100: Our hundredth bulletin

COVID-19 Actuaries Response Group – Learn. Share. Educate. Influence.

Summary

The number 100 has felt ominous recently, with 100 million cases now reported worldwide, and 100 thousand COVID-19 deaths in the UK. For the COVID-19 Actuaries Response Group, those figures explain why we now find ourselves publishing our 100th bulletin – there has been an often changing, but ever increasing, range of issues over the pandemic where we have wanted to offer our insight.

Our group came together in early March 2020, just as Europe started its collective lockdown. Since then, the group has been publishing short bulletins (via our website, LinkedIn, Twitter and recently Facebook) to help share knowledge and insights on behalf of the actuarial profession.

It's been less than a year, but we can proudly point to various indications that we've made an impact:

-   Numerous articles and quotes in national and international media;
-   Over six million social media views of our content, which has been widely shared;
-   Our work has been quoted and referenced at SAGE and at the highest levels of government.

In this 100th bulletin, we wanted to mark the occasion by drawing attention to what we think were some of our notable publications – emphasising that our 'R' is for *Response*, not *Research*. We have tried to bring things out quickly as the issues arose; speed may risk inaccuracy, but in times of crisis a quick 'best endeavours' response is more useful than a long pause.

Most of these were written by members of the group, but we also want to thank our many guest writers, of whom former IFoA President Chris Daykin has been the most prolific. Thank you to them, and to all our readers and supporters – within and outside the actuarial profession.

Bulletin 1: Is the Imperial College Pandemic Modelling Work 'Fit for Purpose'? [link]

The first issue we tackled was Imperial College's modelling, generally seen as the trigger for the Government's pivot to a lockdown strategy. Although the modelling was criticised by many, with parameters that could not be known with certainty, results were broadly in line with estimations we had done in February. These showed that a plausible outcome of an unchecked pandemic could be around 500,000 UK deaths. It was this frightening thought that prompted our group to come together.

Bulletin 8: COVID-19 in numbers: ten times worse than seasonal influenza? [link]

Matthew Edwards sought to estimate the Infection Fatality Rate, noting the major difficulties involved. At the time, the number of COVID-19 deaths was unclear, the number of infected people even more so. We expressed results as a multiple of normal seasonal influenza IFR (concluding that COVID-19 was 5-10 times worse), partly reflecting that similar reporting problems also affect influenza numbers.

Bulletin 10: Are COVID-19 Victims Already 'on Death Row'? [link]

Early on, we noted a worrying tendency to 'write off' the victims as people who were old and (often) obese or diabetic, and therefore presumed to be already 'on death row'.

We challenged that somewhat callous narrative using a combination of mortality underwriting models and insights from the Intensive Care National Audit and Research Centre ('ICNARC'). We showed how people with managed conditions such as diabetes, even in the presence of adverse risk factors (e.g. obesity, smoking) would generally have several years of life expectancy at high ages.

What started off as a viral tweet by Stuart McDonald quickly developed into a bulletin by Matthew Edwards, articles in The Spectator and the Wall Street Journal, and was later the subject of Stuart's first appearance on BBC Radio 4's "More or Less".

Bulletin 11: Exceptional Volunteer Response! [link]

We were delighted to help Gary McInally and Mohammed Khan launch their 'call to arms' to the actuarial profession. They appealed for volunteers to help in whatever way they could, and here they note how more than 400 actuaries responded. Many of these went on to contribute in ways such as helping NHS Regions optimise resource allocation, helping GP Commissioning Groups improve decision making around the deployment of GPs, as well as providing resources to 'RAMP' – the Royal Society's initiative, Rapid Assistance in Modelling the Pandemic.

Bulletin 16: Risk, Uncertainty, Psychology and Judgement [link]

Tan Suee Chieh, at the time President Elect of the IFoA, had spoken to 800 actuaries in East Asia in Zoom meetings on Risk, Uncertainty, Psychology and Judgement. A summary of this presentation (along with the slides) became our sixteenth bulletin. A key point was how, in an increasingly uncertain world, actuaries will increasingly need to develop, use and rely on judgement.

