Timing of the introduction of school closure for COVID-19 epidemic suppression

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Model used

This work uses a spatially explicit individual based simulation of respiratory virus transmission in the entire GB population. The model was first previously developed for pandemic influenza planning [Ferguson et al., Nature, Nature, 2005. 437(7056): p. 209-14], including non-pharmaceutical interventions (NPIs) [Halloran et al, PNAS, 2008. 105:4639-4644]. The model has been parameterised to reproduce current knowledge of COVID-19 epidemiology, including age-dependence in severity and healthcare utilisation. Healthcare demand assumptions match NHSE models.

Calibration/timing: Foe R0=2.4, the simulation predicted 188 cases newly admitted to ICUs in the 3 days up to and including Tuesday 17th March. CHESS reported 196 admissions to that date. Model predicts 103 deaths by 17th March (55 by 14th March), while only 60 had been reported in the UK by that date. Temporal calibration therefore likely accurate to +/- 3 days, assuming surveillance data is reliable. If ICU cases and deaths have been under-ascertained, these results will be over-optimistic. Current intervention packaged assumed to start on 17th March. R0 values between 2.2 and 2.6

Interventions: the current package of interventions were assumed to start on 17th March. Results are shown with that package alone and for that plus school and university closure, the latter starting with a range of delays between 0 and 3 weeks.

Results: R_0 values of 2.2, 2.4 and 2.6 examined. Results are qualitatively similar for each. Graph shows results for 2.4. We predict an increase of approximately 1000 ICU cases in the peak week of the outbreak for every week of delay in introducing school closure. Starting school closure at Easter risks exceeding ICU surge capacity. School closure reduces *R* by between 0.4 and 0.5 (depending on baseline R_0) and is required to bring R<1.