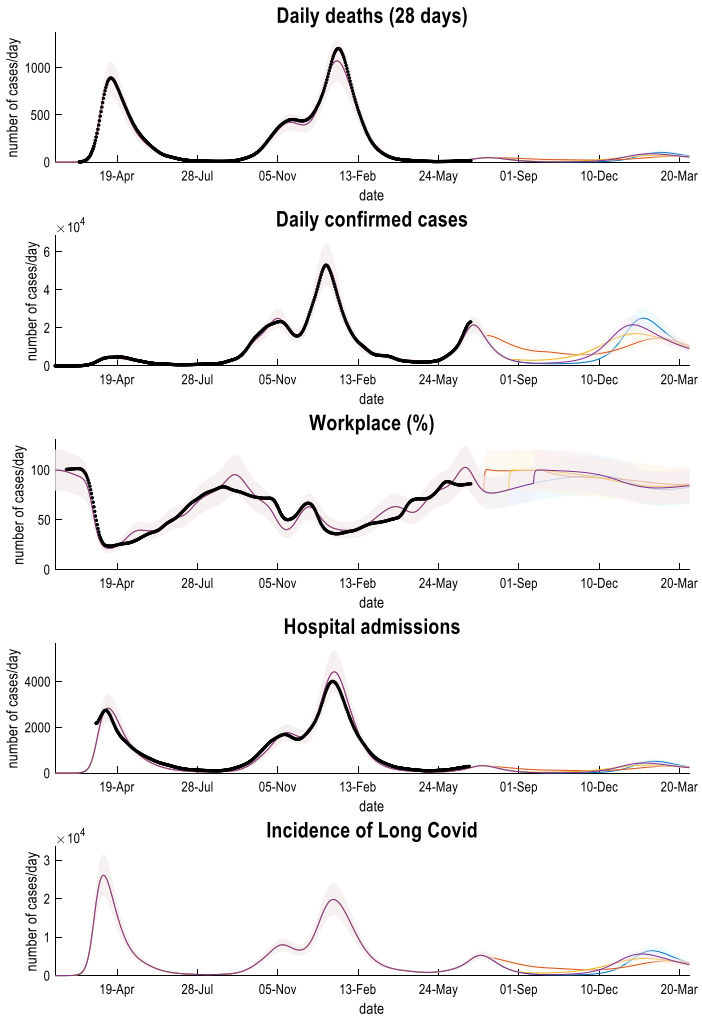
Scenario modelling for advisory board to the Cabinet office (7 July 2021)

Context: The final phase of the roadmap on 19th of July is approaching. Current dynamic causal modelling suggests a slight resurgence of hospital admissions and fatality rates over the next week or two and a gradual (partial), prevalence-dependent increase in contact rates (please see the long-term forecast dashboard for current estimates – and the national dashboard for data fits upon which these estimates are based). Predictions of contact rates are based on population behaviour in response to previous fluctuations in prevalence. **What would happen if restrictions were lifted completely on 19th July 2021 – or deferred for one or two months?**

This question can be answered—using scenario modelling—by increasing the rate at which people return to a normal (pre-pandemic) contact rate on **19 July, 19 August and 19 September 2021**, for a period of two months.



This figure reports the results of scenario modelling using the parameters of a dynamic causal model based on data covering the entire pandemic until 4 July 2021. The lines correspond to expected deaths per day, daily confirmed cases, workplace activity (based upon Google mobility data), hospital admissions and the incidence of long COVID[1]. The shaded areas correspond to 90% confidence intervals. The blue lines are the most likely estimates, while the black dots correspond to (smoothed) data from the ONS and Google mobility data. The red lines show what might happen if restrictions are lifted on 19th July (modelled by increasing the rate at which people return to a normal contact rate). The corresponding estimates for a deferred relaxation on 19 August and 19 September are shown in yellow and purple, respectively. Quantitatively, the estimated excesses following complete relaxation of restrictions (relative to the predicted, prevalence-dependent, relaxation of contact rates) are as follows[2]:

	Total under predicted (prevalence - dependent) unlocking until **1 April 2022**	Excess with unlocking on 19 July	Excess with unlocking on 19 August	Excess with unlocking on 19 Sept
Daily deaths (28 days):	134,076 (106,590 to 161,562)	817	446	453
Daily confirmed cases	7,468,197 (5,937,217 to 8,999,177)	329,996	124,358	97,510
Hospital admissions	522,730 (415,571 to 629,890)	4,261	1,792	1,796
Long COVID cases	3,521,380 (2,799,497 to 4,243,263)	89,501	36,173	30,193

Conclusions

- A relaxation of restrictions on 19 July will produce a substantial number of excess confirmed cases (4.42%) and cases of long COVID (2.54%). However, there will be **less impact** on excess deaths (0.61%) or hospital admissions (0.82%).

