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### **Modeling the epidemic of the Covid-19 omicron variant in England**

**ABSTRACT.** The model of the Covid-19 epidemic in England has been extended to allow for two co-existing variants, delta and the new omicron strain. A simple model is proposed to assess the likely beneficial effect of the government's booster campaign of third vaccine doses. Details of the new modeling required are given. The model results are compared with incoming data from both the Health Security Agency and the Office of National Statistics, and found to hold up well. Peaks are predicted for active cases in England, 3.7 million in the base case, 3900 hospitalizations per day, and 500 deaths per day. The latter two figures are below what England saw in January 2021. A sensitivity study raises these numbers by between 50 and 70%, to 5.6 million, 6500 and 850, respectively. However, South Africa, which faced the omicron strain first, has reported that hospital stays with omicron are half what they experienced with other strains. Bed occupancy would stay within tolerable limits if this behaviour translated to England, even with the rate of hospitalization expected in the sensitivity study. A postscript has been added to cover new data up to 4 March 2022, which provides validation for the model used. A discussion is given of the poor performance of the government's official modeling groups and the damage this has caused to the reputation of epidemic modeling as a field. This is obviously unfortunate when it is clear that the future course of the Covid-19 epidemic could have been modeled accurately, as explained in this paper, and there is no reason why an epidemic of a new disease should not be modeled accurately in the future. But epidemic models, if they are to be useful in controlling an epidemic like Covid-19, need to be updated daily to allow decision makers to have the earliest possible notification of the state of the epidemic that they are seeking to control. A further eight lessons are listed.

**Keywords:** delta variant, lessons learned, pandemic, validation

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