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*Predicting the second wave of COVID-19 in Washtenaw County, MI.*

We study and predict the spread of COVID-19 in Washtenaw County, MI, using a discrete and stochastic network-based modeling framework. In this framework, we construct contact networks based on synthetic population datasets specific for Washtenaw County that are derived from US Census datasets. We assign individuals to households, workplaces, schools, and group quarters (such as prisons or long term care facilities). In addition, we assign casual contacts to each individual at random. Using this framework, we explicitly simulate Michigan-specific government-mandated workplace and school closures as well as social distancing measures. We perform sensitivity analyses to identify key model parameters and mechanisms contributing to the observed disease burden in the three months following the first observed cases of COVID-19 in Michigan. We then consider several scenarios for relaxing restrictions and reopening workplaces to predict what actions would be most prudent. In particular, we consider the effects of 1) different timings for reopening, and 2) different levels of workplace vs. casual contact re-engagement. Through simulations and sensitivity analyses, we explore mechanisms driving the magnitude and timing of a second wave of infections upon re-opening. (Received August 24, 2020)