Calibration of an agent-based model of the transmission of Respiratory Syncytial Virus (RSV) with data of hospitalized children.

Carlos Andreu-Vilarroig [♭],[1] Pilar Cano-Arcos [♮], Cristina-Luisovna Pérez [♭], Javier Villanueva-Oller [♢], Rafael-Jacinto Villanueva [♭]

(♭) Instituto de Matemática Multidisciplinar, Universidad Politécnica de Valencia, Edif. 8G, 2o , 46022 Valencia, Spain.
(♮) Universidad de Córdoba, Córdoba, Spain.
(♢) Departamento de Informática y Estadística, Universidad Rey Juan Carlos, Móstoles, Spain.

Abstract

Model calibration, understood as the inverse problem of estimating the model parameters that best explain a given data set, is a technically and conceptually complex issue. Moreover, in the case of the study of infectious disease transmission, the complexity increases because it is impossible to collect time series of susceptible, infected/infectious, recovered, etc. persons. It is usual to have data on cases reported by health systems, but these data can be far from the actual infected/infectious. Therefore, to perform a calibration that can accurately estimate the magnitude of the epidemic, it is necessary to dive into the medical literature to obtain additional information to assist in the calibration.

In this spirit, we approached the calibration of an agent-based model with one million nodes describing the transmission dynamics of RSV using hospitalization data of children under one year of age from 2010 to 2016 in the Community of Valencia, Spain. Through a literature review, we will search for evidence that will allow us to estimate the magnitude of the RSV epidemic. We will use the Multiobjective Particle Swarm Optimization (MOPSO) algorithm to perform the model calibration in a distributed computing environment, necessary due to the computational cost of the model simulations. Finally, we will discuss the results obtained.

References

[1] f92caarp@uco.es