

This paper has been published as: Jones R. Austerity in the UK and poor health: were deaths directly affected? **British Journal of Healthcare Management** 2019; 25(11): 337-347.  
<https://doi.org/10.12968/bjhc.2019.0016>

# Austerity in the UK and poor health: were deaths directly affected?

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Part of a longer series of articles available at [http://www.hcaf.biz/2010/Publications\\_Full.pdf](http://www.hcaf.biz/2010/Publications_Full.pdf)

## Abstract

A dramatic increase in deaths in the UK since 2011 has defied actuarial forecasts. This has led some to propose a direct link with government social care austerity. However, several facts argue against this link. Firstly, age standardised mortality in the second quarter of 2019 was statistically lower than the second quarter in all years since 2001, clearly austerity is still present, but age standardised mortality has recovered. Also, deaths have increased equally across the whole of the UK, whereas social care austerity has largely been restricted to England. English citizens resident outside of the UK also show the same trend in deaths as the four countries of the UK. These effects are highly reminiscent of a recurring series of disease outbreaks of an unidentified pathogen. In addition, increases in deaths are always linked to increases in medical admissions. This linkage arises since around half of a person's lifetime use of acute services is compressed into the last 6 months of life, irrespective of the age at death. This is called the nearness to death effect. International research is needed to understand exactly why deaths are behaving in this unique way. While austerity has created a significant problem relating to delayed discharges in hospitals and has highlighted serious problems with how end-of-life care is to be funded, it seemingly cannot be blamed for the increase in the mortality rate or for directly causing more deaths.

**Key words:** Austerity, Deaths, Medical admissions, Morbidity, Mortality, Spatiotemporal effects

## Introduction

Recently, there have been debates in England regarding the role of government social care austerity in the cessation of improvements in life expectancy and of the age-standardised mortality rate (ASMR) (Fransham and Dorling, 2017; Green et al, 2017; Hiam et al, 2017a, 2017b; Watkins et al, 2017; Hiam et al, 2018a, 2018b). A trend to lower ASMR is considered to reflect improvements in overall population health and hence longer life expectancy. The ASMR has been a fundamental public health measure of population health for many years, hence, concern that this reflects a deterioration in population health.

In a recent commentary by Hiam et al (2018b) regarding the cuts and poor health, they articulate the case for a direct link between cuts in social care funding and increased deaths in England since 2011. However, a direct relationship between austerity and deaths has been questioned (Wren-Lewis, 2017; Raleigh, 2018). Indeed, a Public Health England review of increased deaths concluded that trends in England were reflected across Europe and that changes in ASMR did not reflect the degree of austerity that was imposed on some countries (Public Health England, 2018).

A recent Office for National Statistics report on ASMR in England for the second quarter of 2019 showed that the ASMR has resumed its downward trend (Office for National Statistics, 2019). Clearly austerity has not gone away, yet the downward trend in ASMR has recovered.

While most studies to date have focused on ASMR, an increase or pause in the downward trend in this parameter implies increased deaths relative to the expected trajectory. It is always useful to look at the basic parameter (deaths) in an unmanipulated way to see if additional insights can be gained. Many forget that the ASMR is calculated relative to the European Standard Population at 2013 (National Records of Scotland, 2019a), which may weight deaths for different ages in such a way as to potentially create temporary artefacts when applied to the actual population age profile in England and elsewhere in the UK.

Indeed, if the claim by Hiam et al (2018b) regarding a direct link between austerity and increased deaths is correct, then such a direct link should apply directly at local government level. This article investigates trends in deaths at country and local authority level in the UK and looks at curious trends in deaths seen across the whole world that defy an austerity-based explanation.

## Methods

Data for local authority service spending cuts across England, Scotland and Wales were kindly provided by Gray and Barford (2018). Data on monthly deaths in England and Wales are from the Office for National Statistics (2019); in Scotland from National Records of Scotland (2019), and in Northern Ireland from Northern Ireland Statistics and Research Agency (2019). Monthly deaths for countries of the world was obtained from the United Nations (2019). Deaths have either been aggregated into financial year totals, to match with local government spending data, or summarised into a 12-month rolling total. Deaths by single year of age and gender in England and Wales are from the Office for National Statistics (2018). All data have been manipulated using Microsoft Excel. All data are available on request from the author.

