Quantifying the Epidemic Potential of an Infectious Disease in Stochastic Markovian Models

Speaker: María Jesús López Herrero

Abstract: The basic reproductive ratio, R_0, is probably the most important quantity in epidemiology. It is used to measure the transmission potential during the initial phase of an epidemic. In the stochastic framework, R_0 is well-defined as the average number of secondary infections caused by a single infectious individual during their entire lifetime. However, the stochastic literature frequently assumes a value for R_0 that is usually inherited from the deterministic approach. In this talk, we are specifically ncerned with the quantification of the spread of a disease modelled by a Markov chain. Due to the occurrence of repeated contacts taking place between a typical infective individual and other individuals already infected before, R_0 overestimates the average number of secondary infections. Two alternative measures, namely, the exact reproduction number, R_{e0}, and the population transmission number, R_p, are defined in order to overcome this difficulty. The applicability of R_{e0} and R_p to control of disease spread is also examined.