Valeriy D Perminov

BioTeckFarm Ltd., Russia

Agent-based models for influenza epidemic dynamics and its decision-making capability

Agents-based models (ABMs) had become more and more popular in applied mathematics. During last 15 years large number of ABMs have been created and used in different scientific areas (ecology, economy, epidemiology, human behavior to name a few), but in this talk I am going to tell only about ABMs for influenza epidemic/pandemic dynamics in cities. Because of our only partial knowledge of agents' rules for interaction with each other and with environment, such models contain unknown parameters. For our special ABMs these parameters are probabilities of getting infected in different age groups of citizens. These parameters usually are evaluated with the help of several numbers extracted from available patterns and/or external considerations (for example, cumulated illness attack rates in age groups). Being integrals over lower level of agent population such numbers do not have unique and exact relationship with model's parameters. So, the evaluation based on such numbers is carried out by a no unique selection of model parameters' values that correspond to these numbers. I will tell about a new approach to creation of ABMs together with mathematical substantiation of a correct method for evaluation of model's parameters. Using this approach we get: a) a numerical assessment of the model's and patterns' proximity and b) capability (under some conditions) to estimate a level of coming pandemic in the city under consideration and choose administrative and interventional measures before and during future outbreak and evaluate their efficiency and cost.

Speaker Biography

Valeriy D Perminov worked as a Senior Researcher of Central Aerohydrodynamic Institute in Moscow for a long time. His research interests include rarefied gas dynamics, ill-posed problems, agent-based models and its application to infectious diseases spreading.

e: vdperm@yandex.ru

Notes: