

Project: Stochastic epidemic models.

Proposer: Eliane R. Rodrigues.

Brief Description: In this project we study the use of Markov chains models to understand the infectious history of a virus. In particular, we will focus attention on the natural history of the infection caused by the Human Papillomavirus (HPV) – the virus leading to cases of cervical cancer. The aim is to understand through simulation and theoretical study the behaviour of this infection and the impact of the introduction of a vaccine as preventive measure in addition to other preventive mechanisms.

Theoretical/Simulation Project

Prerequisites: Markov chains, Bayesian Inference, Computing ability to code programs.

References

Goldie, S. J., Grima, D., Kohli, M., Wright, T. C., Weinstein, M. and Franco, E. A comprehensive natural history model of HPV infection and cervical cancer to estimate the clinical impact of a prophylactic HPV-16/18 vaccine. (2003) *Int. J. Cancer*. 106, 896-904.

Myers, E. R., McCroy, D. C., Nanda, K., Bastian, L. and Matchar, D. B. Mathematical model for the natural history of Human Papillomavirus infection and cervical carcinomas. (2000) *American Journal of Epidemiology* 151, 1158-1171.

Robert, C. P and Casella, G. *Monte Carlo Statistical Methods*. (1999) Springer.

Karlin, S. and Taylor, H. M. *A first course in stochastic processes*. (1975) Academic Press, 2nd Edition.