Bulletin 20: How COVID-19 kills [link]

Our group includes a far wider range of skills than the 'pure' actuarial. In this bulletin, Joseph Lu – an actuary with a medical degree – described the underlying biological process involved in COVID-19 deaths. Death arises through lung damage, the joint culprits being the virus (attacking the respiratory system) and our over-reacting immune defences. Oxygen deprivation from lung damage may cause death directly or indirectly by stressing other diseased organs.

Bulletin 23: Risk Factors for COVID-19 [link]

As more data emerged, we were able to bring actuarial insight to bear and to challenge some early fallacies. For instance, given the advanced age of most COVID-19 victims, conditions such as high blood pressure that are highly correlated with age had been thought to be risk factors in their own right. As multifactor analyses of COVID-19 mortality emerged, Matthew Edwards clarified the underlying dynamics of 'confounding' in this bulletin and summarised early research.

Bulletin 43: Care homes: Forgotten by us, not by COVID [link]

Perhaps the biggest tragedy – because with hindsight it was avoidable – was mass deaths in care homes. In March 2020, the country's collective focus was on hospitals. Dan Ryan and Adrian Baskir described the care home situation in this bulletin. The main problems were lack of sufficient protective personal equipment (PPE) and the early release of patients from hospitals. Between March and June, 1-in-7 care home residents died. New protocols such as routine testing of all residents and staff have fortified care homes against subsequent waves, but the mental challenges of isolation have intensified as the pandemic continues.

Bulletin 45: Longer-term mortality and morbidity impacts of the pandemic [link]

As the months passed, our understanding of the pandemic's mortality impacts grew. Matthew Edwards and Andrew Gaches wrote a series of bulletins on mortality, the last of which looked at the longer-term impacts. We considered the economic impacts, as the price of lockdown and its reduction of COVID-19 deaths is severe damage to the economy, and hence likely reduced funding for future healthcare. We also looked at the mental health damage, behavioural changes and physiological effects (before 'Long Covid', below, started to be another major problem).

Bulletin 51: Are we getting better at treating COVID-19? [link]

In July we noted that mortality of those entering hospital with COVID had halved in the three months since the peak of the first wave. John Roberts explored possible reasons for this, notably improvements in treatment. With recent hospital admissions nearly 50% higher than the first wave peak, but deaths "only" around that first peak level, we can see the benefit those improvements have had in limiting deaths during the second wave.

Bulletin 63: The second wave [link]

Our Twitter account has continued to attract new followers, recently surpassing 11,000, with regular updates of hospital admissions and deaths, and our estimate of R for England. The platform has also been useful for wider dissemination of some of our key messages. Our activity on Twitter started to attract more attention in September when we accurately 'called' the start of the second wave.
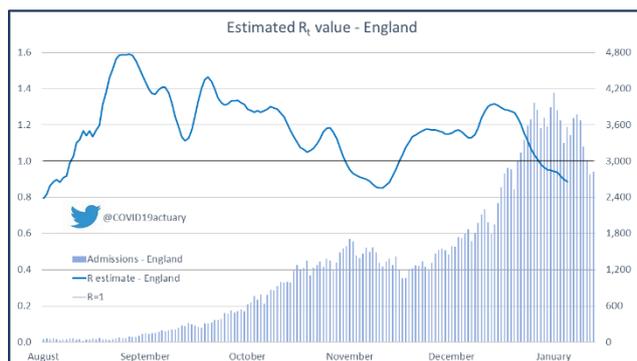
The approach underlying our regular updates, is set out in bulletin 63, and our conclusions were discussed by Stuart (by now the show's "favourite actuary") on BBC "More or Less".

Application of actuarial methods to estimate deaths which have occurred but not yet been reported meant that we were able to identify the increasing death numbers before others.

