males and females. A socio-economic pattern for mortality persisted; consistently higher mortality rates were present among the less advantaged compared to the more advantaged NS-SEC classes. This is illustrated in Figures 2 to 4 below.

- Socio-economic ordering in mortality at older ages

Figures 2 to 4 illustrate the development of a socio-economic ordering in mortality at older ages for both males and females, and show its durability over time. In these figures, the seven analytic NS-SEC classes have been condensed into a three-class grouping to show the pattern more clearly and precisely. In this condensed format, managerial and professional is more advantaged than intermediate, while routine and manual is the least advantaged group. The ‘condensed’ version of the NS-SEC class schema can be interpreted as a true ordinal scale.
Figure 2a. Age-specific mortality rate for males aged 35-39: by condensed NS-SEC, 1982-86 to 2002-06

England & Wales

Source: Office for National Statistics

Download chart

XLS format
(27 Kb)
As shown in Figures 2a and 2b, no consistent ordering across the entire study period was observed for those aged 35–39, which was also true for other age-groups below 60–64.
Figure 3a. Age-specific mortality rate for males aged 65-69: by condensed NS-SEC, 1982-86 to 2002-06

England & Wales

Source: Office for National Statistics

Download chart

XLS format

(27 Kb)
However, from age-group 60–64 onwards, the managerial and professional class had the lowest mortality rates, followed by intermediate with higher rates and the routine and manual class with the highest rates. For example in figure 3a, for males aged 65–69 in 1982–86, the mortality rate was highest for routine and manual at 35.9, followed by intermediate at 33.2 and managerial and professional at 24.4. By 2002–06, mortality rates fell to 22.9, 17.3 and 14.4 respectively, with the ordering of the groups remaining consistent through all time periods.
Figure 4a. Age-specific mortality rate for males aged 85-89: by condensed NS-SEC, 1982-86 to 2002-06

England & Wales

Source: Office for National Statistics

Download chart

[Download chart in XLS format](27 Kb)
Figures 4a and 4b show that at age-group 85–89, the ordering became less well defined, with NS-SEC classes starting to overlap, similar to that before the age of 60.

- **Absolute and relative differences in mortality at older ages**

As shown above, a socio-economic pattern in mortality was present between the ages of 60 and 84, with those in managerial and professional occupations having lower mortality rates than those in routine and manual occupations. Tables 1a and 1b compare the mortality rates of these groups between the ages of 60 and 84, showing their absolute and relative differences in mortality for both 1982–86 and 2002–06.
### Table 1a: Inequalities in male mortality at older ages between Managerial & Professional and Routine & Manual classes, 1982-86 and 2002-06

England and Wales

| Age group | 1982-86 | | | | | 2002-06 | | | |
|-----------|---------|---|---|---|---|---|---|---|---|---|
| RI | AI | Lower CI | Upper CI | RI | AI | Lower CI | Upper CI |
| 60-64 | 1.4 | 6.4 | 4.0 | 8.8 | * | 1.8 | 5.8 | 4.2 | 7.4 | * |
| 65-69 | 1.5 | 11.5 | 8.0 | 15.0 | * | 1.6 | 8.5 | 6.1 | 10.9 | * |
| 70-74 | 1.3 | 15.2 | 10.0 | 20.4 | * | 1.6 | 13.5 | 10.3 | 16.7 | * |
| 75-79 | 1.3 | 19.3 | 10.9 | 27.7 | * | 1.6 | 24.3 | 19.4 | 29.2 | * |
| 80-84 | 1.4 | 38.2 | 23.4 | 53.0 | * | 1.4 | 27.1 | 19.4 | 34.8 | * |

**Table source:** Office for National Statistics

**Table notes:**

1. 'RI' stands for relative inequality
2. 'AI' stands for absolute inequality
3. The symbol * denotes a statistically significant difference between the age-specific mortality rates of Managerial & Professional and Routine & Manual classes within a time period.
4. Confidence intervals for age-specific mortality rates can be found in the accompanying reference table.
5. Figure 5a shows the assessment of the change in absolute inequalities between the two time periods using the confidence intervals in this table.