## The four countries of the UK show identical trends

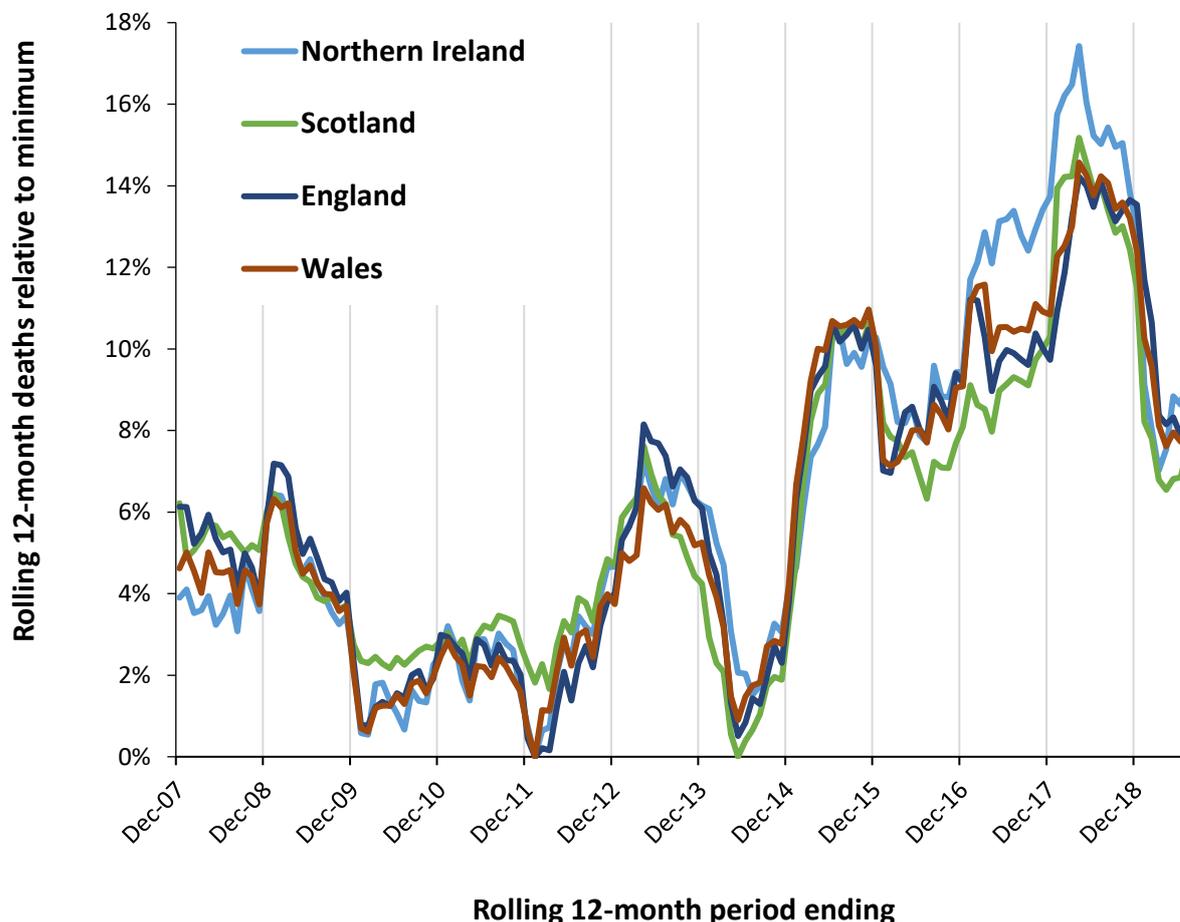
While it is true that local government spending has been reduced following the 2008 financial crisis, the governments of Northern Ireland, Scotland and Wales took active steps to mitigate the effects on local government spending. Gray and Barford (2018) have recently demonstrated that the median reduction in local government spending between 2009/2010 and 2016/2017 was only  $-10.5\%$  in Scotland and  $-10.9\%$  in Wales. However, this figure was almost double that in England at  $-23.4\%$ . If austerity is directly causative of increased deaths, then it would be natural to expect that deaths in England should have risen faster than elsewhere in the UK.