Bulletin 65: Long COVID [link]

In September we started seeing increasing news about 'Long COVID' – an emerging condition in which symptoms of COVID persist for longer than 12 weeks following onset. These range from the expected respiratory symptoms, through to cardiovascular complications, chronic fatigue, muscle and joint pain and mental health conditions. So far there is relatively little data on longer-term aspects, but it looks as if a significant proportion of previously healthy COVID survivors face an enduring health problem.

Bulletin 70: Tracking the mutation potential of SAR-CoV-2 [link]

Once we started to understand the virus, we started to worry about how it might mutate – and this subject has only become more important in 2021. Epidemiologist Dan Ryan explained the problem in this bulletin. Every mutation results in changes to amino acids and to protein folding. Most make no difference; some compromise the virus but a very few confer a survival advantage. Indeed, by June 2020 the dominant strain (D614G) was itself a mutation of the 'original' version. Mutation is competitive, and 'successful' mutations are generally more infectious. The main concern is that a new strain may 'outwit' vaccines, which all focus on the spike protein. One piece of good news: thankfully, coronaviruses mutate less frequently than influenza or HIV.

Bulletin 72: Overdispersion – how superspreading drives the pandemic [link]

We are grateful for 'guest' bulletins from a range of people, including Chris Daykin, Dermot Grenham, Peter Tompkins, Zoe Harcombe, Richard Marshall, Beate Degan, and Jonathan Pearson-Stuttard.

Bulletin 72 on overdispersion, by guest contributor James Sharpe, discussed the influence of superspreading in the pandemic and explained – with reference to the nature of 'fat-tailed' distributions – how targeting superspreading could help manage R down.

Bulletin 73: False Positives: Misleading Results or False Narratives? [link]

The number of people testing positive for COVID-19 started to increase significantly in September and October 2020. This led to a persistent and troubling narrative that many (some claimed up to 90%) were "false positives" – people testing positive who were not actually infected. In this Bulletin, Matt Fletcher investigated these claims using the available data. He concluded that, whilst false positive tests do occur, they are rare, and hence the proportion positive tests fairly reflected the real prevalence of COVID-19.

Bulletin 83: Aerosols – A Summary of the Evidence [link]

One of the many shifts in understanding over the last year has related to the transmission of the SARS-CoV-2 virus. Aerosol transmission is now seen to play a much larger role than previously thought. In this bulletin, Nicola Oliver and Dr Beate Degan summarised a collection of evidence that had been compiled by a group of academics on aerosol transmission. In summary: avoid crowding, indoor environments, and people not wearing masks.

Bulletin 87: Vaccine Priorities [link]

As 2020 progressed we gradually became accustomed to our work being referenced by politicians and the media. Nonetheless, it was a surprise to hear one of our statistics quoted by Boris Johnson!

In December, Stuart McDonald and Yifei Gong assessed the logic of the newly announced vaccine priority order by considering how many of the deaths to date had been people from each priority group. They found that the nine priority groups comprised 99% of all COVID-19 deaths, and that 88% of the deaths belonged to the first four groups. The 88% statistic was widely cited including by the Chief Medical Officer Chris Whitty, Secretary of State for Health Matt Hancock, and the Prime Minister.

Stuart discussed these findings on "More or Less" on the BBC World Service, a clip which also featured on Radio 4's "How to Vaccinate the World".

Other material

After overhauling our website over the quieter Christmas period, we have also been able to share blog post and links to some of our media activity. In early January, we posted a note considering the then vital question of the relative short-term merits of one dose for two people rather than the recommended two doses per individual.

Our outputs go well beyond our relatively formal bulletins:
- Joseph Lu masterminded a series of LinkedIn posts highlighting useful infographic resources to help people navigate through the complex sea of data;
- Stuart McDonald, Nicola Oliver and John Roberts provide regular Twitter summaries of ICNARC's reports on intensive care admissions and outcomes;
- Conrad Edwards, working in New Zealand as the COVID-19 analyst for a major power company, provided insightful graphs which plotted the pandemic's growth in an unusual way.

