

## Friday Report: Issue 74

By: Adele Groyer & John Roberts

### ***Covid-19 Actuaries Response Group – Learn. Share. Educate. Influence.***

The Covid-19 Actuaries Response Group has reported on important Covid-related topics throughout the pandemic. This, however, is our last regular bulletin, although we will return in January with a review of some of the key themes covered by Friday Reports over the last three years.

#### **Stuart McDonald MBE**



This month we start by congratulating our co-chair, Stuart McDonald, who received his MBE, awarded in the New Year’s honours list, from His Majesty the King at Windsor Castle on Wednesday. Stuart was awarded the honour for his volunteer services to public health during the pandemic.

Whilst some of Stuart’s work has been very public, such as his leadership of our group, much of it has been “behind the scenes”, supporting the Department of Health and Social Care in respect of various impacts of the pandemic.

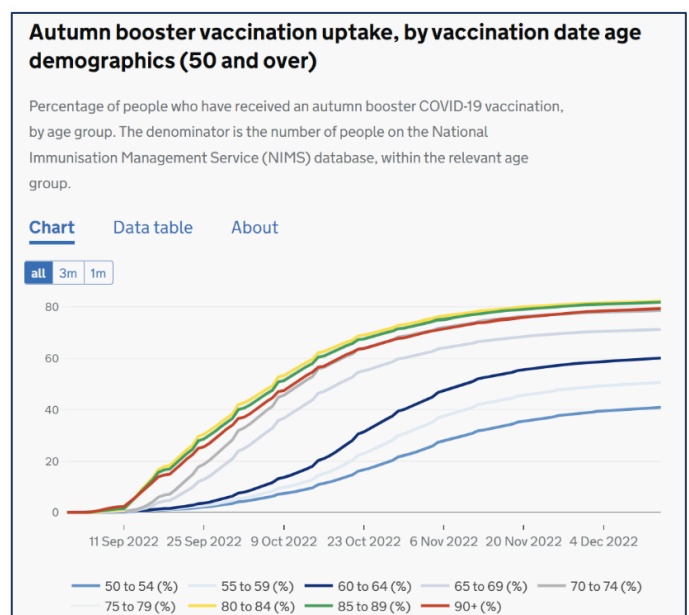
Congratulations Stuart on a very well deserved honour, and we hope you and your family enjoyed the occasion.

## Vaccines and hybrid immunity

### **Autumn Booster Progress ([link](#))**

The rate of boosters has now tailed off, despite recent publicity from the NHS looking to encourage those eligible who have yet to come forward to do so. Over the last week just 160,000 jabs were administered in England, taking the overall take-up rate amongst over-50s to 63.5%.

As can be seen from the chart, there’s a very marked divide by age, with 80% take-up in the older age groups (over 75), but only 40% immediately above age 50, which is the cut-off point for eligibility by age.



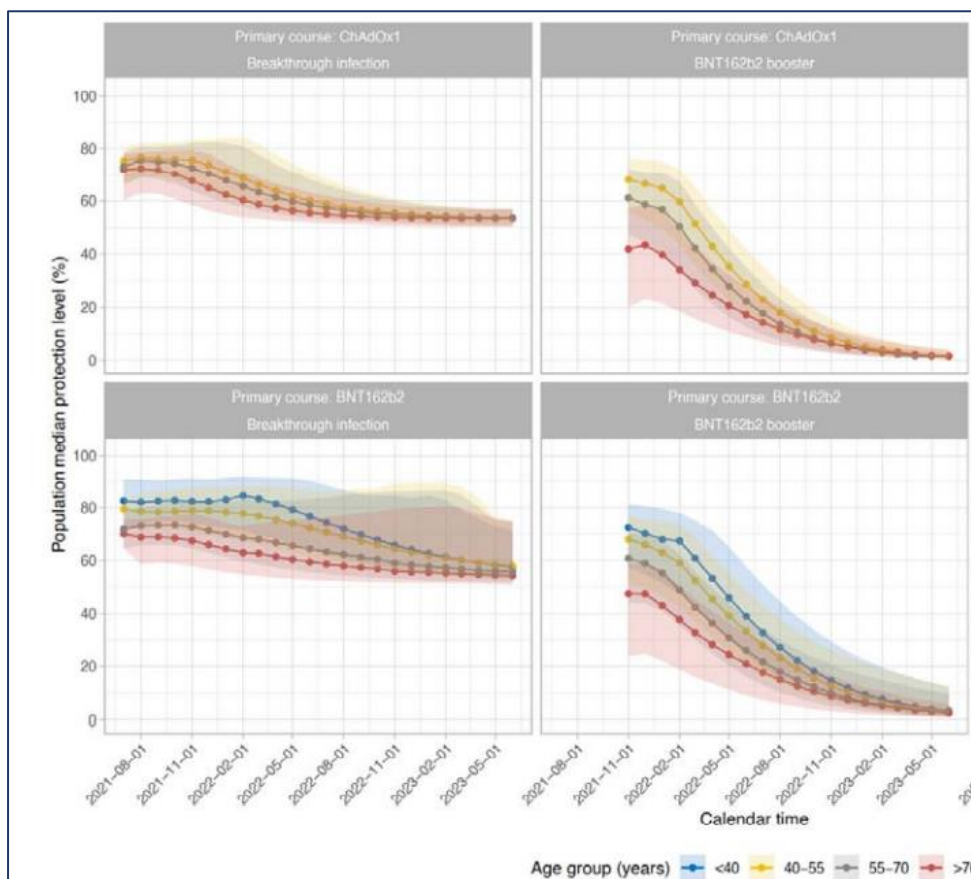
## MHRA Authorises Pfizer Vaccine for 6 months to 4 years old children [\(link\)](#)

The Medicines & Healthcare products Regulatory Agency (MHRA) has authorised the use of a low dose of the Pfizer Comirnaty vaccine for children over 6 months and under five years old. MHRA's authorisation is in respect of safety, quality and effectiveness. Any decision on its use in that age group will be determined by the Joint Committee on Vaccination and Immunisation which will put forward a recommendation to Ministers.

