The Public Health England report on 'Excess Winter Mortality 2012-13'

Dr Rod Jones (ACMA, CGMA)
Statistical Advisor
Healthcare Analysis & Forecasting
www.hcaf.biz
hcaf_rod@yahoo.co.uk

Most will be aware of the media attention regarding a period of excess mortality which commenced in early 2012 and extended into 2013. Public Health England (PHE) has now responded with a definitive report designed to end all speculation (see https://www.gov.uk/government/publications/excess-winter-mortality-2012-to-2013) and thereby assure us that the excess deaths are simply restricted to a smaller number of weeks in the winter of 2012/2013. Or have they?

The accompanying letter to this report lets us know that the work that led to the whole controversy had potential 'methodological weaknesses'. A strange conclusion since the methods used appear to be fairly standard and the conclusions highly informative. Have they have been labeled 'dubious' simply because they disagree with the EuroMOMO agreed standard methodology?

The key issue is that the EuroMOMO methodology is very much focused on the identification of large infectious outbreaks (such as influenza epidemics) or periods of excess deaths arising from extreme temperatures.

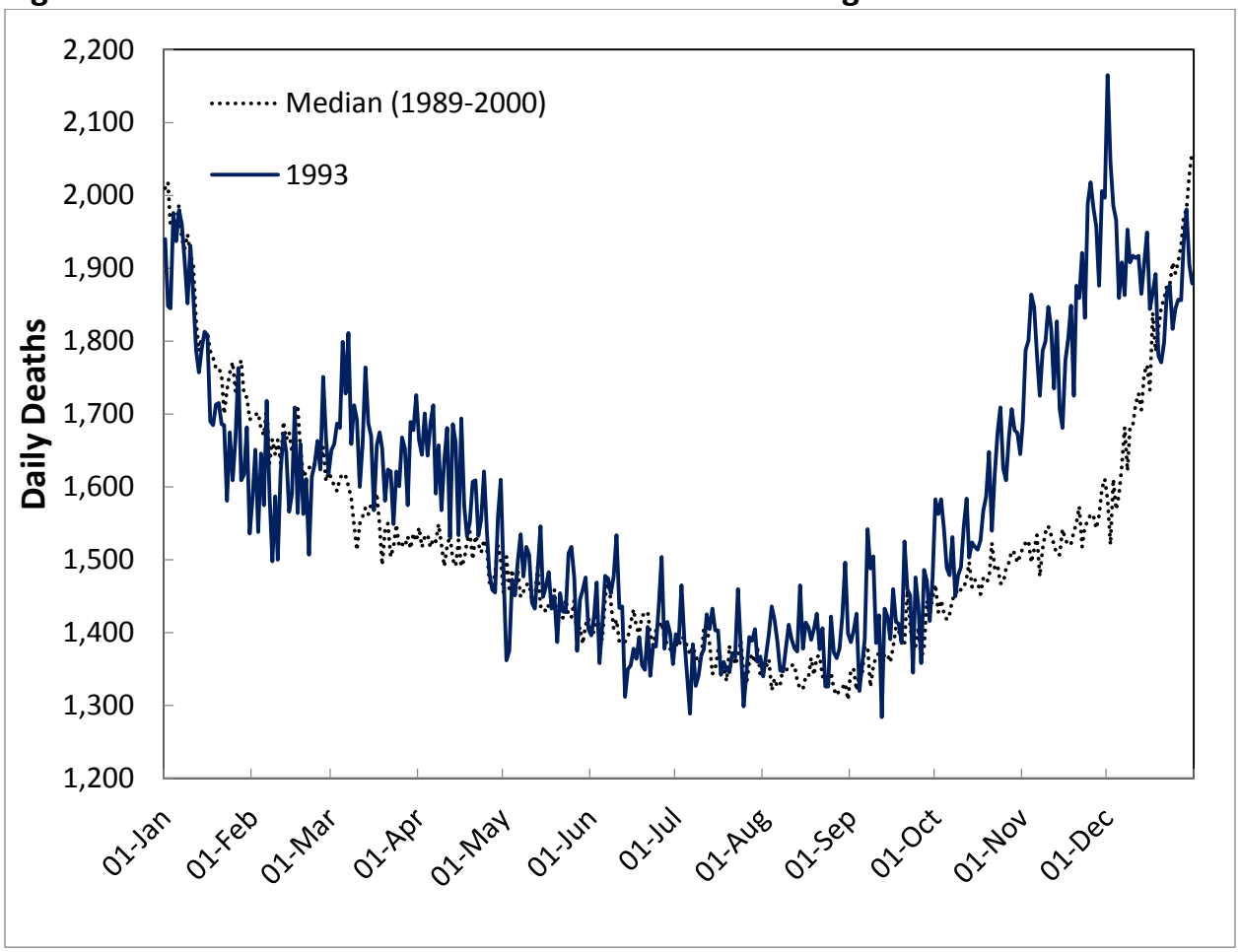
However, I suspect that it will only be the very eagle-eyed among you that spotted the obvious flaw in the whole PHE argument. Namely in Figure 3 the baseline (blue line), against which excess deaths are determined, actually trends upward over time.