*Figure 1* shows that there is no difference whatever in the trend in deaths between the four countries of the UK. Therefore, it appears that austerity is not causing a direct and profound influence on deaths. Indeed, as *Figure 1* shows, the trends are far more complex with a lower number of deaths in early 2012 and early 2014. Austerity has increased over that time period and as such this does not explain the peaks and troughs, nor the large drop in deaths in late 2018. This large drop in deaths has resulted in a restoration in the downward trend in the ASMR in England (ONS, 2019).

It is of interest to note that the large rise in deaths for the 12-month period ending April/May in 2013 across the entire UK was initially blamed on austerity in England (Loopstra et al, 2016); however, researchers did not notice that any increased deaths had disappeared across the entire UK by the 12-months ending May 2014. The central problem has been the use of calendar year totals to calculate the mortality rate, hence the vertical lines in *Figure 1* at calendar year intervals. The peaks and troughs, however caused, do not neatly align with calendar years. This has been called the

calendar year fallacy (Jones, 2019) and is one reason that the Office for National Statistics is now calculating the mortality rate at quarterly intervals (ONS, 2019).

**Figure 1. Change in rolling 12-month total deaths for England, Northern Ireland, Scotland and Wales relative to the 12-month minimum 2009 to 2019**



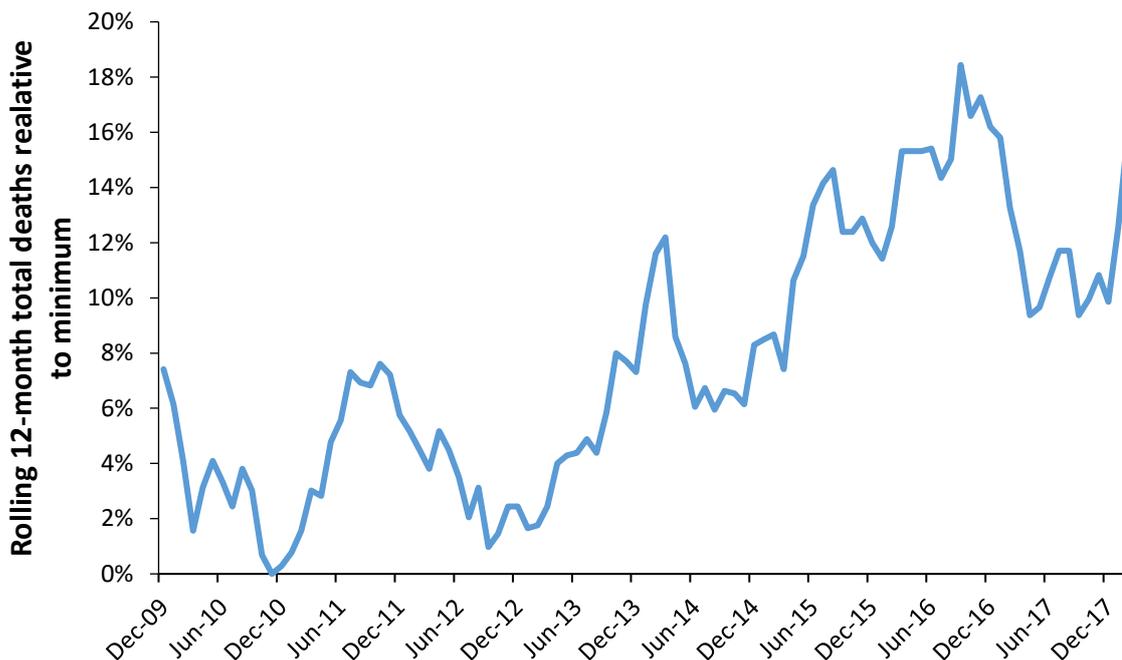
### UK citizens living abroad show the same trends

UK citizens who choose to live abroad are not subject to local government austerity; however, as *Figure 2* shows the trend in deaths is remarkably like that seen for the four countries of the UK. As seen in *Figure 1* additional complexity is apparent in the trend over time, which is statistically significant.

