Project: **Mathematical modelling of Covid Outbreak**: **Two Strain Model**

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Description: The emergence of new variants of SARA-CoV-2 can significantly influence the trajectory of the Covid-19 pandemic. This can further impact the burden on NHS facilities and other intervention strategies. In this project, we will analyse a two-strain SEIR model to study the influence of stochastic emergence of the new strain and how that impacts the pandemic. We will also investigate multiple factors such as vaccinations, waning immunity, hospital admissions and the impact of various intervention strategies, and their role in the interplay between the considered variants. The overall aim of the project is to contribute to the efforts of the "Swansea Modelling Group" in their Covid outbreak modelling project.

This will be a computational project and the models are likely to be implemented in MATLAB or Python. So the potential applicants are expected to have a good knowledge in Matlab or Python and have taken some modules on mathematical modelling/biomathematics.

Project Tasks:

1) Start with a basic 2-strain SEIR model and implement in Matlab (ODE 45)/Python.

2) Analyse the model to study various scenarios (by varying parameter values).

3)Incorporate various interventions strategies such as school closure and lockdowns to study its effect on COVID trajectory

4) Add stochastic emergence of the new strain and its impact.

5) Further extensions of the model