This is a direct contradiction to the expected trends in the number of deaths produced by the Government Actuary. For example, in the 1999-based forecast of total deaths for the whole of the UK deaths were expected to reach a minimum around 2009 - 2012. Since that time life expectancy has increased faster than was expected and hence the 2008-based forecasts for England reach a minimum

around 2016 - 2017. At regional level the minimum varies for the South West (2014-2016), South East (2015), London (2022), North East (2017-2019), and the earliest expected minimum was 2012 for the East of England. The latest 2012-based forecasts (incorporating the 2011 census data) are not due until later this year and will presumably be very close to the 2008-based forecasts or if anything will slightly extend the point at which the minimum is reached.

Hence between 2008 and 2013 the baseline should be trending slightly downward at around 500 fewer deaths per month, although the actual time-curve is non-linear. Can PHE explain why the baseline in Figure 3 of the PHE report trends upward between 2008 and 2013 thereby contradicting the Government Actuary? Were they inadvertently led astray by the application of the methodology and have included the whole period from 2012 to 2013 into the calculation of the baseline? Given the data this would be the only way to generate an upward trend.

Figure A: The 1993 outbreak and trends in death for England & Wales



Footnote: Data provided by ONS.

Such a trend upward only acts to mask the unexpected increase in deaths which commenced in the early part of 2012 and were correctly identified in the earlier work now suggested as being the output from a potentially flawed methodology.

I have consistently stated that we are dealing with the equivalent to a slow-burn infectious outbreak of a subtle persistent agent (as opposed to spike events such as an influenza epidemic or extreme temperatures).

This has been illustrated in Figure A for the 1993 outbreak which for the whole of England & Wales commences with an early increase in deaths in late February of 1993 through to the end of April. This outbreak was characterized in Reading, Berkshire to occur in the middle of March 1993 with a dramatic 15% step-increase in medical admissions. After this point deaths are consistently slightly higher than the median for daily deaths between 1989 and 2000 and winter mortality is greatly elevated from October onward. This outbreak (and indeed all other outbreaks) has been documented to initiate slightly earlier in Scotland.

Those who have read my research will have noted that it is my suspicion that an outbreak of this agent earlier in a given year leads to increased winter mortality later in that year. The increased respiratory deaths demonstrated in Figure 1 of the PHE report is consistent with this observation and is in agreement with a potential role for cytomegalovirus (CMV) where CMV pneumonitis may not be recognized and misdiagnosed as unspecified pneumonia. Regarding excess deaths for the over 65s the PHE report states that 'A similar observation was made in several countries across Europe'.

However the subtle shift in deaths documented in Figure A (above) and also correctly identified after the 2012 outbreak are not detectable by the EuroMOMO approach (especially with the addition of the incorrectly upward sloping baseline) because it was designed to look for a different type of event.

Indeed the life insurance industry is well aware of the unusual increase in deaths commencing in early 2012 - they have, after all, been paying out for life policies. They are also aware that deaths (and policy payments) have now returned to what may be considered normal levels.

On a more technical note I would argue that the impact of these infectious outbreaks diminishes with time and hence the shape of the baseline probably changes over time. To establish if this is the case will involve correcting the historic data for temperature[1].

In conclusion, the analysis has to suit the particular characteristics of the outbreak in question.

Thank goodness that an alert public health analyst, using tried and tested public health methods, was alert enough to spot the onset of the increased deaths emanating out of the 2012 outbreak.

Where does all this leave us? The excess deaths are still there, EuroMOMO is valid for what it was designed to do and can be left to do that, but the rest of us need to be aware that there is probably more to infectious outbreaks and epidemiology than is currently in the textbooks. So why are PHE seemingly averse to the possibility of a genuine infectious outbreak of a type not previously characterized?

Footnote

1. Hajat S, Kovats R, Lachowycz K. Heat-related and cold-related deaths in England and Wales: who is at risk? Occup Environ Med 2007; 64: 93-100.

Details of publications relating to this research can be found at www.hcaf.biz

A key publication looking at the trends for death in Scotland has been accepted by the online journal ***Biomedicine International*** and will be published later this year.

A comprehensive review of the potential roles for CMV in hospitalization and death has been submitted to another online journal.