

SEASONAL EFFECTS ON STALLING MORTALITY IN ENGLAND

INTRODUCTION

Life expectancy at birth has been increasing in recent decades. However, these improvements which had been around a one-year increase every five and a half years for women and every four years for men in the period 1981 to 2010, slowed to a rate of a one-year increase every 28 years for women and 15 years for men in the years 2011 to 2018 (1). There has been a considerable amount of discussion of the possible causes of this slowdown - seasonal factors (principally flu and cold weather) and factors affecting all seasons (austerity, material deprivation, demographic factors, disease patterns, statistical artefacts) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13). This note presents an estimate of the proportion of the slowdown associated with seasonal factors.

In September ONS published the latest quarterly mortality report for Q2 2019 (14). Based on this and previous quarterly mortality reports, Murphy produced a graph comparing quarterly mortality data for the years 2001 to 2018/9 (15). Using these data, seasonal and non-seasonal stalling can be compared.

RESULTS

Table 1 compares the trends in quarterly mortality rates in 2001-10 with those in 2011-18/19. This shows that trends in 2001-10 were similar in each quarter, except that the first quarter (Q1) trend for males, an annual reduction of 39.4 per 100,000 population, was steeper than for other quarters and rate reduction for males were between around 60 and 90 percent greater than for females. The slowing of mortality reduction in 2011-18/9 was similar in subsequent quarters (Q2, Q3 and Q4) and in every quarter, the percentage change in trend was similar for males and females.

Table 1 Trends in quarterly mortality rates, 201-10 and 2011-2018/9

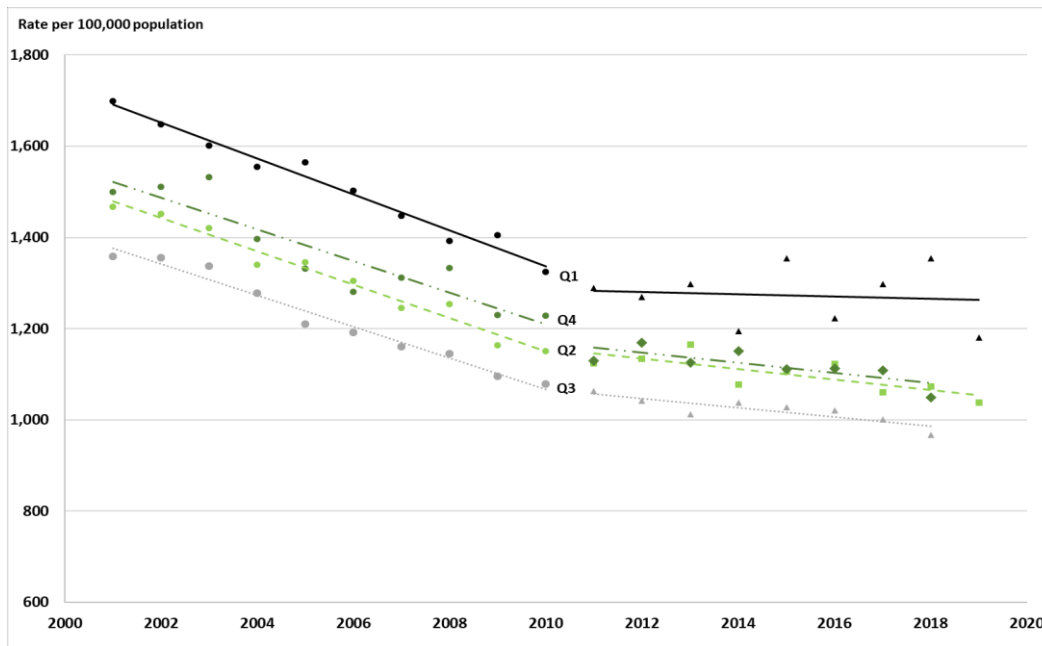
| | Males | | | | Females | | | |
|--------------------------------|-----------|-------------|--------|----------------|-----------|-------------|--------|----------------|
| | 2001-2010 | 2011-2018/9 | Change | percent change | 2001-2010 | 2011-2018/9 | Change | percent change |
| Q1 | -39.4 | -2.5 | 36.9 | -93.7 | -21.0 | 1.5 | 22.5 | -107.2 |
| Q2 | -36.5 | -11.5 | 25.0 | -68.5 | -20.9 | -7.4 | 13.4 | -64.4 |
| Q3 | -34.4 | -10.2 | 24.2 | -70.3 | -21.1 | -6.3 | 14.8 | -70.1 |
| Q4 | -34.7 | -11.1 | 23.5 | -67.8 | -19.4 | -5.8 | 13.7 | -70.3 |
| Difference between Q1 and Q3 | -5.0 | 7.8 | 12.7 | | 0.05 | 7.8 | 7.8 | |
| Applying Q3 trend change to Q1 | | | | | | | | |
| Revised Q1 | -39.4 | -15.2 | 24.2 | -61.3 | -21.0 | -6.3 | 14.8 | -70.2 |

