Friday, October 15th 15:00

Paula Patrício

Centro de Matemática Aplicada (CMA), Universidade Nova de Lisboa, Portugal

The Impact of Vaccination on the Evolution of COVID-19 in Portugal

First, we present an age-structured SEIR model that uses contact patterns to reflect the physical distance measures implemented in Portugal to control the COVID-19 pandemic. By using these matrices and proper estimates for the parameters in the model, we were able to ascertain the impact of mitigation strategies employed in the past. Results show that the March 2020 lockdown had an impact in the disease transmission, bringing the effective reproduction number ($R(t)$) below 1 ([2]).

In a second part, we use a simple model to analyze the impact of vaccination on the control of the pandemic. First, we fit a SEIR type model without vaccination to the Portuguese data on confirmed cases of COVID-19 by the date of symptom onset, from the beginning of the epidemic until the 23rd January of 2021, to estimate changes in the transmission intensity. The goal here is to see if this very simple model could describe COVID-19 dynamics in Portugal when using different and more noisy data. Then, by including vaccination strategies in the model we develop different scenarios for the fade-out of the non pharmacological intervention (NPIs) measures as vaccine coverage increases in the population according to Portuguese vaccination goals. We also include a feedback function to mimic the implementation and relaxation of NPIs, according to some disease incidence thresholds defined by the Portuguese health authorities.

[1] C. Caetano, M.L. Morgado, P. Patr´ıcio, J.F. Pereira and B. Nunes, Mathematical modelling of the impact of non-pharmacological strategies to control the COVID-19 epidemic in Portugal, Mathematics, 9, no 10 (2021) 1084.

[2] B Machado, L Antunes, C Caetano, J F Pereira, B Nunes, P Patrício, and M L Morgado, The Impact of Vaccination on the Evolution of COVID-19 in Portugal, Submitted (2021).

Link to the sesión: https://us06web.zoom.us/j/82128835685?pwd=L2VLZHFYZ1ZHdzFmR0VkUE9PM0RQQT09