## Protection against Omicron infection from booster vaccination vs breakthrough infection [\(link\)](#)

Researchers from the Nuffield Department of Medicine at the University of Oxford have used data from vaccinated participants in the ONS Covid Infection Survey to find that breakthrough infections were associated with higher levels of protection against new infection than booster vaccinations. Breakthrough infections generated similar antibody levels to booster vaccinations but drops in antibody levels following breakthrough infection were slightly slower than the drop after booster vaccination. They estimate that 50-60% of the vaccinated UK population with a breakthrough infection would still be protected against a new infection by the end of 2022, compared with less than 15% of the triple-vaccinated UK population without previous infection.

*Estimated median protection level by calendar time, assuming no further vaccinations*

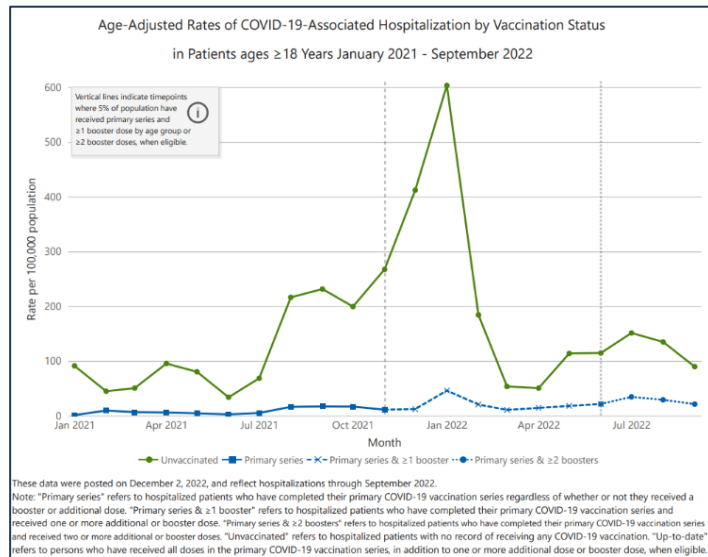


These findings could inform decisions about future vaccination programmes. The authors do however acknowledge that there are societal impacts and risks to some individuals associated with ongoing transmission.

## United States hospitalisations by vaccination status [\(link\)](#)

The CDC hosts an interactive dashboard showing how Covid-19 hospitalisation rates in the US vary by vaccination status for a network of over 250 acute care hospitals. The latest available data is up to September 2022.

The age-adjusted rates of Covid-19 hospitalisation are consistently higher in the unvaccinated – in September 2022 hospitalisation rates were 4.2 times higher in unvaccinated adults.



## mRNA Vaccines Application Beyond COVID [\(link\)](#)

We've become familiar over the last two years with references to mRNA vaccines in respect of the fight against COVID, but there are encouraging signs that the technology behind them may have wider applications, potentially of great significance in the fight against cancers. Unlike normal vaccines, these treatments would be administered to patients already suffering from the condition.

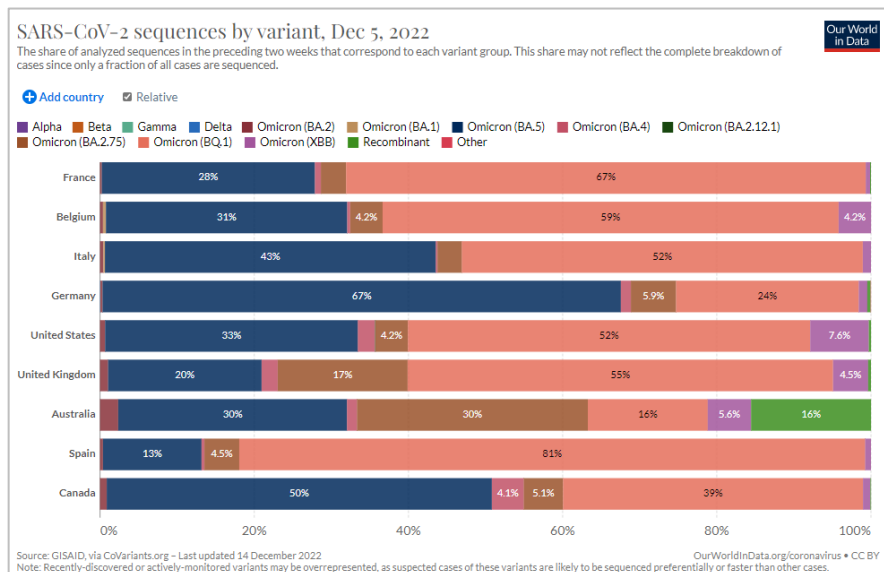
It was reported this week that a Stage IIb randomised clinical trial by Moderna and MSD on 157 patients with advanced melanoma displayed a 44% relative reduction in the risk of dying or having the cancer progress for patients who had taken the mRNA-derived treatment. The findings have yet to be peer-reviewed, and further trials will be required in due course.