Download table

XLS XLS format

(29 Kb)

### Table 1b: Inequalities in female mortality at older ages between Managerial & Professional and Routine & Manual classes, 1982-86 and 2002-06

England and Wales

| Age group | 1982-86 | | | | | 2002-06 | | | |
|-----------|---------|---|---|---|---|---|---|---|---|---|
| RI | AI | Lower CI | Upper CI | RI | AI | Lower CI | Upper CI |
| 60-64 | 1.1 | 1.1 | 0.0 | 3.1 | | 1.6 | 3.1 | 1.6 | 4.6 | * |
| 65-69 | 1.5 | 6.8 | 4.1 | 9.5 | * | 1.4 | 4.3 | 2.3 | 6.3 | * |
| 70-74 | 1.3 | 5.8 | 1.8 | 9.8 | | 1.6 | 8.4 | 5.8 | 11.0 | * |
| 75-79 | 1.1 | 5.7 | 0.0 | 12.4 | | 1.5 | 13.3 | 9.5 | 17.1 | * |
| 80-84 | 1.3 | 23.0 | 10.2 | 35.8 | * | 1.3 | 17.7 | 11.8 | 23.6 | * |
From tables 1a and 1b, absolute inequalities tended to grow with increasing age in each time period for both males and females. This is also illustrated by the bars in figures 5a and 5b below. For instance, males in 2002–06 showed an absolute inequality of 5.8 deaths per 1,000 person years at risk for those aged 60–64, compared to 13.5 for those aged 70–74 and 27.1 for those aged 80–84 (table 1a, figure 5a). Similarly, females in 2002–06 showed an absolute inequality of 3.1 for those aged 60–64, compared to 8.4 in the 70–74 age-group and 17.7 in the 80–84 age-group (table 1b, figure 5b).

Relative inequalities however, were irregular with increasing age in 1982–86, but showed a more regular decreasing pattern in 2002–06. For males aged 60–64 in 2002–06, the mortality rate of those in the routine and manual class was 1.8 times larger than that of the managerial and professional class, compared to 1.4 times larger at ages 80–84 (table 1a). Similarly, relative inequalities for females in 2002–06 decreased from 1.6 times larger for those aged 60–64, to 1.3 times larger for those aged 80–84 (table 1b).

Significant inequalities in absolute mortality between managerial and professional and routine and manual classes (shown by the asterisks in tables 1a and 1b, and again in figures 5a and 5b) were seen for both males and females in both time periods. From table 1a, the gap between the classes for males at ages 65–69 remained significant; a trend which was also observed for the other age-groups presented in the table. From table 1b, females also conformed to this pattern over time for age-groups 65–69 (6.8 deaths per 1,000 person years at risk in 1982–86, 4.3 in 2002–06) and at 80–84 (23.0 in 1982–86, 17.7 in 2002–06). This demonstrates that the social inequality in mortality which existed two decades ago persisted, in particular for males, over time, and remained significant in 2002–06 for these older age groups.

**- Changing inequalities over time?**

Figures 5a and 5b use the results from tables 1a and 1b, to display these socio-economic inequalities for older ages at 1982–86 and 2002–06, and picture the trend in the size of the inequality over time.
Figure 5a. Absolute inequalities in male mortality at older ages between Managerial & Professional and Routine & Manual classes, 1982-86 and 2002-06

England & Wales

Absolute inequality in mortality (deaths per 1000 person years at risk)

Source: Office for National Statistics

Notes:
1. *significant drop in mortality in 2002–06 from 1982–86, NS-SEC1
2. +significant drop in mortality in 2002–06 from 1982–86, NS-SEC7
3. The symbol * denotes a statistically significant difference between the age-specific mortality rates of Managerial & Professional and Routine & Manual classes within a time period.
4. Confidence intervals for age-specific mortality rates can be found in the accompanying reference table.