- Delaying unlocking by one month would reduce excess mortality and morbidity by about 54%. However, delaying by two months would **not** further reduce mortality or morbidity.

- As might be anticipated, relaxing relaxations in the summer **reduces** the peak morbidity

[1] The incidence of long COVID is based upon an 8% probability of developing long COVID (i.e., restrictive symptoms for 12 weeks or more), given one has clinical (i.e., symptomatic) COVID-19. This is not differentiated by age and is based upon the following prevalence estimates: Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK - Office for National Statistics (ons.gov.uk), Update on long COVID-19 prevalence estimate, 1 February 2021 (publishing.service.gov.uk), Covid-19: Third of people infected have long term symptoms | The BMJ. A value of 8% was chosen to emulate the ~1.5% prevalence in the above surveys.

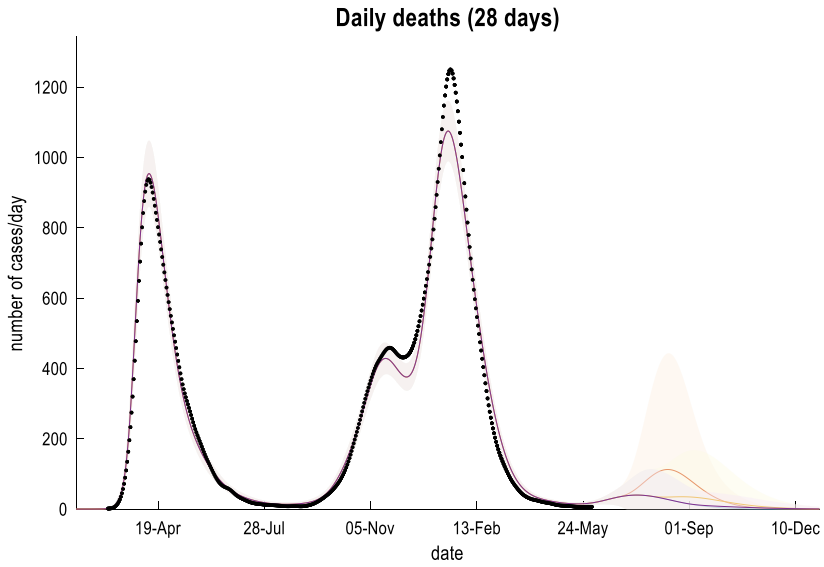
[2] The confidence intervals represent uncertainty about what could have happened over the entire epidemic – as opposed to uncertainty about what will happen. These are approximate confidence intervals based upon Poisson assumptions (more accurate intervals are available on request).

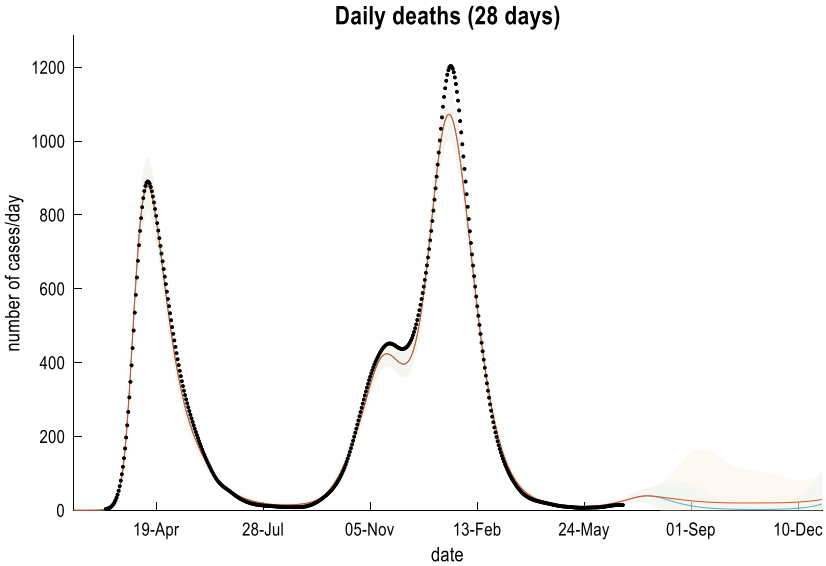
and mortality of the winter resurgence. However, the effect of vaccination means that cumulative mortality and morbidity costs will be reduced by delaying unlocking by one month.

