

## **Exploring the impact of the COVID-19 epidemic on other respiratory diseases in England: application of mathematical and statistical modelling**

Since early 2020, alongside large-scale vaccination against COVID-19, social distancing measures imposed by governments have been widely used to mitigate the transmission of SARS-CoV-2 and its variants. The reduction of social mixing has also reduced the level of other respiratory diseases such as influenza, with reported low levels of influenza worldwide over the COVID-19 seasons of 2020/21 and the 2021/22.

This project will combine mathematical and statistical modelling with [data](#) from the UK Health Security Agency to explore the impact of the COVID-19 epidemic on six respiratory diseases: influenza A, influenza B, Respiratory Syncytial Virus (RSV), rhinovirus, parainfluenza and adenovirus. The project will have two separate streams. Firstly, we will use an established mathematical model calibrated to influenza data until end of 2019, to explore possible influenza A and influenza B epidemic waves that may emerge under different combinations of vaccination effectiveness and background population susceptibility. Secondly, we will use statistical modelling to quantify the changes in each of the six respiratory diseases: influenza A, influenza B, Respiratory Syncytial Virus (RSV), rhinovirus, parainfluenza, adenovirus in the preCOVID-19 period of 2018/2019 and 2019/2020 years, during the COVID-19 seasons of 2020/2021 2021/2022 and over the current 2022/2023 seasons.

During this project the students will learn about epidemiological modelling that was used widely over the COVID-19 epidemic, and gain skills in developing mathematical – differential equations based - models for infectious diseases transmission and control, as well as statistical and data science skills in analysing data.

### **References**

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