Download chart

XLS format (27.5 Kb)
Figure 5b. Absolute inequalities in female mortality at older ages between Managerial & Professional and Routine & Manual classes, 1982-86 and 2002-06

England & Wales

Absolute inequality in mortality (deaths per 1000 person years at risk)

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>82-86</th>
<th>02-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75-79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Office for National Statistics

Notes:
1. *significant drop in mortality in 2002–06 from 1982–86, NS-SEC1
2. +significant drop in mortality in 2002–06 from 1982–86, NS-SEC7
3. The symbol * denotes a statistically significant difference between the age-specific mortality rates of Managerial & Professional and Routine & Manual classes within a time period.
4. Confidence intervals for age-specific mortality rates can be found in the accompanying reference table.

Download chart

XLS format
(28 Kb)

There was no evidence to support whether absolute differences in mortality became larger or smaller between 1982–86 and 2002–06 for each age-group. For males (figure 5a), an increase was observed for ages 75–79 (19.3 to 24.3) while all other age-groups showed decreases. For females (figure 5b), differences became smaller over time for those aged 65–69 (6.8 to 4.3) and 80–84 (23.0 to 17.7), while for the other age groups the inequality became larger. However, there was a general absence of a statistically significant growth or decline in the extent of the inequality in mortality.
between the managerial and professional class and the routine and manual class across ages 60–84 over the two decades of study. The overlapping confidence ranges represented by error bars in figures 5a and 5b, suggest that the absolute gap between the least and most advantaged NS-SEC classes has remained constant.

Relative mortality differences for older ages from 1982–86 to 2002–06 (tables 1a and 1b), mostly suggest an increase over time; this effect can be explained in terms of varying improvement in mortality seen across NS-SEC classes (table 2). For example, for males aged 60–64, the difference increased from 1.4 times higher to 1.8 times higher. For females, this pattern was similar for age-groups 60–64 (1.1 to 1.6), 70–74 (1.3 to 1.6) and 75–79 (1.1 to 1.5), while for males, this occurred for all age-groups in the table except for 80–84. As the more advantaged NS-SEC classes have experienced larger relative declines in the rate of death than the least advantaged, in relative terms, the social inequality has increased over the time period studied.

Table 2: Comparison of relative improvements in mortality between Managerial & Professional and Routine & Manual classes: by sex, 1982-86 to 2002-06

England and Wales

<table>
<thead>
<tr>
<th>Age group</th>
<th>Males</th>
<th></th>
<th></th>
<th>Females</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>60-64</td>
<td>2.2</td>
<td>1.7</td>
<td></td>
<td>1.8</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>65-69</td>
<td>1.7</td>
<td>1.6</td>
<td></td>
<td>1.3</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>70-74</td>
<td>1.9</td>
<td>1.6</td>
<td></td>
<td>1.6</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>75-79</td>
<td>1.7</td>
<td>1.4</td>
<td></td>
<td>1.6</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>80-84</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
<td>1.3</td>
<td>1.3</td>
<td></td>
</tr>
</tbody>
</table>

Table source: Office for National Statistics

Download table

XLS XLS format

(27 Kb)

On the whole, the relative decline in the rate of death between 1982-86 and 2002-06 was smaller with falling social advantage. For instance, among females aged 60–64, mortality rates were 1.8 times higher in 1982–86 than 2002–06 for the managerial and professional class, compared to only 1.3 for the routine and manual class. For males, this pattern was present for age-groups 60–64 (2.2 in managerial and professional, versus 1.7 in routine and manual), 65–69 (1.7 versus 1.6), 70–74 (1.9 versus 1.6) and 75–79 (1.7 versus 1.4); for females it was present for age-groups 60–64 (1.8 versus 1.3), 70–74 (1.6 versus 1.3) and 75–79 (1.6 versus 1.2) Therefore, the relative increases seen in tables 1a and 1b were due to the larger declines in the mortality rate for the managerial and
professional class compared to the routine and manual class (table 2), with similar results occurring for both males and females.

- Gender differences in age-specific mortality

Figures 6a (1982–86) and 6b (2002–06) compare male and female age-specific mortality rates over time from age-group 40–44 onwards, for the most and least advantaged NS-SEC classes.