## Variants

### Variant prevalence

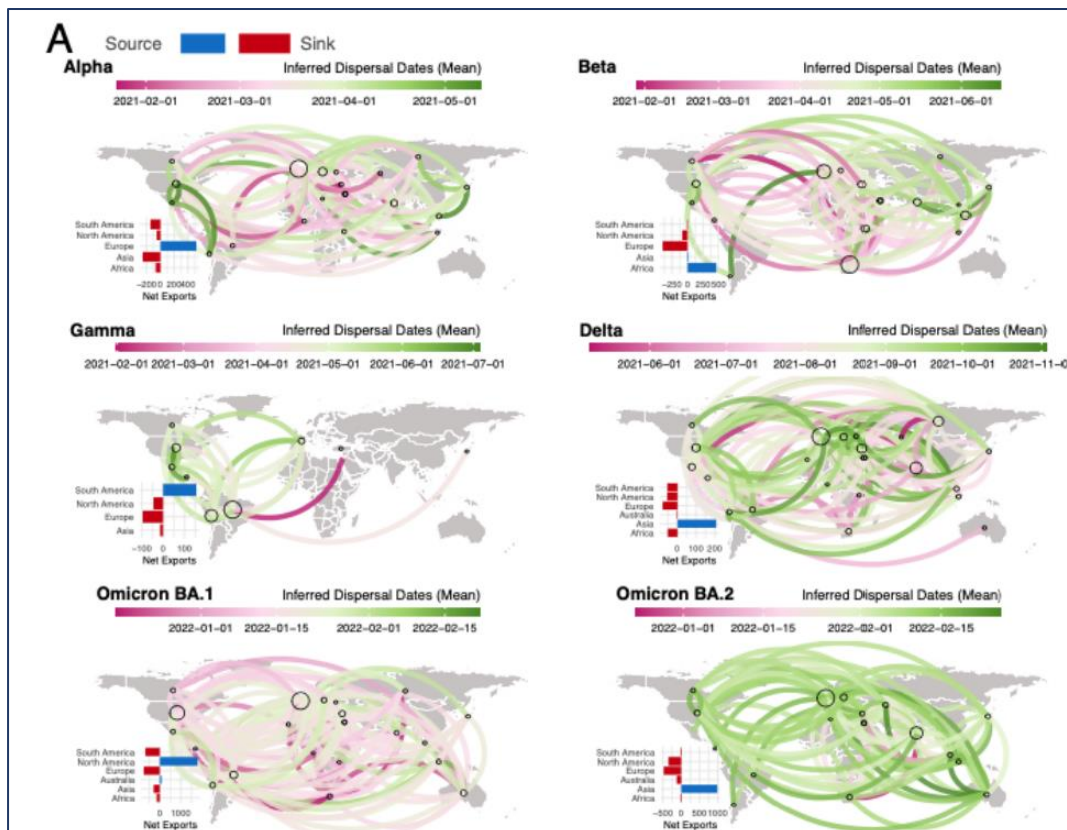
GISAID data is captured by Our World in Data [\(link\)](#) and shows that BQ.1 is now the dominant variant. BQ.1 displaced BA.5.

We are also starting to see emergence of variant recombinants including Omicron XBB.



## International variant dispersal patterns and influence of air travel [\(link\)](#)

A pre-print study has used phylogenetic and phylogeographic methods to reconstruct the dispersal patterns of SARS-CoV-2 variants of concern. In addition to providing beautiful visuals, the study identifies which countries acted as global or regional hubs of dissemination. The study shows that global travel hubs were important contributors of viral exportations, and suggests that the dynamics were different for each variant. For example there was faster global spread following a rebound in air travel volume prior to Omicron's emergence, combined with the higher transmissibility of Omicron relative to Alpha.



The implications for public health, as explained by the authors, are:

- Once a variant has been established in multiple countries, continued international spread may be inevitable. When specific routes are shut through travel restrictions, other locations become responsible for a greater share of global dissemination. This indicates that actions to control the effects of virus transmission would need to be undertaken everywhere.
- Travel restrictions are often implemented after initial 'imports' have already come into the country. To limit local transmission, testing at arrival needs to be accompanied by wider community non-pharmaceutical interventions.
- With increasing air travel and human mobility, new variants are likely to reach secondary countries much faster. This means that testing and genomic surveillance will often struggle to detect a new variant before it has already spread widely; targeted travel restrictions become increasingly redundant. Continued investment and innovation in robust, fast, and systematic diagnostic and surveillance programs is crucial for current and future pathogens.