### No correlation with individual local authority service spending cuts

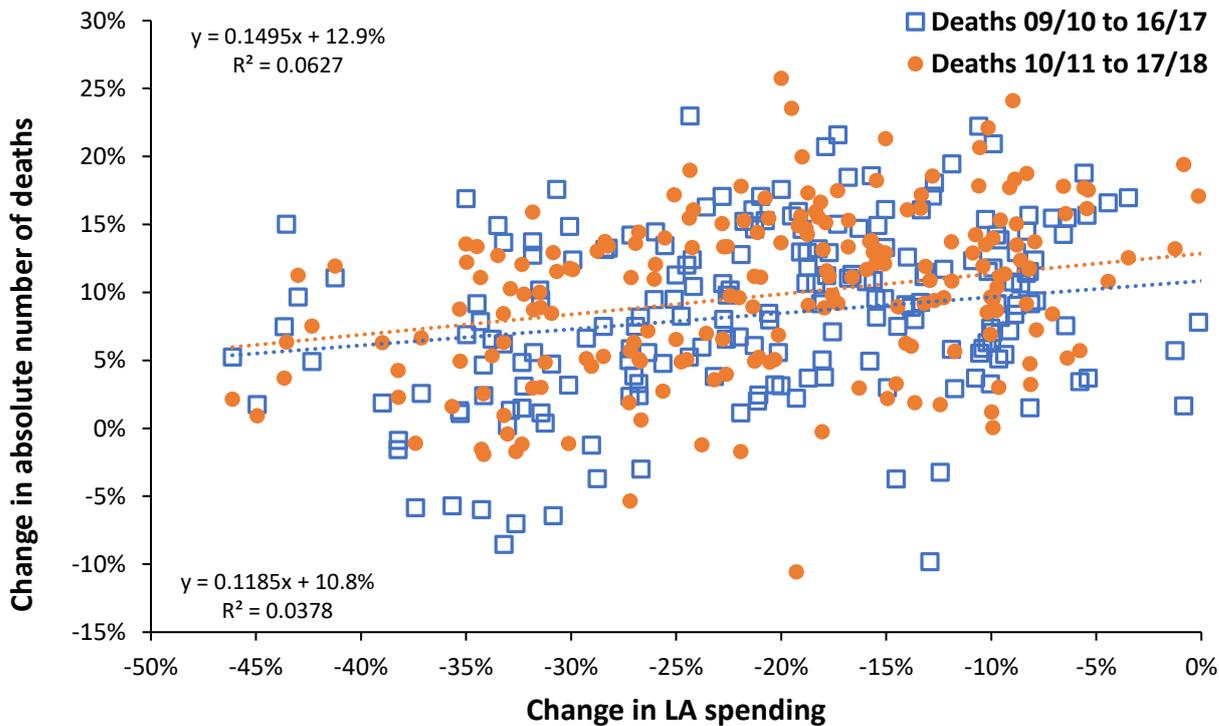
Gray and Barford (2018) sought to establish a like-for-like spending base between England, Scotland and Wales. Local authority service spending is the totality of local authority spending, excluding education, public health, police, fire and some minor parts of social care. Therefore, it includes the bulk of adult social care. In this respect, *Figure 3* shows changes in real-time local authority spending between 2009/2010 and 2016/2017 across England, Scotland and Wales and the corresponding change in the number of deaths in those local authorities for which Gray and Barford (2018) had calculated the direct impact of austerity. The data on deaths for 2010/2011 to 2017/2018 investigates the possibility that there could be a 1-year lag between spending changes and deaths.

**Figure 2. Change in rolling 12-month total deaths for UK residents who live abroad relative to the 12-month minimum 2009 to 2018**



Footnote: Monthly data for Figure 2 comes from: Office for National Statistics. Monthly deaths by usual area of residence in England and Wales, 2018. <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/monthlyfiguresondeathsregisteredbyareaofusualresidence>

**Figure 3. Change in the absolute number of deaths and like-for-like real-terms change in spending in local authorities in England, Scotland and Wales between 2009/10 and 2016/17**



