

Accounting for the prevalence of chronic conditions in an agent-based model for COVID-19 hospitalizations

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People with chronic conditions, such as asthma, chronic obstructive pulmonary disease (COPD), diabetes, hypertension, and obesity, are at high risk for poor health outcomes from COVID-19. Accurately accounting for the heightened risk of hospitalization for individuals with these chronic conditions is crucial for future public health emergency preparedness in health care systems. We employ a novel approach of integrating national prevalence data of chronic conditions into the Framework for Reconstructing Epidemic Dynamics (FRED) agent-based modeling platform. Specifically, while also matching age and race prevalences, we assign conditions to adult individuals in FRED's synthetic population which is developed by RTI International from 2010 census data. To address potential over- or under-counting of certain attributes, we have developed an algorithm to check for and adjust individuals accordingly. We have developed this methodology with the intention of leveraging hospitalization risk ratios to better predict COVID-19 hospital admissions using the Simulator of Infectious Disease Dynamics in North Carolina (SIDDC-NC) model built using the FRED platform. This approach, when later integrated into the SIDDC-NC model, will provide valuable insights for public health emergency planning efforts in North Carolina.

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