## Long COVID

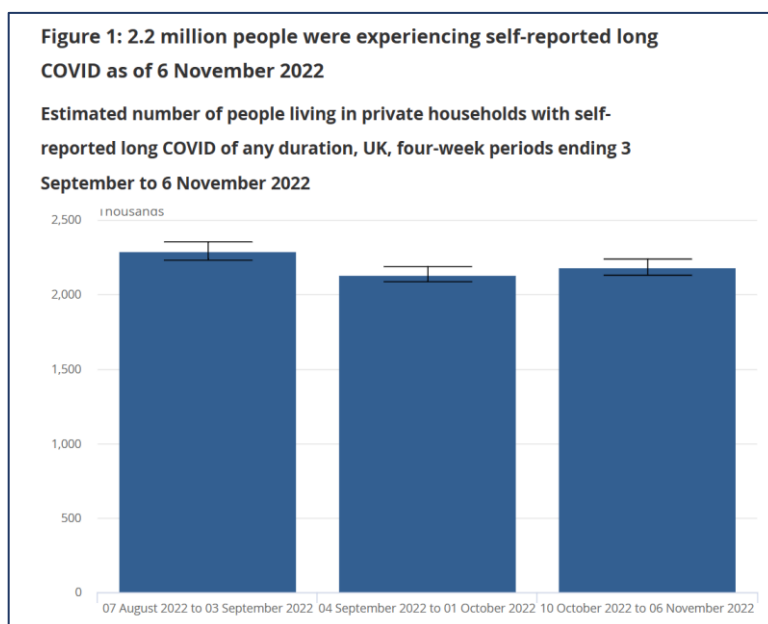
### ONS Surveillance ([link](#))

The ONS continues to estimate numbers of people suffering from Long COVID (LC), based on self-reported symptoms. Whilst the fact that this is a self-reported survey does attract some criticism as to its objectivity, it remains a useful litmus test as to the extent and direction of LC.

The method of collecting data changed in October, and so recent results are not considered comparable with earlier ones – hence the relatively small time-series of estimates. These show, however, that a relatively constant figure in excess of 2m continue to feel that they have symptoms consistent with LC.

These estimates are based on those who believe their COVID infection commenced more than four weeks previously. Of these, around 1.9m were infected over 12 weeks earlier, 1.6m over one year earlier, and 0.6m more than 2 years ago.

In terms of severity, LC is estimated to adversely affect the day to day activities of 1.6m, with 0.37m reported as having their activities seriously affected.



## Excess mortality

There is ongoing activity worldwide to understand the death toll associated with Covid-19's direct and indirect effects. We give an overview of recent analyses on this topic (further to the CMI's regular excess mortality reporting, noted under 'UK Data' below).

### WHO estimates of excess mortality associated with the Covid-19 pandemic ([link](#))

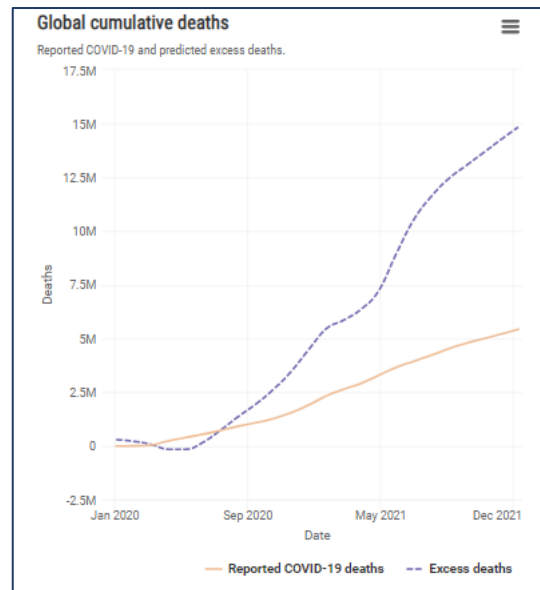
A working group of the WHO estimates that there were 14.8 million excess deaths globally from 1 January 2020 to 31 December 2021. This is 2.7 times more than the 5.4 million deaths reported as due to Covid-19 for the period. In 2020, the excess was 4.5 million and in 2021, the excess was 10.4 million.

In 2021, the rise in infections outpaced the roll-out of vaccines in many locations and this was exacerbated by the emergence of more infectious and severe variants such as Delta.

The authors explain the challenges they encountered in conducting their research. In particular, excess mortality cannot be directly estimated for all countries as many do not have the requisite all-cause mortality data. For countries without data, figures were predicted from models based on similar or nearby countries where data was available but results should be interpreted with caution as countries without data are typically clustered.

The authors acknowledged and acted on earlier feedback about estimates for Germany and Sweden ([link](#)). They also note that they used spline models as the basis for the modelling of the expected numbers, but will revisit this choice for the next round of estimates, as such models can produce inappropriate extrapolations.

