

# Application of geospatial multi-agent system for simulation of different aspects of tuberculosis transmission

## Part two

I.O. Semianiv<sup>1</sup>, L.D. Todoriko<sup>1</sup>, Ya.I. Vykylyuk<sup>2</sup>, D.V. Nevinskyi<sup>2</sup>

1. Bukovinian State Medical University, Chernivtsi, Ukraine

2. Lviv Polytechnic National University, Lviv, Ukraine

**Conflict of interest:** none

**BACKGROUND.** The paper presents epidemiological process modeling, with a focus on tuberculosis utilizing multi-agent system.

**MATERIALS AND METHODS.** This study involves the development of an algorithm that uses the potential of artificial intelligence to create a geospatial model that highlights the different routes of tuberculosis transmission. The simulation process itself is characterized by a number of key stages, including initialization of the city, calibration of health parameters, simulation of the working day, spread of infection, evolution of disease trajectories, rigorous statistical calculations and transition to the next day. A comprehensive description of the course of active tuberculosis according to official data of the World Health Organization is given. Each agent is provided with an appropriate and consistent model that includes relevant health attributes and necessary rules for their dynamic evolution.

**CONCLUSIONS.** The model's results exhibit stability and lack of significant fluctuations. The statistical values obtained for infected, latent, and recovered individuals align well with known medical data, confirming the model's adequacy. The proposed model allows for tracking and analyzing the life and behavior of each individual agent, enabling a thorough assessment of tuberculosis infection spread and the development of prevention strategies.

**KEY WORDS:** epidemiology, tuberculosis, modeling, agent, prevention, GeoCity.