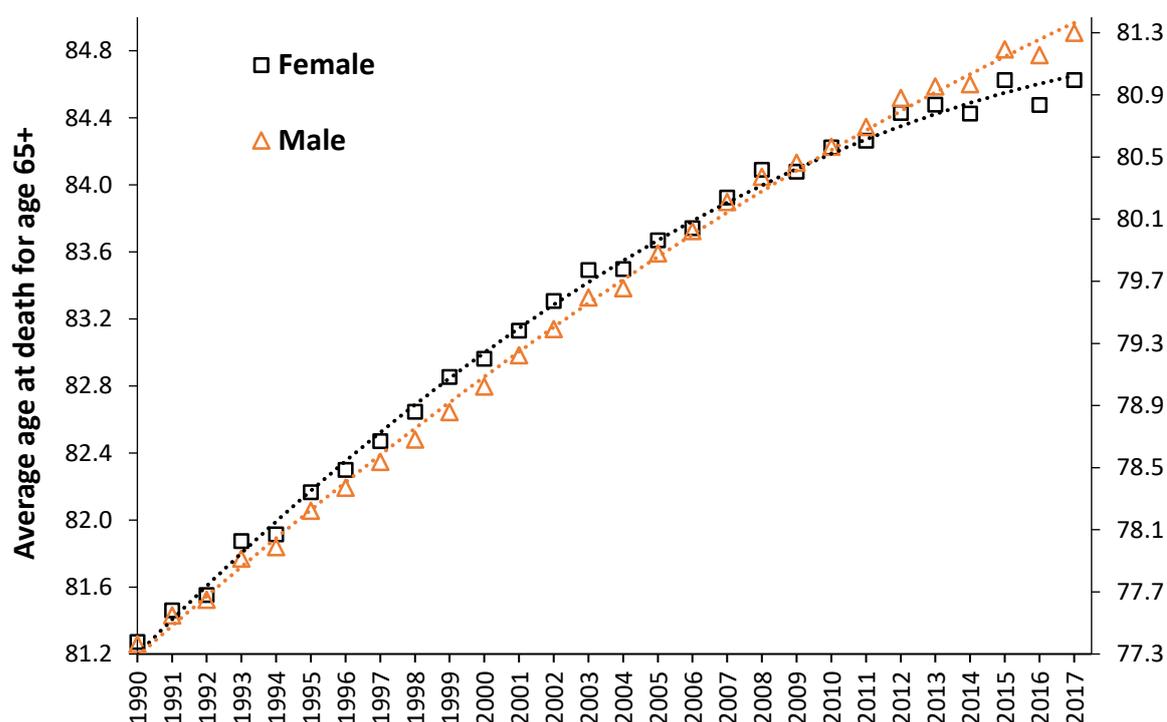
Data sources: LA spending from Gray and Barford (2018) monthly deaths from ONS (2019b) summed to financial year totals.

As can be seen, there is no correlation between the magnitude of local authority spending cuts and the change in deaths. The very low value of  $R^2$  indicates that spending cuts do not explain the observed change in deaths. For example, deaths are changing because of the other factors illustrated in *Figure 1*. Austerity cannot explain the slight trend to lower deaths in those areas experiencing highest austerity. This slight trend may well arise from the different response of various social groups to the agent(s) causing complexity in the trends (Jones, 2016).

### Average age at death continues to rise in the elderly

Austerity has been invoked to explain the stalling in increased life expectancy (Fransham and Dorling, 2017). To this end, *Figure 4* shows the trend in the average age at death in England and Wales for males and females aged over 65 years between 1990 and 2017. Over the age of 65 was chosen because it is around the retirement age and segments the population into those most likely to be affected by local government austerity. As can be seen, the average age at death has risen in an unbroken smooth line since 1990 for both males and females. As would be expected the rate of increase has declined over time. This is because it gets progressively harder to extend life span as the average age at death rises. For this reason, the trend for females is showing a larger decline in the slope than for males since females die at a higher average age. However, neither trend shows any interruption or inflection since the introduction of austerity.

**Figure 4. Average age at death for males and females aged 65+ in England and Wales 1990–2017**



Footnote: Trend in average age at death over age 65 for males =  $77.1 + 0.2 X - 0.0017 X^2$  while for females =  $81.0 + 0.217 x - 0.0031 x^2$  where  $X$  = number of years since 1990.

The wild gyrations in total deaths shown in *Figure 1* are more than likely to have been the direct cause of the apparent stalling in the mortality rate before the drop in late 2018. Constraining the calculation of the standardised mortality rate to the ESP-2013 may have inadvertently acted to amplify the apparent stalling in the mortality rate trend in England and other parts of the UK before 2019 by weighting certain ages unduly relative to the current UK age profile.