Source: Based on ONS (14)

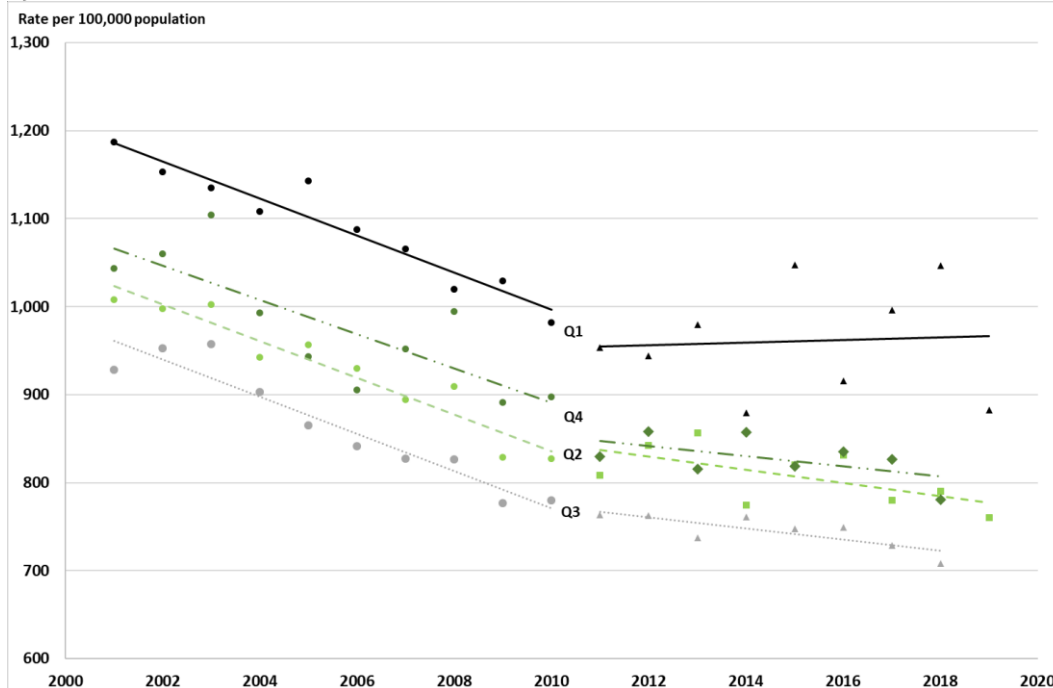
The stand-out point was that there was virtually no reduction in mortality rates for males and females in Q1 in the period 2011-2018/9. As Figure 1 shows, this reflected a huge increase in year on year variability, which is known to coincide with seasonal flu epidemics. The same degree of year on year variation does not appear to have affected Q3, which has the lowest mortality rates of any quarter and the least year on year variability.

Figure 1 Mortality rates by quarter and sex, England, 2001-10 and 2011-18

a) Males



b) Females



Source: ONS (14)

Table 1 shows how trends in Q1 and Q3 differed in 2001-10 and 2011-18/9, as well as how the change in trend differed between the two periods. The table also shows what the 2011-18/19 trend line for Q1 would have been had it only been reduced by the same amount as Q3 i.e. been unaffected by the increased variability due to factors such as flu epidemics.

Table 2 and Figure 2 show the impact on average annual rates of excluding this extreme change in the mortality rates in Q1. While the trend in 2001-10 had been a reduction in annual mortality of 36 and 21 per 100,000 population for males and females, respectively, this slowed to 8 and 4, respectively, in 2011-18/19. By removing this extra variability from Q1, the annual slowing is less great, 12 and 6, respectively.

The change in trends by excluding the extra variability in Q1 is thus 3.6 and 3.0 respectively. This accounts for 13 per cent of the change in trend among males and 17 per cent among females.