These conclusions suggest a shift in focus from mortality to morbidity; i.e., a shift away from national lockdowns and restrictions towards personal mitigating behaviours, local public health measures and vaccinating groups (i.e., children) who may develop complications of COVID-19 that do not require hospitalisation.

Appendix

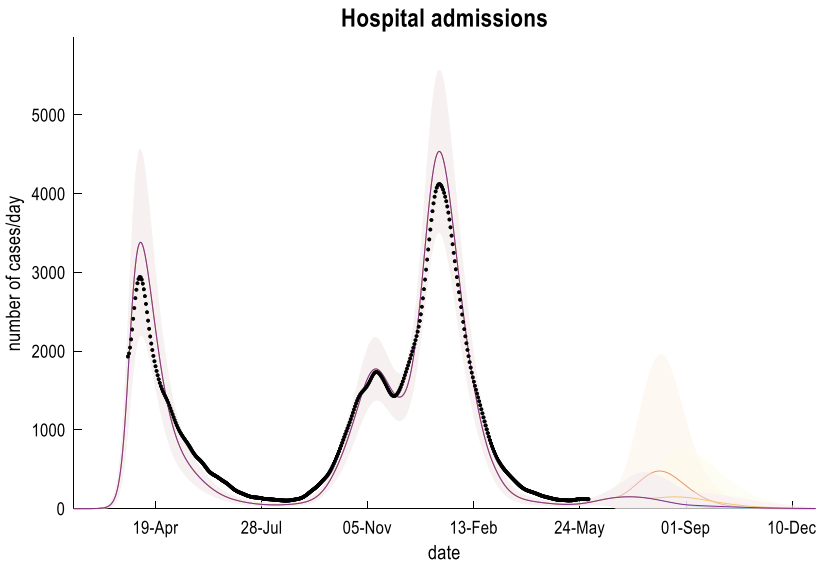
A previous report (on 11 June 2021) predicted trajectories of daily deaths that are consistent with the current predictions and, more importantly, what actually happened:

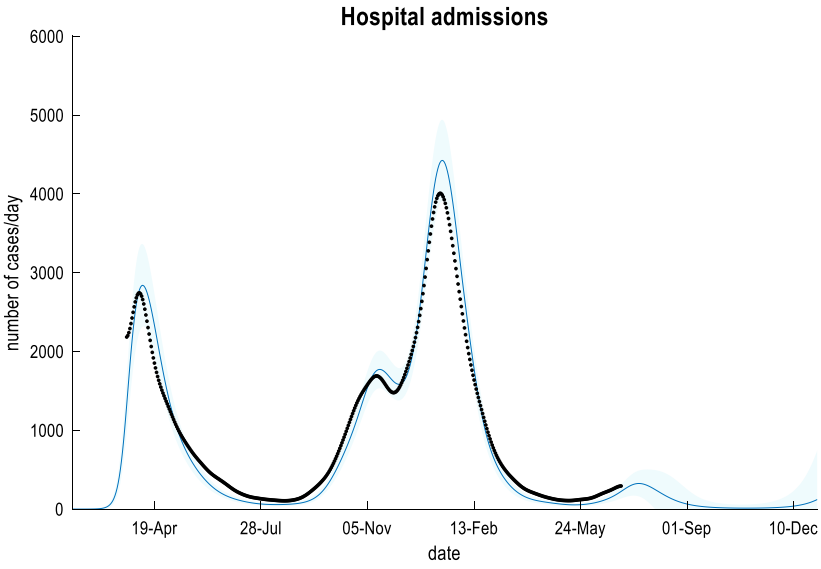




The upper figure reproduces the first panel of the last report for the advisory board to the Cabinet Office on **11 June.** The lower figure reproduces the first panel above (on **5 July**), scaled for direct comparison. The fatality rates (black dots) appear to be following the predicted trajectory (purple line in the first panel). Although the predictions were a slight underestimate, the trajectory of actual deaths lies well within the 90% credible intervals.

A similar concordance is seen with estimates of hospital admissions, where the upper panel below reproduces the estimates in the previous report (**11 June**) and the lower panel reports forecasts based upon current data (under the predicted relaxation of contact rates):





Actual hospital admissions over the past four weeks were underestimated but remained in the 90% Bayesian credible intervals (see purple area in the upper panel).