Figure 6a. Age-specific mortality rate by sex: NS-SEC1 and NS-SEC7, 1982-86

England & Wales

Source: Office for National Statistics

Notes:
1. *significantly lower mortality for females compared with males, NS-SEC1
2. +significantly lower mortality for females compared with males, NS-SEC7

Download chart

XLS  XLS format

(28 Kb)
From both figures above, male mortality rates were noticeably higher than those for females at older ages for both NS-SEC1 and NS-SEC7. From age-group 65–69 onwards, the trend in male mortality for NS-SEC1 closely resembled that of females in NS-SEC7 in both time periods, especially in 2002–06. This defined a gender difference in mortality across all socio-economic strata; of particular interest is the importance of gender in mortality risk which is demonstrated by the comparability of the rates of death in males in the most advantaged socio-economic class with those of females in the least advantaged class.
In 1982–86 (figure 6a), mortality for males in NS-SEC1 was significantly higher than that of females in the same class for age-groups 65-69 (24.6 for males, 11.4 for females), 70-74 (44.3, 18.5) and 75-79 (71.2, 35.8) only. For NS-SEC7 however, male mortality was significantly higher than for females for age-groups 45-49 to 85-89, suggesting the gender gap grows with falling social advantage.

This pattern was repeated in 2002–06 (figure 6b). For NS-SEC1, male mortality was significantly higher than females at age-groups 65–69 (13.9 for males, 7.8 for females), 75–79 (38.5, 19.8) and 85–89 (142.7, 100.1), while for NS-SEC7, it was significantly higher at age-groups 50–54 to 85-89. Therefore, gender differences in mortality may be influenced by socio-economic factors; significant gaps between male and female mortality were less frequent in more advantaged classes compared to the least advantaged classes.

However, despite a clear and persistent gender gap, with male mortality rates higher than females, table 3 below suggests that the gender gap has narrowed over time, a finding consistent with national estimates of life expectancy.

**Table 3: Relative differences in mortality between males and females: NS-SEC1 and NS-SEC7, 1982-86 and 2002-06**

<table>
<thead>
<tr>
<th>Age group</th>
<th>1982-86</th>
<th>2002-06</th>
<th>Difference</th>
<th>1982-86</th>
<th>2002-06</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-44</td>
<td>1.5</td>
<td>1.1</td>
<td>-0.4</td>
<td>1.8</td>
<td>1.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>45-49</td>
<td>1.3</td>
<td>2.5</td>
<td>1.2</td>
<td>2.5</td>
<td>1.4</td>
<td>-1.1</td>
</tr>
<tr>
<td>50-54</td>
<td>1.1</td>
<td>1.4</td>
<td>0.3</td>
<td>2.4</td>
<td>1.8</td>
<td>-0.6</td>
</tr>
<tr>
<td>55-59</td>
<td>1.7</td>
<td>1.3</td>
<td>-0.4</td>
<td>2.0</td>
<td>1.8</td>
<td>-0.2</td>
</tr>
<tr>
<td>60-64</td>
<td>1.5</td>
<td>1.3</td>
<td>-0.2</td>
<td>2.4</td>
<td>1.6</td>
<td>-0.8</td>
</tr>
<tr>
<td>65-69</td>
<td>2.2</td>
<td>1.8</td>
<td>-0.4</td>
<td>1.6</td>
<td>1.6</td>
<td>0.0</td>
</tr>
<tr>
<td>70-74</td>
<td>2.4</td>
<td>1.5</td>
<td>-0.9</td>
<td>2.0</td>
<td>1.6</td>
<td>-0.4</td>
</tr>
<tr>
<td>75-79</td>
<td>2.0</td>
<td>1.9</td>
<td>-0.1</td>
<td>1.8</td>
<td>1.8</td>
<td>0.0</td>
</tr>
<tr>
<td>80-84</td>
<td>1.5</td>
<td>1.3</td>
<td>-0.2</td>
<td>1.6</td>
<td>1.4</td>
<td>-0.2</td>
</tr>
<tr>
<td>85-89</td>
<td>1.1</td>
<td>1.4</td>
<td>0.3</td>
<td>1.4</td>
<td>1.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>90+</td>
<td>1.3</td>
<td>1.1</td>
<td>-0.2</td>
<td>1.4</td>
<td>1.1</td>
<td>-0.3</td>
</tr>
</tbody>
</table>

