Scenario modelling for advisory group to the Cabinet Office (17 Jan 2022)

Summary: On the 26 Jan 2022, the UK government will consider Plan B, and what follows in England. From an epidemiological perspective, the current decline in case rates is attributable to population immunity—due to vaccination—and, crucially, reduced contact rates. This begs the question, what would happen if the 'work from home if possible' guidance was rescinded, and a return to pre-pandemic workplace activity encouraged? This question can be addressed using scenario modelling[1] to compare outcomes under the predicted, prevalence-dependent recovery of contact rates with a precipitous increase after 26 Jan 2022. Technically, this involves reducing the time constant over which sociobehavioural responses to high levels of circulating virus recover (currently estimated to be 122 days or four months) to a few (eight) days.

Methods: In brief, this scenario modelling rolls out several months into the future (until 01-09-22) in the absence of any changes in predicted contact rates and under a precipitous recovery of contact rates (e.g., rescinding the recommendation to 'work from home when possible'). The cost in terms of deaths, hospital admissions, deaths and economic burden are summarised below.

Conclusion: A precipitous increase in contact rates (e.g., encouraging a return to work) would attenuate the decline in morbidity anticipated over the next months. An immediate return to work would increase gross domestic product (by about £1.2 billion)[2]. However, the cost in terms of deaths[3] and hospital admissions[4], would exceed this gain; with a net loss to the economy (of about £2.3 billion).

Results: The impact of a precipitous increase in contact rates can be assessed quantitatively in terms of, hospital admissions, deaths and economic activity (as reflected in the gross domestic product over the 7-month period from 26 Jan to 1 Sept 2022):

Factor	£Billion
Cost of hospital admissions: **31677 excess admissions** x £50,000	£1.58B
Cost (£-QALY = £60,000) of **4202 extra deaths** (1 death = 7.6 QALY) x £456,000	£1.92B
GDP: average increase of 0.09% per day x 218 days @ £560B per quarter	£1.20B
Cost of increasing contact rates	**£2.30B**

[1] This (dynamic causal) modelling is based upon current estimates of epidemiological and sociobehavioural parameters that are updated on a weekly basis: please see the following website.

[2] Assuming quarterly GDP is £560 billion.

[3] Assuming a (Green Book) £-QUALY is £60,000 and one death entails 7.6 QUALY

[4] Assuming the cost of a hospital admission for COVID 19 is £50,000 (see also).

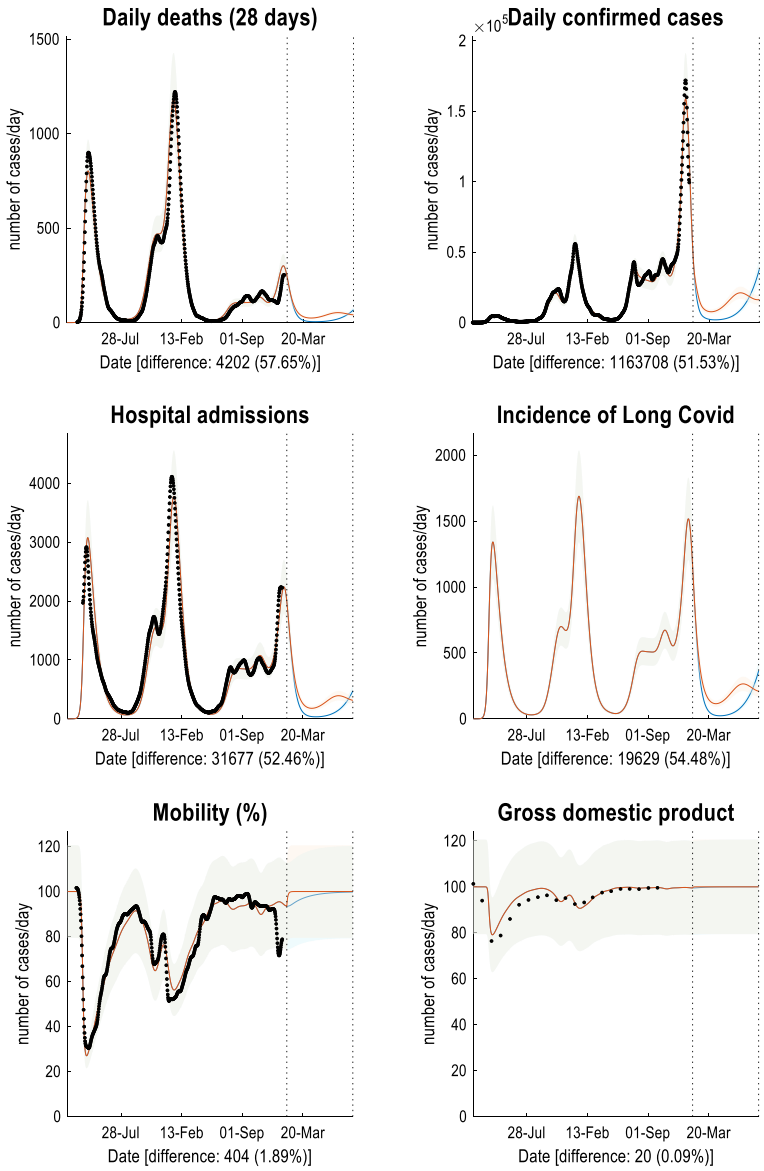

Figure 1: This figure reports the results of scenario modelling using the parameters of a dynamic causal model based on data covering the entire pandemic until 17 Jan 2022. The lines correspond to expected deaths per day, daily confirmed cases, hospital admissions, incidence of long COVID, mobility based upon Department of Transport data, and gross domestic product for the UK. 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. The orange lines show what might happen if contact rates started to recover to pre-pandemic rates on 26 Jan 2022 (indicated by the dotted line). The differences under each graph are the cumulative differences over the period in question: **26 Jan 2022** to **1 Sep 2022**. The percentages refer to the cumulative differences relative to the baseline (predicted) outcomes.