



The Friday Report – Issue 13

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

Every week, more is written on COVID-19 than any individual could possibly read. Collectively, the COVID-19 Actuaries Response Group read more about the outbreak than most, so we've decided each Friday to provide you with a curated list of the key papers and articles that we've looked at recently.

Modelling – reports

The end of social confinement and COVID-19 re-emergence risk (Lopez et al, June 2020) ([link](#))

This is a modelling study investigating the risk of COVID-19 recurrence given the lack of effective pharmaceutical interventions. It uses a modified SEIR (Susceptible-Exposed-Infectious-Recovered) model, incorporating effects such as awareness of social distancing and the use of non-pharmaceutical interventions. The model is based on analysis of Spanish data but the authors extend their work to look at other countries.

The study finds that, in a generic scenario, lockdowns should remain in place for at least 60 days to prevent epidemic growth and a potentially larger second wave in the near future. It also makes recommendations on the speed at which people should be asked to return to work.

A mathematical model reveals the influence of population heterogeneity on herd immunity to SARS-CoV-2 (Britton, Ball, Trapman et al, June 2020) ([link](#))

This paper looks at how population heterogeneity impacts on the level of infection required to reach herd immunity. The authors note that, based on their modelling, if R_0 is 2.5 and mixing rates across age groups are in line with social activity, then the herd immunity level could be 43% rather than the 60% that would be implied by a homogeneous model. The paper specifically states that this figure is an illustration rather than an exact value or best estimate, but suggests that more work should be done to quantify this effect more precisely.

Clinical and Medical News

Neurological and neuropsychiatric complications of COVID-19

There have been concerns that patients with COVID-19 may develop neurological complications such as encephalopathy, encephalitis and primary psychiatric syndromic diagnoses. In this analysis ([link](#)), UK based researchers collaborated to develop an online network of secure rapid-response case report notification portals across the spectrum of major UK neuroscience bodies.

Since the launch of the platform, 153 unique case notifications have been made. Key complications include ischaemic stroke, intracerebral haemorrhage, encephalitis, unspecified encephalopathy, and neuropsychiatric disorders.

COVID-19 and men

We have seen that males appear more susceptible to developing COVID-19 compared to females. The exact cause of this is not completely understood. One research team looked to the plasma concentrations of angiotensin-converting enzyme 2 (ACE2) in a cohort of men and women with heart failure ([link](#)). ACE2 concentrations were found to be higher in men than women; commentary on these findings report that the ACE2 gene is located on the X chromosome, and that men suffer more often from X-linked disease traits than do women. ([commentary one](#)) ([commentary two](#))

COVID-19, children and adolescents

There is little data on COVID-19 infections in children and adolescents. To address this issue, a recent multi-national and multi-centre cohort study using an established research network—the Paediatric Tuberculosis Network European Trials Group ([ptbnet](#)) – aimed to capture key data on children and adolescents with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection across Europe ([link](#)).

585 cases of SARS-CoV-2 infection were reported from 77 health-care institutions located in 21 European countries; the mean age of the study population was 5.0 years (from 3 days to 18 years). This study reports that severe COVID-19 can occur in young children and in adolescents, though infection is generally mild. Significant risk factors for admission to ICU include being male, being very young (<1 month), having pre-existing medical conditions, and having a co-existing viral infection. Thankfully, fatal outcomes are rare.

Pulmonary Post-mortem Findings

Lung tissue samples from 38 patients who died from COVID-19 in two hospitals in northern Italy were analysed in order to increase understanding of the disease pathogenesis and clinical outcomes ([link](#)). The findings revealed that the lungs of those with severe COVID-19 disease had extensive damage to the alveoli, (tiny lung air sacs), interstitial pneumonia (interstitial meaning the walls between the alveoli), organising pneumonia (collection of debris and inflammation to alveoli and other air sacs), and in some, but rarely, the development of fibrosis (scarring as a result of significant lung damage). Similar damage has been observed in coronavirus victims infected with SARS-CoV and MERS-CoV. However, with SARS-CoV-2, there appears to be an additional complication related to disordered clotting, evident in the lung samples themselves.

Data

ONS – Coronavirus (COVID-19) related deaths by occupation, England and Wales: deaths registered between 9 March and 25 May 2020 ([link](#))

ONS continue to carry out analysis of COVID-19 related deaths stratified in different ways (location, deprivation etc). Their latest release looks at deaths by different occupational groups, for men and women aged 20-64 in England & Wales.

This analysis finds that there were a total of 4,761 deaths in the working age population registered between 9 March and 25 May 2020. Almost 2/3rds of these were men. Of the specific occupations investigated, men working as security guards had the highest death rate, with 74 deaths per 100,000 (104 deaths).

Men and women working in social care (including care workers and home carers) had increased mortality (both sexes) – there were 97 male deaths (50.1 per 100,000) and 171 female deaths (19.1 per 100,000). In healthcare, nurses had higher rates than the general population for both sexes (50.4 deaths per 100,000 men or 31 deaths; 15.3 deaths per 100,000 women or 70 deaths).

ONS note that their analysis of the data available has not necessarily found that certain occupations are automatically at higher risk of infection from COVID-19 there are multiple factors, including the level of deprivation, that are likely to be behind these results.

ONS – Coronavirus (COVID-19) Infection Survey pilot: England, 25 June 2020 ([link](#))

We have previously reported on the Infection Survey pilot, which looks to identify the percentage of the population testing positive for COVID-19 and whether or not they have symptoms.

We draw readers' attention again to the latest data on this, as it suggests that incidence of COVID-19 infection appears to have decreased between mid-May and early June, but levelled off since then – the number of new people testing positive in the period 8 June to 21 June 2020 is estimated at 4 new infections per 10,000 people which would equate to around 22,000 new infections per week over that period.

COVID-19 Government Response Event Dataset (CoronaNet v1.0) (Cheng, C., Barceló, J., Hartnett, A.S et al, June 2020) ([link](#))

Over 260 research assistants have hand-coded a dataset of over 13,000 governmental policy announcements across 195 countries. It is updated daily, with a 5-day lag for validation. Each action is categorised across multiple dimensions (for example, whether an action is national or provincial, or whether a policy is mandatory or voluntary).

The group have also categorised countries according to their responses to the pandemic, and shown how quickly policy responses have changed over time. The authors note that they believe the data presented can “help policymakers and researchers assess how effective different policies are in addressing the spread and health outcomes of COVID-19”.

And finally ...

Short of social distancing activities? Artist Phil Shaw has written a short story using book titles ([short story inspiration](#)). Sadly, all I managed, was: ‘Beloved, if this is a man say goodnight to insomnia. One flew over the cuckoo’s nest to kill a mockingbird’. (Though I do have a good excuse, my books are in boxes, not unpacked, as in temporary accommodation!)

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