**Table source:** Office for National Statistics

**Table notes:**
1. * Negative differences suggest a narrowing of inequality between the sexes over time.
In the majority of age-groups shown in the table, relative mortality between males and females decreased over time. For instance in NS-SEC1, the mortality rate for males aged 65–69 was 2.2 times that of females in 1982–86, which reduced to 1.8 times in 2002–06. This effect was present for most age-groups in both NS-SEC classes 1 and 7; the only age-groups that differed from this were 45–49 (1.3 times in 1982–86, versus 2.5 times in 2002–06), 50–54 (1.1 versus 1.4) and 85–89 (1.1 versus 1.4) for NS-SEC1, and 65–69 (1.6 versus 1.6) and 75–79 (1.8 versus 1.8) for NS-SEC7. So males have experienced declines in mortality rates over the study period to the extent that they are closing the gap on females, across socio-economic classes.

There are also a full set of age-specific mortality rates (276.5 Kb Excel sheet) associated with this bulletin.

- Context of mortality statistics, and the use of NS-SEC

Mortality rates are useful health indicators, which assist the investigation into health inequalities and are used widely by the Department of Health, the Department for Work and Pensions, local Public Health Observatories, local authorities and health organisations to inform policy and resource allocation. Actuaries and pension providers also make use of mortality and survival rates to inform price-planning.

It is well-established that mortality risk in England and Wales is strongly related to a person's socio-economic position; a large number of studies, synthesised in government reviews such as the Black Report (1980) and the Acheson Report (1998), have observed a social gradient in mortality (social gradient in mortality refers to the fact that mortality risk increases in line with increasing social disadvantage).

A 2009 report from the Department of Health described health inequalities as ‘persistent, stubborn and difficult to change’ (DH, 2009). Following this, a strategic review of health inequalities (The Marmot Review, 2010) concluded that there continues to be a social gradient in mortality and that action should be taken to reduce it. In 2012, the Department of Health report Improving Outcomes and Supporting Transparency further stressed the importance of reducing ‘differences in life expectancy and healthy life expectancy between communities' and ‘preventing premature mortality’ (DH, 2012).

The National Statistics Socio-Economic Classification (NS-SEC) was introduced in 2001, which assigns occupations to classes based on the level of socio-economic advantage associated with the occupation (further information on NS-SEC can be found in the Methods section). The use of NS-SEC in the analysis of health inequalities is based on individual-level attributes. Johnson (2011) showed that the highest life expectancies were seen for the most advantaged NS-SEC class; Higher managerial and professional. Health inequalities can also be measured according to area-based factors, for instance, Kyte and Wells (2010) showed that higher life expectancies were associated with those living in less deprived areas, measured using the Index of Multiple Deprivation. Therefore,
analysis using both area deprivation and NS-SEC measures complement one another in the monitoring of health inequalities.

There is also a full set of age-specific mortality rates (276.5 Kb Excel sheet) associated with this bulletin.

**Methods:**

**Data source**

The figures used in this bulletin were derived from the ONS Longitudinal Study (LS). This is a 1% population sample from the England and Wales census, which is linked to mortality and other life events data. Further information about the LS can be found in the LS section of the ONS website.

**- Age-specific mortality rates**

Two sources of information are needed to calculate mortality rates – number of person years at risk, and number of deaths. For this analysis, the number of person years at risk for an individual is defined as the number of years contributed by the individual, in terms of being at risk of death, for the given population and period studied. For example, a person in the study period who entered the LS aged 35, and died aged 53, would contribute 5 years each to age-groups 35–39, 40–44, and 45–49, and around 4 years to age-group 50–54 (depending on their point of death in their last year of life).

For this analysis, the number of deaths and person years at risk were aggregated into 5-year periods. The number of deaths in a particular period and 5-year age-group were then divided by the corresponding number of person years at risk to produce age-specific mortality rates. Values were then multiplied by 1,000, and should be interpreted as the number of deaths per 1,000 person years at risk.