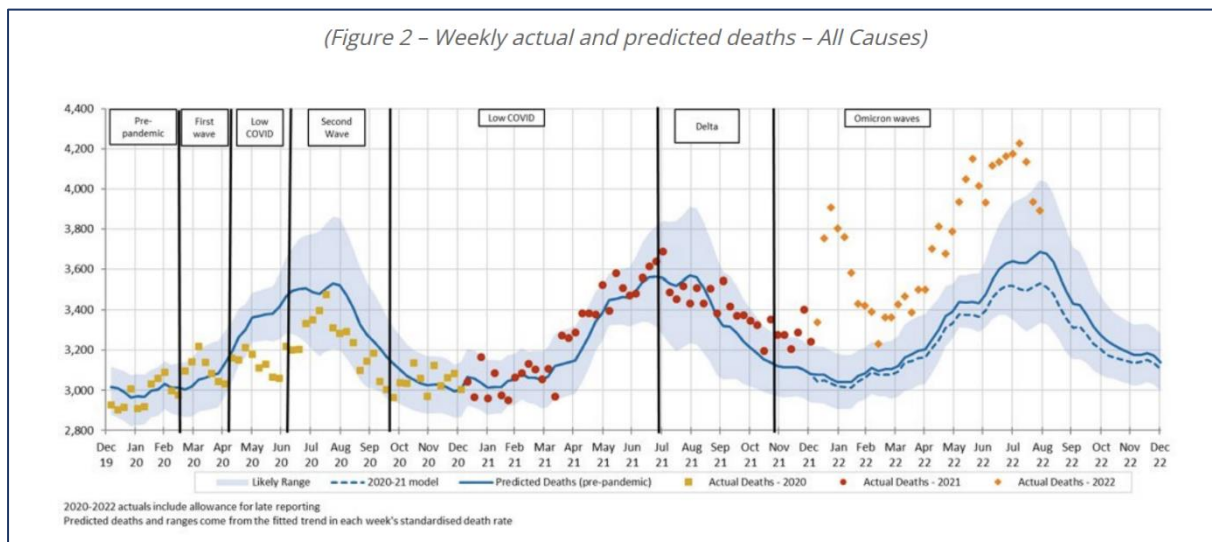
The excess mortality estimates are available in an interactive web application ([link](#)) and the data and code are also available ([link](#)).



### COVID Down Under ([link](#))

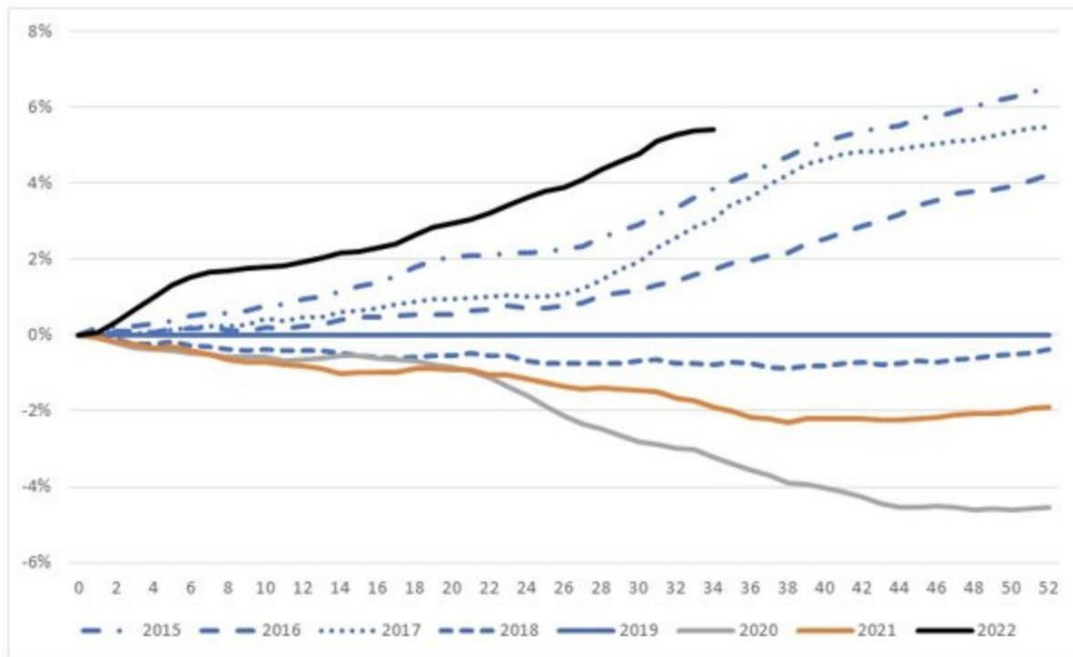
As is well known, Australia, along with New Zealand, adopted a much stricter approach to lockdowns (and non-pharmaceutical interventions more generally) until such time as the population had all had the opportunity to be vaccinated. Our Australian counterparts (and occasional contributors), Karen Cutter and Jennifer Lang are co-authors of a blog which analyses recent experience as the country has opened up. There are some interesting contrasts to be made with the UK.

Below we can see how mortality was below expectation in 2020, was more in line with expectations in 2021, and has been much higher this year, as the remaining restrictions have been relaxed.



