# Modelling the third COVID-19 pandemic wave in Australia

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**Abstract:** The third pandemic wave in Australia started in mid-June 2021. The ongoing epidemic is of great concern because of the high infectivity of the Delta variant and a delayed vaccination campaign in Australia. We used a re-calibrated agent-based model that includes about 24 million software agents representing the Australian population [1-3], with the aim to quantify effects of non-pharmaceutical interventions (case isolation, home quarantine, school closures, and social distancing, comprising several stay-at-home restrictions) and pharmaceutical interventions (progressive vaccination rollout). The model accounts for a shortened incubation period, an increased fraction of symptomatic cases in children, and the basic reproduction number ($R_0$) of 6.2.

The study estimated the timing and the extent of incidence stabilisation in mid-October. Our findings show that the Delta variant amplifies any lack of social distancing (SD) significantly compared to the ancestral strain and the current social distancing level (estimated as 50% of population adhering to social distancing rules, SD=0.5) is inadequate to contain the ongoing pandemic.

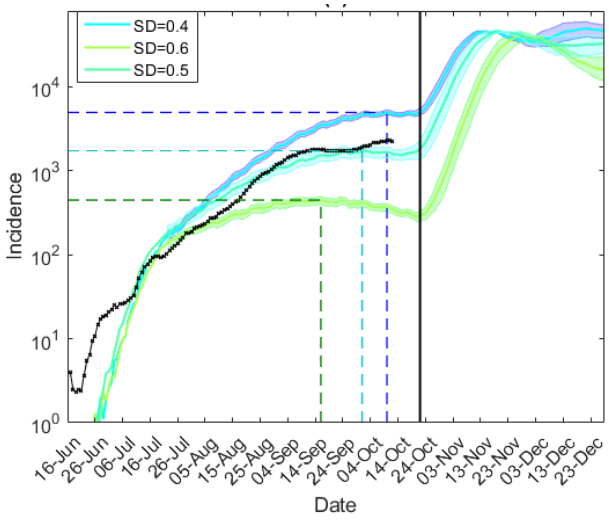


*Figure 1. Incidence (log scale). The vertical black line separates nowcasting modelling up to mid-October and a counter-factual "worst-case" scenario until the end of the year. Actual incidence is shown with black crosses.*

We also considered a possible "worst-case" scenario under which all stay-at-home restrictions are fully removed at the end of October. This scenario is not a forecast of the dynamics which are likely to develop once the restrictions are eased with the adult vaccination rate reaching 70% nationwide. Instead, it is a counter-factual scenario showing a potential surge of post-lockdown infections in the absence of any remaining restrictions. This "worst-case" scenario is shown in Figure 1, highlighting an extreme possibility that new cases may peak at tens of thousands per day. We argue that with increasing vaccinations there is a path out, but as a society we can choose to land softly after reopening, maintaining targeted SD and ensuring a better preparedness of the healthcare system. We also suggest that eligible children must be included in a rapid vaccination rollout.

## References

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***Keywords:*** *COVID-19 modelling, agent-based modelling, social distancing, vaccination*