

Modelling update and the impact of vaccination:

The most common approach to mathematical modelling of the COVID epidemic is to use a compartmental model employing an SIR (susceptible-infectious-recovered) approach or a variation of it. Dozens of such models have been published and are in use throughout the world; there is no single standard model which everyone uses.

Current modelling (model 1 below) assumes that 85% of over 18s will have received a first dose of vaccine by the end of July and 90% by the end of August, and in addition that delta variant is fully dominant from 1st July. The modelling does not account for waning immunity or cross border movements. We have assessed the impact of increasing the proportion of the adult population who have received a first dose of vaccine by the end of July to 90%, with 95% having received a first dose by the end of August (model 2). Both models assume that those who have received a first dose go on to receive a second dose of vaccine after the appropriate time interval.

The key message from this modelling is that achieving an extra 5% adult uptake of vaccination by the end of July will reduce peak case numbers and hospital admissions by approximately 50%, all other things being equal.

It is important to stress that modelling does not represent a prediction. Considerable uncertainty remains, particularly in relation to hospital pressures; modelling will be updated as further data emerge. Modelling is reasonably accurate for a four week period, but becomes increasingly uncertain beyond that. At present we are tracking on the central scenario for case numbers. It will not be possible to distinguish between central and pessimistic scenarios before the middle of July, and central and optimistic scenarios before the end of July.

Basic assumptions

- Now 100% Delta variant
- Transmission increase factor (from KENT) to 1.3/1.45/1.60 (up from 1.1/1.25/1.4)
- Model 1: 85% of first doses completed 31/07/21 & 90% completed 31/08/21
- Model 2: 90% of first doses completed 31/07/21 & 95% completed 31/08/21