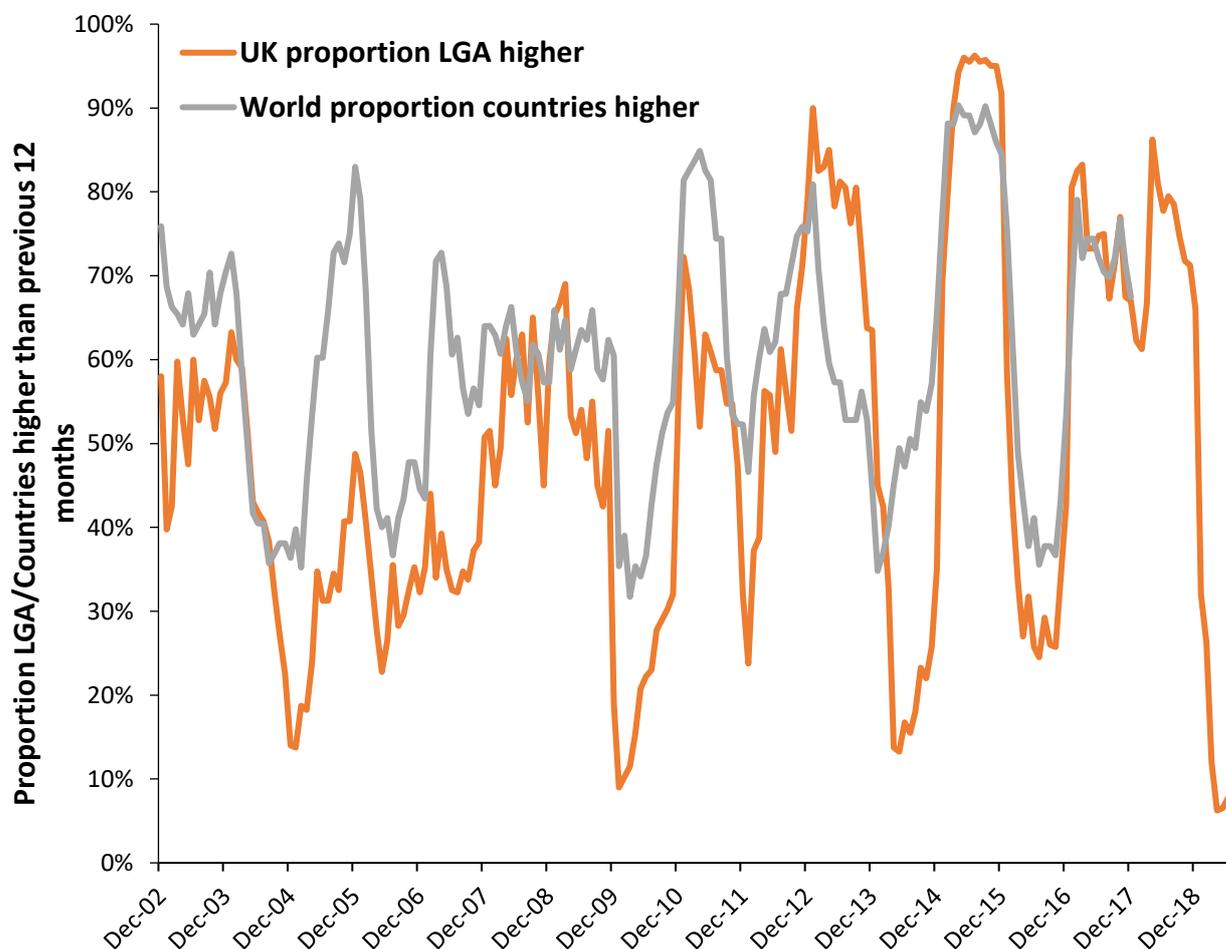
## Peculiar trends in deaths

This study uses a rolling 12-month total of deaths to reveal hidden patterns in the trend in deaths. In a rolling total the underlying monthly seasonality is removed, and sudden shifts up or down in total deaths is revealed. For example, the rolling 12-month total is acting as a frequency filter somewhat similar to the techniques employed in Auto-Regressive Integrated Moving Average time-trend analysis (Duke University, 2018).