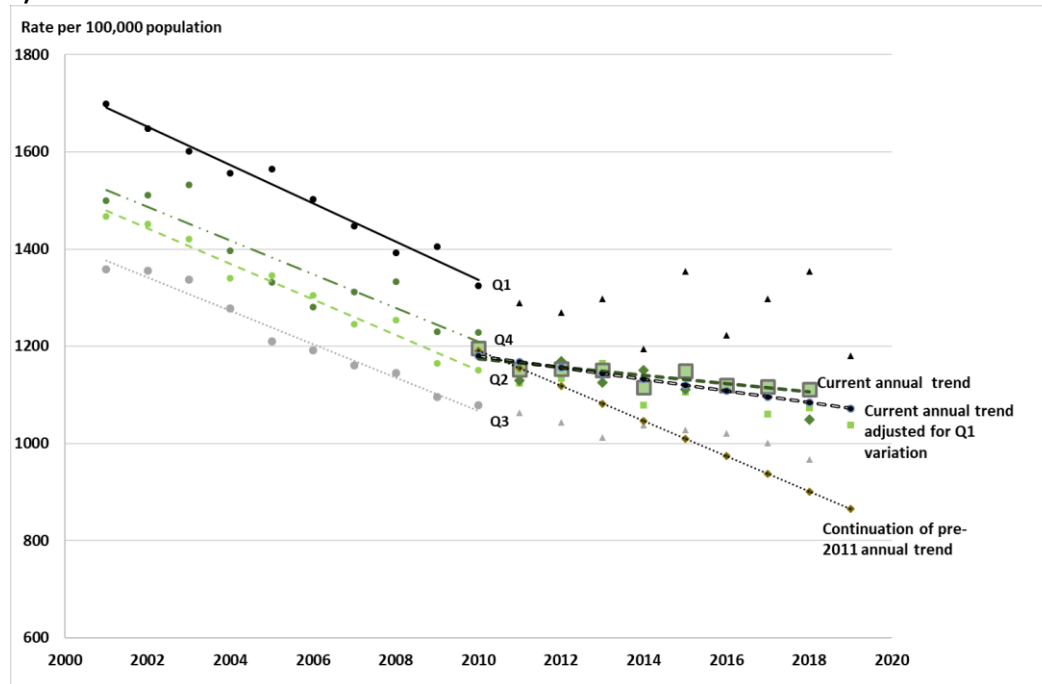
Table 2 Change in annual trend if the mortality trend in Q1 had been the same as that for Q3 in 2011- 2018/19

| Change in average annual trend | Males | Females |
|--|--------------|----------------|
| Continuation of previous quarterly trends | -36.2 | -20.6 |
| Actual trend | -8.4 | -3.5 |
| New trend if Q3 trend change applied to Q1 | -12.0 | -6.4 |
| Actual change in trend | 27.8 | 17.1 |
| Change in trend if Q3 trend change applied to Q1 | 24.2 | 14.2 |
| Difference | 3.6 | 3.0 |
| percent change accounted for by Q1 differing from Q3 | 12.9 | 17.4 |

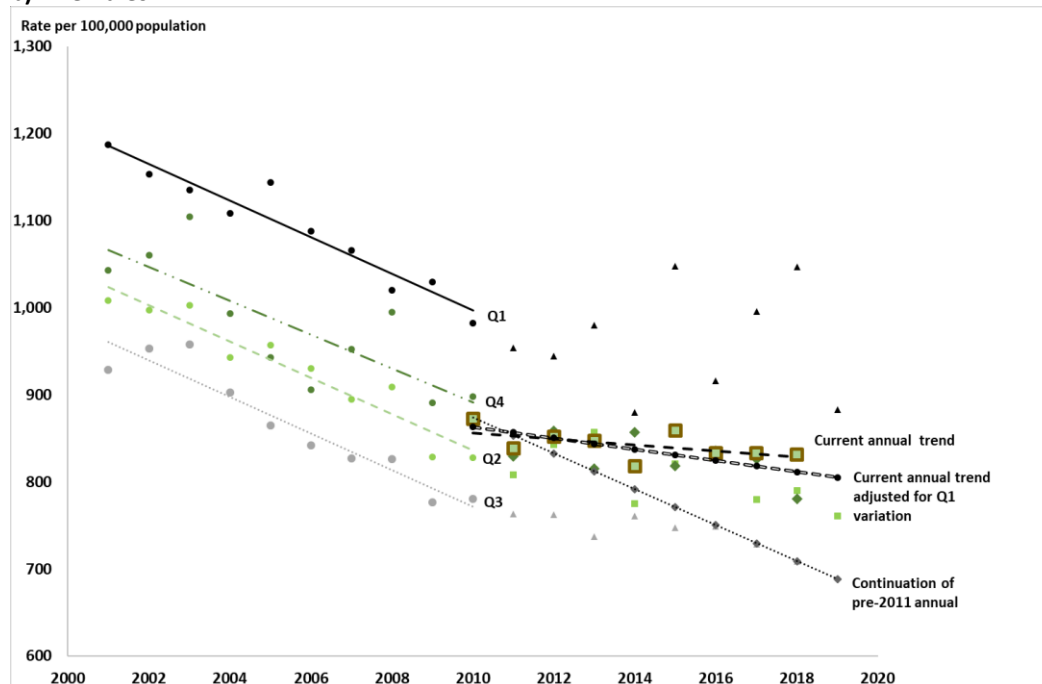
Source: Based on ONS (14)

Figure 2.4 Effects on annual mortality trends of adjusting Q1 mortality trends in 2011-18/19 to match the changes that occurred in Q3 mortality

a) Males



b) Females



Source: ONS (14)

CONCLUSION

To the extent that mortality in the winter months of 2011-2018/9 was increased by periodic flu epidemics and cold spells, this analysis shows that if the change in mortality in winter was no greater than in summer this would account for one eighth of the slowdown in male mortality and one sixth of the slowdown in female mortality.

In other words, seven eighths and five sixths of the annual slowdown for males and females, respectively, was due to factors other than the effects of greater winter-associated mortality in 2011-18/9 compared to 2001-10.

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