

*Fifth Workshop Dynamical Systems Applied
to Biology and Natural Sciences DSABNS 2014
Lisbon, Portugal, February 10-12, 2014*

Vaccination strategies in the SIRI model

JOSÉ MARTINS¹ AND ALBERTO PINTO²

¹*Department of Mathematics, School of Technology and Management,
Polytechnic Institute of Leiria, and LIAAD-INESC TEC, Porto, Portugal*
jmmartins@ipleiria.pt

²*Department of Mathematics, Faculty of Sciences, University of Porto, and
LIAAD-INESC TEC, Porto, Portugal*
aapinto1@gmail.com

ABSTRACT

In the case of voluntary vaccination, people have to decide if the benefits of vaccination outweigh the adverse effects that may result from vaccination. The decision depends on the perceived risks from vaccination and infection, but also depends on the decision of all other people.

In this work, we make a game theoretical analysis [3] of this game of vaccinate or non-vaccinate and we study the best strategies that people can adopt. People's decisions are simple in the case of only one infection [1], but the possibility of reinfection provides further diversity and complexity in people's decisions. To do this study, we consider the epidemic SIRI model [2] that takes into account the possibility of reinfection besides a first infection.

References

- [1] Chris T. Bauch and David J. D. Earn (2004) *Vaccination and the theory of games*, PNAS 101, pp. 13391–13394.
- [2] M. Gabriela M. Gomes, Lisa J. White, Graham F. Medley (2004) *Infection, reinfection, and vaccination under suboptimal immune protection: epidemiological perspectives*, Journal of Theoretical Biology 228, pp. 539–549.
- [3] J. Hofbauer, K. Sigmund (1998) *Evolutionary Games and Population Dynamics*, Cambridge University Press.