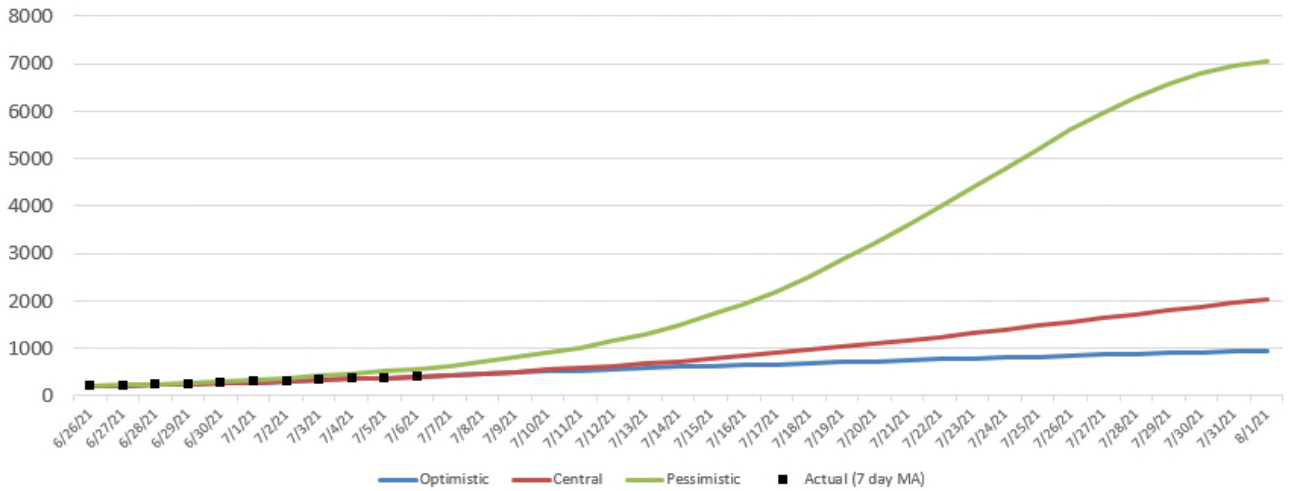
NOTE: Waning immunity ignored

Model 1

85% adult uptake for first dose by 31/07/21

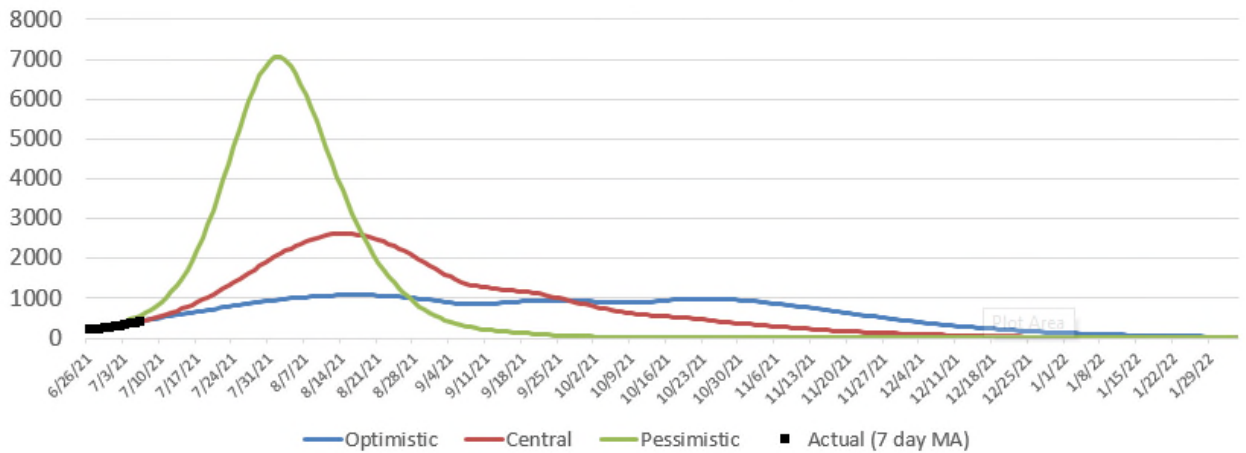
90% adult uptake for first dose by 31/08/21

Model 1 Daily Cases: Scenario Projection - Truncated at 31/07/21
(This is not a prediction)



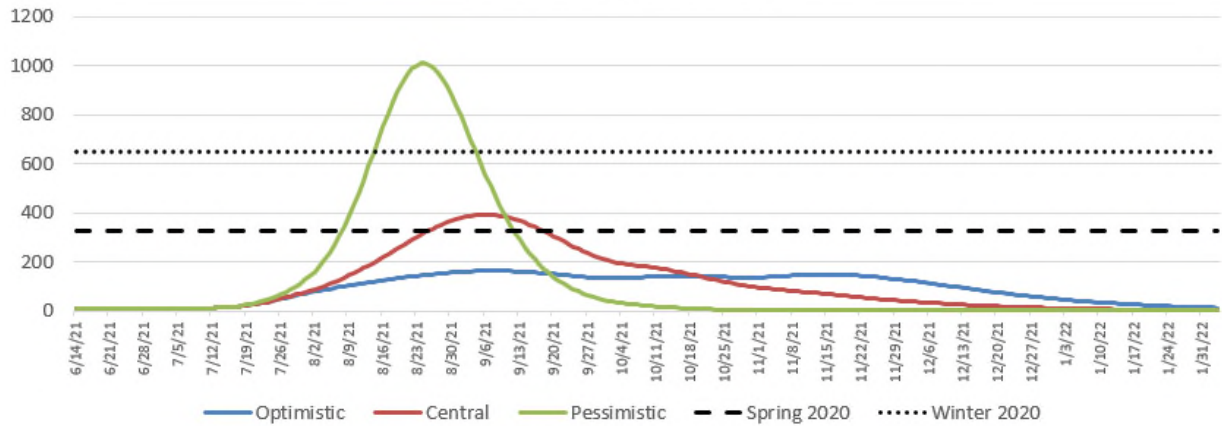
- Assumes **85%** of the adult population first dosed by **31/07/2021 & 90% by 01/08/2021**
- Assumes **no further relaxations**
- Any **further increase** in potential contact patterns would make the **pessimistic scenario much more likely**

Model 1 Daily Cases: Scenario Projection
(This is not a prediction)



- Assumes **85%** of the adult population first dosed by **31/07/2021 & 90% by 01/08/2021**
- Assumes **no further relaxations**
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Model 1 Community Occupancy: Scenario Projection (This is not a prediction)