**- Assessing statistical significance**

Within this bulletin and the accompanying reference table (276.5 Kb Excel sheet), ‘statistically significant’ differences were assessed using 95% confidence intervals. They are a measure of the statistical precision of an estimate and show the range of uncertainty around the estimated figure. Calculations based on small numbers of events are often subject to random fluctuations. As a general rule, if the confidence interval around one figure overlaps with the interval around another, there is uncertainty about whether the difference between the two point estimates is statistically meaningful, because of random fluctuation in the rate of death.

**- Absolute and relative measures explained**

Absolute differences in mortality were calculated by subtracting the lower mortality rates from the higher rates. For example, the mortality rate for males aged 65–69 in the routine and manual class in 2002–06 was 22.9, compared to 14.4 in the managerial and professional class; a gap of 8.5 (22.9 minus 14.4) deaths per 1,000 person years at risk separating the two groups (see table 1a).
Relative differences in mortality express how many times larger mortality rates were for those belonging to one sub-population compared to the mortality rates for those in a different sub-population, such as NS-SEC classes. For example, the mortality rate for females in routine and manual occupations aged 65–69 in 2002–06 was 14.1, compared to 9.8 in the managerial and professional class, indicating that the mortality rate for those in routine and manual occupations was 1.4 (14.1/9.8) times higher than the rate for those in the managerial and professional class (see table 1b).

To illustrate the difference between absolute and relative measures, consider the following hypothetical example where, for a certain age-group in a given year, the mortality rate for the ‘Routine’ class is 5.0 deaths per 1,000 person years at risk, and the mortality rate for the ‘Higher managerial and professional’ class is 2.0 deaths per 1,000 person years at risk. Imagine that the rates change to 4.0 and 1.5 respectively in a future year. In absolute terms of deaths per 1,000 person years at risk, the gap between the most and least advantaged classes is 3.0 in the first instance (5.0 minus 2.0) and 2.5 in the second instance (4.0 minus 1.5). This implies that the inequality, in terms of the absolute number of deaths involved, has reduced.

In the same hypothetical example, however, the deaths in the ‘Routine’ class are 2.5 times higher (5.0/2.0) than those in the more advantaged class. In the second instance the relative inequalities imply that mortality rates of the disadvantaged are now 2.7 times higher (4.0/1.5). So inequality in relative terms has become larger.

In this example the reduction in mortality rates for the more advantaged class, the ‘Higher managerial and professional’ class has been small in terms of the number of deaths (0.5 deaths) compared to the reduction achieved in the ‘Routine’ class (1.0 deaths). But because the more advantaged class starts at a lower level the percentage reduction is larger (25%) compared to the percentage reduction in the ‘Routine’ class (20%). Thus because the more advantaged class is at a lower level at baseline, it is necessary for the more disadvantaged class to achieve a higher absolute reduction to maintain or reduce the relative difference between the two classes.

- National Statistics Socio-Economic Classification

The data associated with this bulletin focuses on NS-SEC classes 1 to 7, with the 3-class and 7-class methods of grouping used to measure social differences in the rate of death. The methods used to assign LS members to an NS-SEC class, to calculate mortality rates by age and sex, and to group the seven NS-SEC classes into the ‘condensed’ three-group format are described in detail in an article by Johnson B (2011) ‘Deriving trends in life expectancy by the National Statistics Socio-economic Classification using the ONS Longitudinal Study’ (567.5 Kb Pdf).