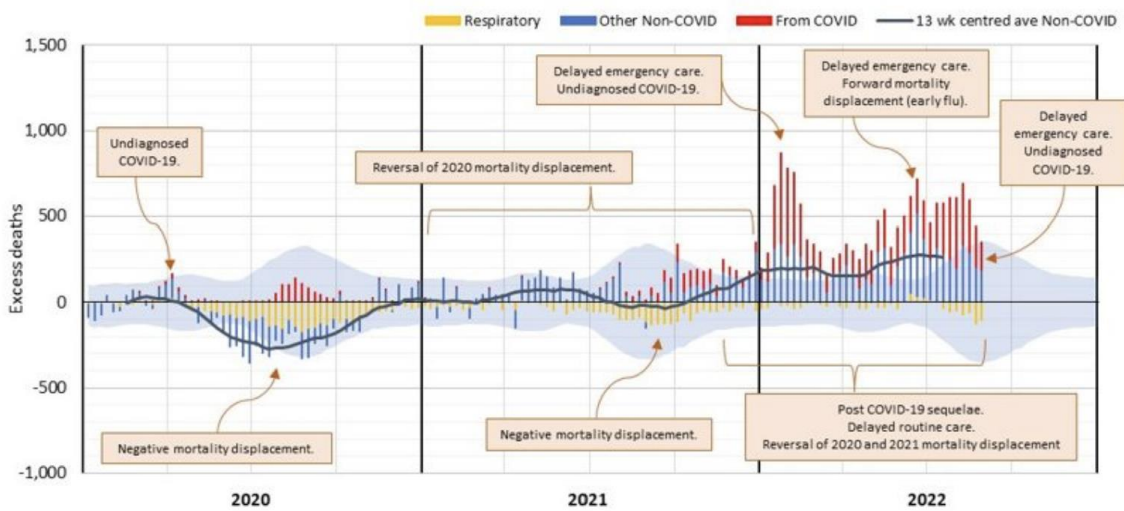
Analysing recent mortality using 2019 as a benchmark, we can see clearly the extent of the reduced mortality in 2020, and the contrast with 2022 (although the degree by which the latter is higher than recent years is less pronounced). By August, 2022 mortality was running around 13% higher than expected, a figure not dissimilar to the total excess reported by the CMI in 2020.

(Figure 17 – Cumulative standardised mortality rate relative to 2019)



The reasons for the excess this year are discussed, with several of the reasons familiar to those of us in the UK who have been trying to understand the reasons for the continuing excess here. Vaccine-related deaths are regarded by the authors to be unlikely as a cause for the excess this year, particularly as the vaccine roll-out was more or less finished by Jan 2022, and thus not aligned with the profile of excesses observed.

(Figure 14 – Possible causes of non-COVID-19 excess mortality from time to time during the pandemic)



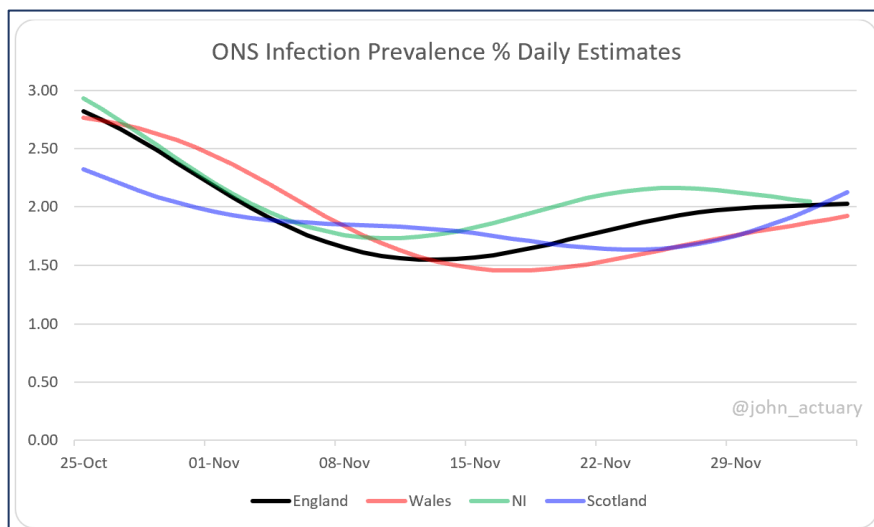
There is far more of interest in the report than we can cover here, and we should also compliment the authors on the clarity and visual appeal of the graphics used.

## UK Data

### ONS Infection Study, Weekly Data & Widening its Scope

The latest infection prevalence study from the ONS suggests that after increasing from a recent low of around 1.5% three to four weeks ago to around 2.0% there may be a flattening in the last few days.

Levels in the rest of the UK are also broadly similar at around 2%, but with varying directions.

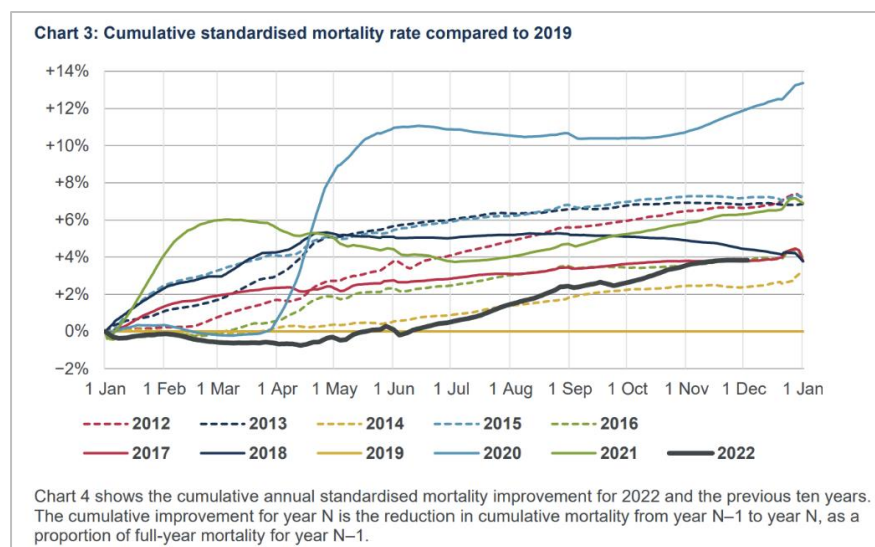


In addition, a blog ([link](#)) by the ONS describes how the infection study is being used in a pilot to see whether other respiratory infections can be tracked. Over the winter period around 750 samples taken from the weekly study are being additionally tested for flu and RSV. Where a sample is identified as having a high concentration of flu virus, additional testing is carried out to determine the exact strain.

