Contribution ID: **118** Type: **Paper**

How to simulate infectious disease spreading in a high-dense city: a 3D agent-based model for 2022 Hong Kong COVID-19 Omicron wave

Tuesday, July 16, 2024 3:20 PM (20 minutes)

The COVID-19 pandemic requested scientists design a more accurate model to forecast infectious disease spreading for enhanced preparedness. While the use of spatially explicit agent-based models for infectious diseases has gained ground during COVID-19, three-dimensional (3D) urban features were not fully incorporated in ABM modelling. Since the latest urban development pursues vertical expansion in cities, incorporating 3D urban characteristics into disease-spreading models is crucial to designing them more realistically.

This study aimed to simulate the 2022 COVID-19 Omicron infection within a 3D built environment using reprojected mobility data in Hong Kong. The building data provided by the Hong Kong government was utilized to construct the 3D representation. Given the concerns regarding the infection risk in high-rise residential buildings, we considered indoor close-contact, cross-corridor, and floor-to-floor vertical transmissions within buildings. Also, unlike other studies that relied on assumed trip sequences, this model reprojected the origins-destinations of individuals' daily trips based on the latest census and land-utilization data, ensuring a more realistic representation. By replicating the infection patterns during the 2022 Omicron wave, the model provides insights at a small scale, aiding policymakers in implementing targeted measures.

Keywords: Agent-based models; Three-dimensional (3D); Infectious diseases; COVID-19; Hong Kong

Primary author: TANG, Ka Chung (The University of Hong Kong, Department of geography)

Co-author: KOH, Keumseok Peter (HKU)

Presenter: TANG, Ka Chung (The University of Hong Kong, Department of geography)

Session Classification: Paper Presentations

Track Classification: Innovation in Methods: Geospatial Analysis