Recall that in a rolling total any sudden shift up/down accrues incrementally in the rolling total, and this creates the sloped lines up and down. The shifts up/down can occur at any time (Jones, 2019) and these rule out the more common winter infectious phenomena. Shift up can last between one to three years. The shift up in Figure 1 in 2012 lasted for 1 year while the shift up in 2014 lasted for 3 years.

The highly peculiar spatiotemporal patterns in deaths hinted at in *Figures 1 and 2* are also seen at local authority level in the UK (Jones, 2016). Similar spatiotemporal large shifts up/down in deaths are also seen in countries around the world. *Figure 5* shows how local government areas in England and Wales show high similarity to trends in death seen in world countries. *Figure 4* commences with a comparison in the number of deaths in the 12-months ending December 2002 vs the 12-months ending December 2001. Move forward 1 month and repeat the calculation. During the period 2001 to 2017 there is monthly data for 90 world countries and 400 local government areas (local authority, county, region and country) in England and Wales for the entire time span.

**Figure 5. A rolling 12-month difference in deaths for world countries and local government areas in England and Wales 2001 to 2019**



The shape of the time trend in *Figure 5* is because of differences in small-area spread of an agent in males and females and because of overall differences in timing and magnitude between small-areas (Jones, 2015a, 2016). A shift up can seemingly endure for 1–3 years before there is a compensating shift down, as seen in *Figure 1*. These may be related to the fact that loss of living independence occurs during the last years of life (Kalbarczyk-Steclik and Nicinska, 2015; Singer et al, 2015; Aaltonen et al, 2017). This is because the agent triggers the onset of the end-of-life trajectory in susceptible members of the population.

Up to the present the focus on the calculation of ASMR using calendar year totals has totally distracted researchers away from analysing the underlying trends in raw deaths. Large shifts up/down were simply not considered possible, so no one thought to look (Jones, 2015b, 2015c).

### **The 2015 peak in deaths**

It is widely known that the 2015 calendar year witnessed a large rise in deaths in the UK over the previous year (ONS, 2016). Somewhat curiously, the explanation of this was thought to be the result of an influenza outbreak in January 2015 (Newton et al, 2016). Since influenza operates globally, *Figure 4* should show a set of far more compact peaks. However, whatever happened in 2015 was international in scope, but was more prominent in the UK than elsewhere in the world. Hence 96% of local government areas in England and Wales were affected in 2015, but only 88% of world countries showed a maximum in deaths (*Figure 4*). Spatial spread of the agent leading to higher deaths can be deduced by the fact that some countries have higher deaths in the years when others have lower, and vice versa. Clearly austerity has nothing to do with whatever is happening, although influenza outbreaks will also be embedded into the curious trends.

### **The PHE report into increased deaths**

Because of justified alarm at the rapid escalation in deaths and calls for a national enquiry (Fransham and Dorling, 2017; Hiam et al, 2018a, 2018b), Public Health England was requested to conduct an investigation, which was published in December 2018 (PHE, 2018). This 86-page report documents the extent of what has happened to human health in terms of gender, age group and cause of death. The report notes that whatever is happening in England is also occurring across Europe, and that England is worst affected compared to other European countries. No common links to austerity is noted. In England, those born in Scotland, Ireland and Northern Ireland are affected more so than those born in England. Those born in India, (southern, eastern and south east) Asia, the middle east, and other 2001 European Union countries are least affected. As to possible causes, a large section is devoted to influenza, which has already been discounted in this study and questioned by others (Hiam et al, 2017a). We are therefore left with considerable detail regarding what has happened but not why. Large changes in the case mix of admissions have also been noted to occur (Jones, 2017, 2018).

### **Correlation is not causation**

Several studies have sought to link austerity to delayed discharges and nursing numbers (Watkins et al 2017). These events are very costly (Jones, 2015b). Hence the suggestion that social care cuts alone have increased delayed discharges and may cause higher in-hospital deaths (Green et al, 2017) is largely a case of understandable correlation but not causation.

Likewise, a period of financial hardship always follows these events since the funding of the NHS is never increased to match the large costs incurred (Jones, 2015b). The NHS is then expected to shoulder the costs and nursing staff numbers are reduced to recoup the deficit (Murray 2017). Hence the suggestion that reduced numbers of nurses is leading to higher deaths (Watkins et al, 2017) is, once again, largely a case of understandable correlation but not causation.