Case and death trajectories by July 2020: rolling 7-day averages against totals to date
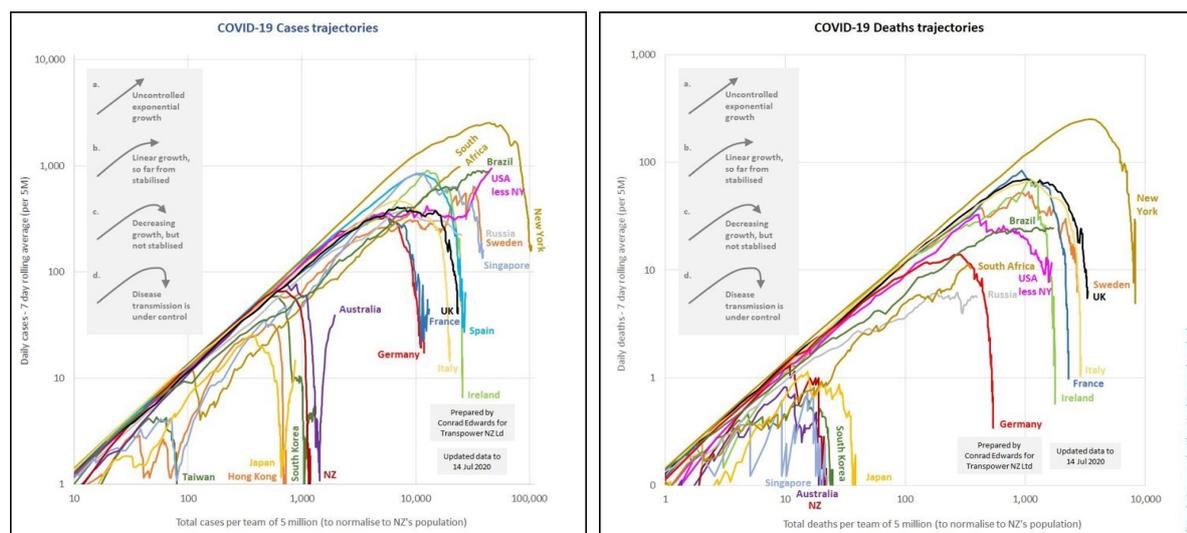
Source: Conrad Edwards, Transpower NZ

Bulletin 93: How Soon to See the Vaccine's Benefits? [link]

With great public interest in how quickly the vaccine-roll out might start to affect hospital admissions and deaths, our second bulletin of 2021 attracted considerable media attention. John Roberts extended our earlier vaccine priorities analysis to model the varying degrees by which the roll-out plan would reduce numbers of hospital and ICU admissions, and deaths. The Guardian and The Spectator were notable in reproducing the analysis in detail.

And finally …

Last but not least: our 'standard' output has been weekly Friday Reports, of which we have now released 34. In these, the key team of Nicola Oliver, Matt Fletcher, John Roberts and Dan Ryan (with review support from Adrian Pinington and Matthew Edwards) summarise the most newsworthy research and data that has emerged that week. The Friday Reports generally cover medical news, modelling news and data – with a gradual shift over the pandemic from modelling to data.

We have tried to end these reports with an 'And finally …' section to add a small lighter touch to the generally sombre tone. These have covered areas from headstands on motorbikes and pandemic-inspired babies' names to Zoom-based card magic and haircuts.

And finally … ending in a more hopeful vein, we started this bulletin with considerations of 100 thousand COVID-19 deaths in the UK, and 100 million cases worldwide. We end by noting that, at time of publication of this bulletin, we are just breaking through the staggering number of 100 million vaccine doses administered worldwide.

There is hope!

For more information, visit our website or follow us on LinkedIn, Twitter or Facebook

Adrian Baskir – Tan Suee Chieh – Matthew Edwards – Matt Fletcher – Andrew Gaches –
Stephen Kramer – Joseph Lu – Stuart McDonald – Nicola Oliver – Adrian Pinington –
John Roberts – Josephine Robertson – Louis Rossouw – Dan Ryan – Gordon Woo