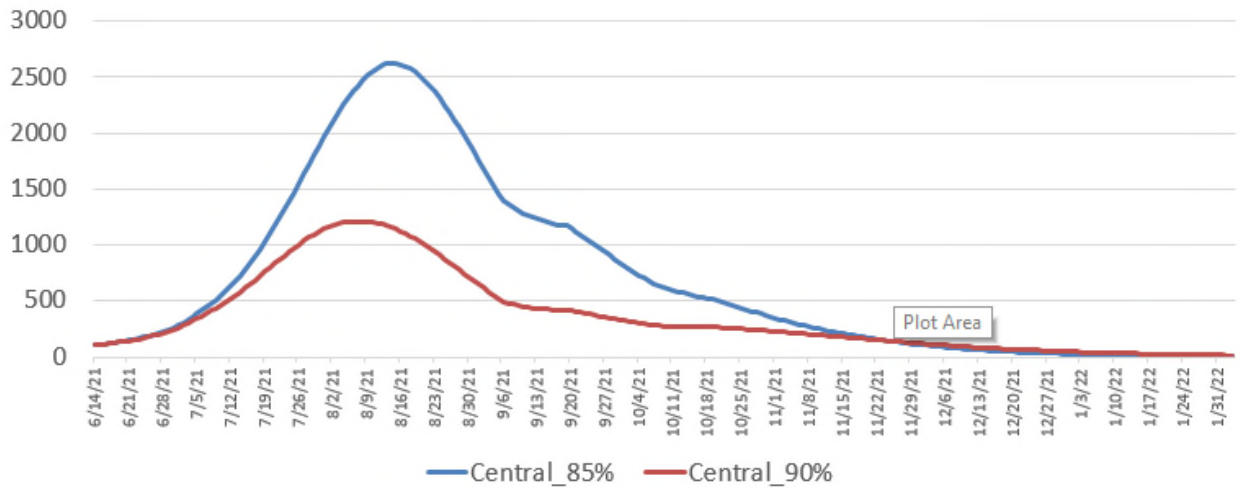


- Assumes **85%** of the adult population first dosed by **31/07/2021** & **90%** by **01/08/2021**
- Assumes **no further relaxations**
- Central scenario produces **hospital pressures greater than wave 1**
- Any **further increase** in potential contact patterns could make the **pessimistic scenario much more likely**
- Pessimistic could potentially produce the **greatest hospital pressures to date**

Model 1 & 2

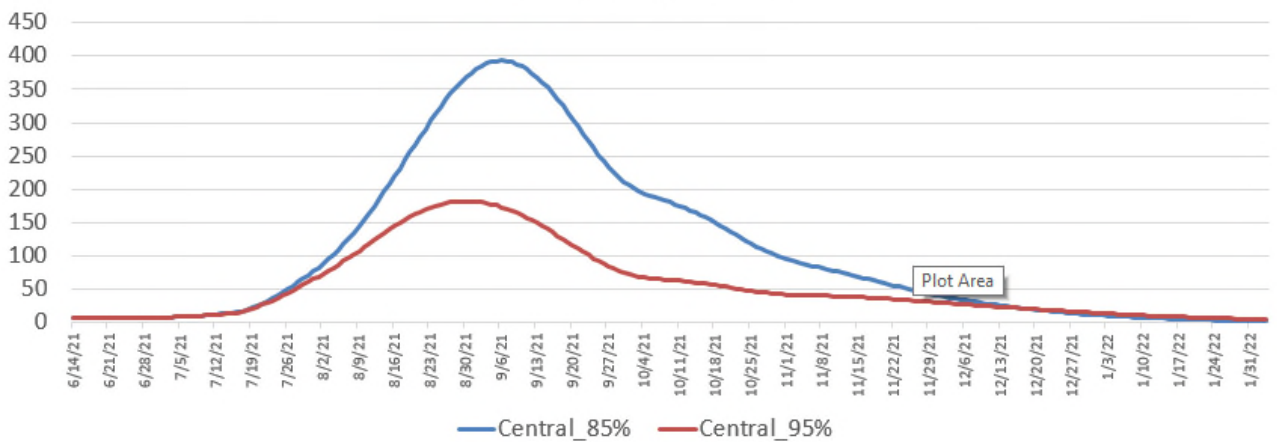
Central scenarios only
 90% adult uptake for first dose by 31/07/21
 95% adult uptake for first dose by 31/08/21

Model 1 & 2 Daily Cases: Central Scenario Projections (This is not a prediction)



- **Blue line** assumes **85%** of the adult population first dosed by **31/07/2021** and **red line 90%**
- Assumes **no further relaxations**
- **Case numbers** potentially **significantly reduced** with the **additional vaccination uptake**

Model 1 & 2 Community Occupancy: Central Scenario Projections (This is not a prediction)



- **Blue line** assumes **85%** of the adult population first dosed by **31/07/2021** and **red line 90%**
- Assumes **no further relaxations**
- **Hospital pressures** potentially **reduced by 50%** with the **additional vaccination uptake**