## **Relationship to poor health**

Acute inpatient care is linked to death via the nearness-to-death effect, in which around half of a person's lifetime hospital admissions (emergency plus elective) occur in the last year of life (Payne et al, 2007; Aaltonen et al, 2017; Flojstrup et al, 2017). Hence any agent capable of tipping a susceptible portion of the population into this declining phase of health will also (after a lag) increase the number of deaths. Along with certain medical conditions, emergency department attendances, bed occupancy and GP referral all show an unexplained increase (Jones, 2015b). Sickness absence among NHS staff also shows spatiotemporal spread, which increases some 8 months before the increase in deaths (Jones, 2015b).

These events can be traced back to the 1950s in the UK and the 1960s in the USA, and seemingly occur across the whole of Europe and other Western countries (Jones 2015b, 2016). If this is so, what has happened since 2011?

Firstly, these curious events commence at very small areas that approximate to social networks or the typical population surrounding a GP surgery (Jones, 2016). Over many years there has been a very large increase in deaths and medical admissions in approximately 0.9% of small areas in England during any month of the year, and the males and females within each small area behave as separate compartments with initiation of the large increase lagging behind each other in a seeming random way (Jones, 2016). This creates complex spatiotemporal patterns in deaths and medical admissions where the National or State picture is a composite of the small area spread and variable synchrony (Jones, 2015a, 2016).

## **Influenza and higher deaths**

The Office for National Statistics (2019a) has identified that the trends in quarterly ASMR for Quarter 1 (January to March) from 2001 to 2019 show low volatility up to 2012. However, after 2012 the trend shows three years with very high ASMR in Q1 of 2015, 2017, 2018, i.e. far higher deaths than usual. These relate to three influenza epidemics (Public Health England 2019), which clearly have no relationship with austerity but co-incidentally occur in the post-austerity years. For these three years influenza-related mortality has been incorrectly attributed to the effects of austerity. These three influenza epidemics are part of the trends seen in *Figure 1*; however, they sit on top of the shift up/down behaviour induced by the other agent, i.e. they occur after shift up and are therefore not causative.

## **An infectious basis?**

It has been proposed that the spatiotemporal behaviour of deaths and medical admissions around the world is indicative of a new type or kind of disease outbreak. The World Health Organization recently hinted at such a possibility and listed outbreaks of Disease X among their list of priority diseases for research (World Health Organization, 2018). Clearly far greater research is required on an international scale to investigate this possibility.

## **Conclusion**

Whatever is happening has been demonstrated to show no linkage with austerity, but has a far more profound international basis, which behaves suspiciously like a disease outbreak. The sudden drop in the mortality rate in England during 2019 attests to the fact that austerity is not the primary cause of higher deaths (ONS, 2019). Deaths around the world are quite simply behaving in a small-area way which had not been conceived possible (Jones 2015c). Because of spatial spread of the agent and resulting high/low shifts the analysis of calendar year data is highly unreliable. Research needs to consider all possibilities.

Indeed, it is vitally important that government policy correctly attributes cause and effect. The concern is that the austerity theory may mislead to the conclusion that increased social care funding will automatically reduce deaths. No one is suggesting that austerity has not created real discomfort and disadvantage, however, the jury remains out as to the exact cause of the highly curious international trends in deaths since 2011. The possibility also exists that the NHS is being blamed for population health and cost issues which are beyond its control.

### Authors Footnote

A recent paper by Luya M, Di Giulioa P, Di Legoa V, et al. Life expectancy: Frequently used, but hardly understood. *Gerontology* 2019; doi: 10.1159/000500955, has also questioned the role of austerity and the interpretation of 'stalling' life expectancy.

A perceived limitation of Figure 3 is that it uses raw deaths without adjustment for population demographic change. This possibility was investigated using Office for National Statistics population forecasts, which include the components of change, among which are forecast future deaths. The raw deaths were then re-calculated relative to the 2010-, 2012- and 2014-based forecasts for deaths in each local authority (data not shown). This re-calculation makes no change to the conclusion of Figure 3, namely, there is no link whatsoever between austerity and the change in deaths at local authority level even after adjusting for the forecast changes in deaths over time.

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