The blog notes that the current data is not to be regarded as representative of the population, but will provide useful information as to whether the data can in future be used to monitor spread and type of infections circulating within the community.

### Excess Mortality Eases – CMI figures ([link](#))

Since our last Report there has been a noticeable reduction in the excess mortality seen since June, to the surprise of many given the well documented stresses within the health service. In particular, the proportion of the excess attributable to “non-COVID mortality” (ie where COVID was not mentioned on the death certificate) has fallen substantially, and was even negative this week (so COVID-related deaths more than accounted for the excess).



The reduction in the excess in recent weeks can be seen here in the flattening off of the cumulative excess for the year to date, which now appears likely to end the year at around 4% higher than the benchmark year of 2019, ie immediately pre-pandemic.



## Deaths among care home residents [\(link\)](#)

The ONS has published a report on deaths of care home residents in England and Wales for 2021. The data includes deaths of care home residents where death occurred outside the care home; 87% of deaths occurred in care homes.

There were fewer deaths in 2021 than in 2020 and also fewer than the average number of deaths pre-pandemic. The reduction in death counts compared to pre-pandemic levels possibly reflects lower care home occupancy in 2021 because the age-standardised mortality rates in 2021 are higher than in previous years. Around 11% of the care home resident deaths were due to Covid.

Wales has a significantly lower mortality rate than England among care home residents in all time periods studied but the reasons have not been explored in the ONS report.

### Death counts

<i>Period</i>	<i>England</i>	<i>Wales</i>
2021 death count	127,171	6,612
vs 2020	-18%	-20%
vs 2019	-3%	-3%

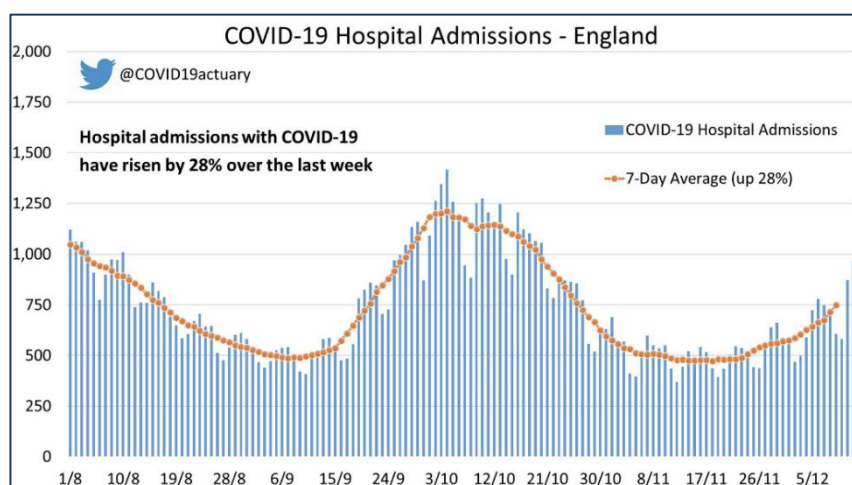
### Age-standardised death rates (per 100,000)

<i>Period</i>	<i>England</i>	<i>Wales</i>
2021	10,478	8,730
vs 2020	+14%	+12%
vs 2019	+32%	+33%

## Hospital Statistics

COVID related admissions have continued the rise seen in recent weeks, with the current 7-day run rate around 50% higher than the recent lows, and increasing at 28% over the last week.

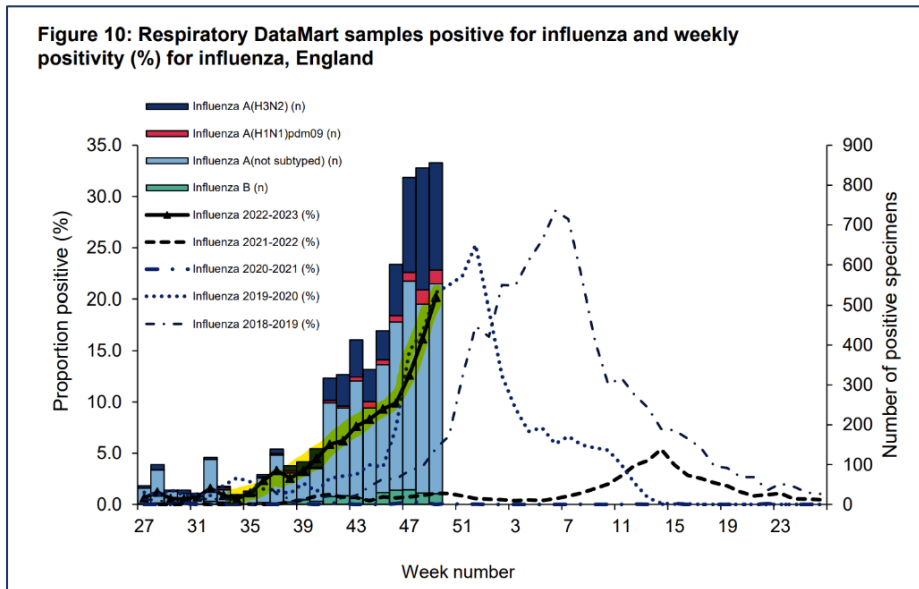
The trajectory of this wave has been more gradual than the previous one, but appears to have accelerated in the last week.