The NS-SEC category is derived from an individual's occupation and employment status and the size of their organisation. Since size of organisation is not collected on the death register, a version of NS-SEC is used which is derived from occupation and employment status alone. This is known as ‘reduced NS-SEC’ and differs in terms of its typical distribution among NS-SEC classes by less than 3%. Reduced NS-SEC was used for the analysis in this bulletin. Table 4 below lists the 7 classes and provides examples of occupations included in these classes:
<table>
<thead>
<tr>
<th>National Statistics Socio-Economic Classification: analytic and condensed classes</th>
<th>Examples of occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condensed</strong></td>
<td><strong>Analytic</strong></td>
</tr>
<tr>
<td>1 Managerial and Professional</td>
<td>1 Higher Managerial and Professional</td>
</tr>
<tr>
<td>2 Lower Managerial and Professional</td>
<td></td>
</tr>
<tr>
<td>2 Intermediate</td>
<td>3 Intermediate</td>
</tr>
<tr>
<td>4 Small Employers and Own Account Workers</td>
<td></td>
</tr>
<tr>
<td>3 Routine and Manual</td>
<td>5 Lower Supervisory and Technical</td>
</tr>
<tr>
<td>6 Semi-routine</td>
<td></td>
</tr>
<tr>
<td>7 Routine</td>
<td></td>
</tr>
</tbody>
</table>
### National Statistics Socio-Economic Classification: analytic and condensed classes

<table>
<thead>
<tr>
<th>Condensed</th>
<th>Analytic</th>
<th>Examples of occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>van, bus and coach drivers, labourers, hotel porters, bar staff, cleaners and domestics, road sweepers, car park attendants</td>
</tr>
</tbody>
</table>

**Table source:** Office for National Statistics

**Download table**

[XLS XLS format](18.5 Kb)

Where appropriate, NS-SEC can be aggregated into larger groups, in particular the three-class ‘condensed NS-SEC’.

Sometimes, class 1 (Higher managerial and professional), is split into 1.1 Employers in large establishments and higher managerial occupations, and 1.2 Higher professional occupations. However, the relatively small sizes of these subgroups in this analysis did not allow for this split, and therefore mortality rates are reported for the aggregated class 1 only.

Further information about NS-SEC can be found in the [NS-SEC manual](#) as part of the ONS website.

### Limitations of data and caution in interpretation

While it is useful to analyse mortality by sex, age and NS-SEC, breaking down results by multiple sub-groups may affect the consistency of patterns and the accuracy and precision of estimates due to smaller sub-group samples. For instance, the absence of socio-economic trends at younger age-groups may be the result of low numbers of deaths, while the smaller populations at very old ages have substantially wider confidence intervals around their rate at death, which may also mask socio-economic differences. Therefore, care has been taken to avoid drawing conclusions which exceed the limits of the data.

There are also a full set of [age-specific mortality rates](#) associated with this bulletin.

### References


Background notes

1. The ONS Longitudinal Study contains data from simple random population samples of all England and Wales censuses since 1971. Census output is Crown copyright and is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

2. Special extracts and tabulations for mortality data by NS-SEC or Occupational Coding for England and Wales are available to order for a charge (subject to legal frameworks, disclosure control, resources and agreement of costs, where appropriate). Enquiries should be made to:

   Health Inequalities Team, Health and Life Events Division, Office for National Statistics, Government Buildings, Cardiff Road, Newport, Gwent, NP10 8XG.

   E-mail: healthineq@ons.gsi.gov.uk

3. The quality of ONS statistics is documented in a series of Quality and Methodology Information (QMI) reports. Information relating to the quality of statistics in this release can be found...
within the ‘Trends in Life Expectancy by the National Statistics Socio-Economic Classification, 1982-2006’ (133.7 Kb Pdf) QMI.

4. As a valued user of our statistics, we welcome you to provide feedback on this release, in particular, on the content, format and structure. Please send feedback to the Health Inequalities Team using the postal or e-mail address above.

5. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

These National Statistics are produced to high professional standards and released according to the arrangements approved by the UK Statistics Authority.

Copyright

© Crown copyright 2013

You may use or re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

This document is also available on our website at www.ons.gov.uk.

Statistical contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Department</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew Yeap</td>
<td>+44 (0)1633 456186</td>
<td>Health Analysis Branch</td>
<td><a href="mailto:andrew.yeap@ons.gsi.gov.uk">andrew.yeap@ons.gsi.gov.uk</a></td>
</tr>
</tbody>
</table>

Issuing Body:
Office for National Statistics

Media Contact Details:
Telephone: 0845 604 1858
(8.30am-5.30pm Weekdays)

Emergency out of hours (limited service): 07867 906553

Email: media.relations@ons.gsi.gov.uk