
XIAOYING WANG, Trent University

Studying social awareness of physical distancing in mitigating COVID-19 transmission

Since the initial identification of a COVID-19 case in Wuhan, China, the novel disease quickly becomes a global pandemic emergency. In this paper, we propose a dynamic model that incorporates individuals' behavior change in social interactions at different stages of the epidemics. We fit our model to the data in Ontario, Canada and calculate the effective reproduction number \mathcal{R}_t within each stage. Results show that $\mathcal{R}_t > 1$ if the public's awareness to practice physical distancing is relatively low and $\mathcal{R}_t < 1$ otherwise. Simulations show that a reduced contact rate between the susceptible and asymptomatic/unreported symptomatic individuals is effective in mitigating the disease spread. Moreover, sensitivity analysis indicates that an increasing contact rate may lead to a second wave of disease outbreak. We also investigate the effectiveness of disease intervention strategies. Simulations demonstrate that enlarging the testing capacity and motivating infected individuals to test for an early diagnosis may facilitate mitigating the disease spread in a relatively short time. Results also indicate a significantly faster decline of confirmed positive cases if individuals practice strict physical distancing even if restricted measures are lifted.