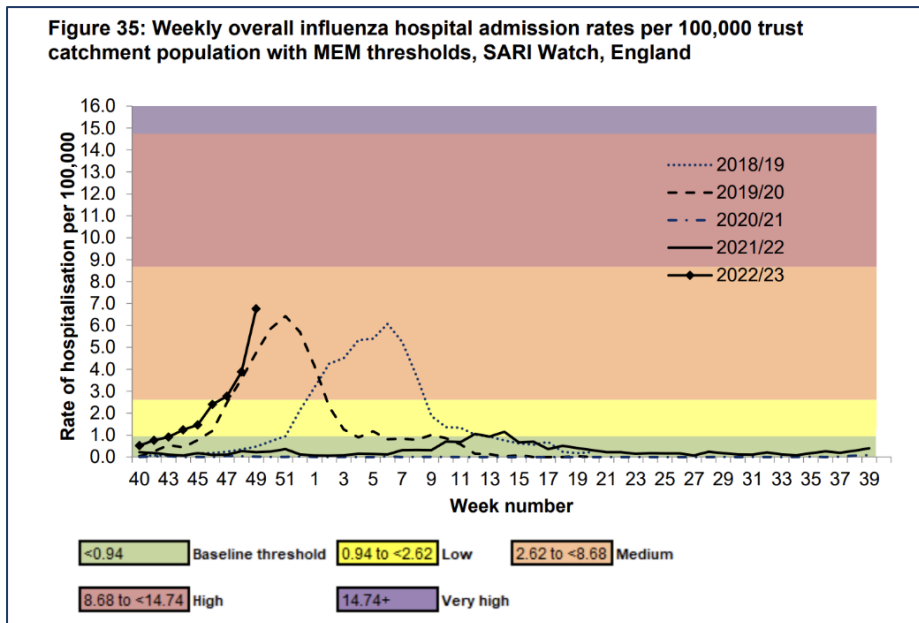
As in the previous wave, hospital acquired infections appear to be a major contributor to the rate of increase. All regions are increasing, but the South West is notably faster than others, up 50% over the week.

**Flu** ([link](#))

With a lot of focus on the likelihood of a severe flu season in addition to ongoing COVID infections, the weekly Flu and COVID surveillance report from UKHSA is tracking progress in comparison to previous years. This can be judged in several ways, firstly by looking at the positivity of samples tested, which shows that 2022 (highlighted in yellow) appears to have got off to an early start, but is now running in line with the period immediately pre-pandemic. You can also see how low the last two winters have been, with 2020/21 in particular at virtually zero levels of positivity.



However, admissions to hospital are currently running ahead of recent years, and on a very steep upward trajectory, which will without doubt be adding to the pressure in hospitals due to the COVID related admissions.



## Pandemic reflections

The Department of Health and Social Care has published a technical report on the pandemic in the UK ([link](#)). DHSC state that ongoing public inquiries will give the definitive narrative of the COVID-19 pandemic to date, including policy decisions taken and reasons for them, and that they have restricted this report to “technical issues”. The report covers a wide range of topics including understanding the pathogen, modelling, testing, contact tracing, pharmaceutical and non-pharmaceutical interventions, medical care, disparities and communications.

The introduction highlights four themes:

- Scientific work from different disciplines was needed, and these had to be integrated at considerable speed. The UK started with a strong science and research base but even with this, accumulating evidence for policy was incremental and initially there was great uncertainty.
- The UK was relatively effective and rapid in responding in areas where there was existing strength and capacity e.g. phase 3 clinical trials. It was less effective, at least initially, in areas with less strength e.g. diagnostics.
- Science and medicine are international and pandemics by definition cross borders. Much of what we learned was from other countries. The UK provided a significant contribution to the global scientific output as well as insights specific to the UK experience.
- The engagement of policymakers and the public in scientific insights was critical to the response. Often the most difficult part of medical and scientific communication is explaining uncertainty or evolving science in a transparent way without it leading to paralysis in decision making.

As actuaries we have considerable experience of decision-making in the face of uncertainty (noting that the rapidity and severity of the onset of the pandemic would stretch any normal decision-making process), and believe that the actuarial profession has a role to play in any future similar situation.

## And Finally ...

Some of the Actuaries Response Group, including your correspondents, recently met up for a discussion at a suitably hospitable venue in the City of London. Whilst there, the subject of the “Chatbot” came up ([link](#)), and we decided to see whether it could accurately represent our current situation, written in the style of [Borges](#).



*“The actuaries sat in a dimly-lit tavern, glasses of amber liquid in their hands, as they discussed the future of the pandemic. They spoke in hushed tones, their words heavy with the weight of their calculations. One of them, his eyes shining with the strange light of the prophet, spoke of the rise and fall of infection rates, of the ebb and flow of death. Another, her face grim, spoke of the certainty of the virus, of its implacable march across the world. They drank, and they discussed, and they tried to glimpse the future through the fog of alcohol and uncertainty.”*

With that disturbingly accurate AI account of our evening, can we extend Season’s Greetings and wish all our readers a very happy Christmas.

**16 December 2022**