Covid-19 Transmission on long-term care facilities: optimizing control strategies

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Close-contact places such as Long-term facilities have been found to be high-risk and high-morbidity places in the US for COVID-19 outbreaks. The reasons include a vulnerable resident population, limited resources in facilities, close contacts with visitors and workers, contaminated resources, and ill-trained workers. In this study, such places are modeled to evaluate the impact of different transmission pathways of the COVID-19 outbreaks in the presence of various types of interventions. The model captures a coupled dynamics between three subpopulations (staff, the residents, and the visitors) and incorporates infection from infectious individuals and through the environment. Using parameterization of the models via reported cases surveillance data from such facilities in the US, we identified timely adaptive interventions that are critically effective for a vulnerable population. Finally, We study the trade-off between disease burden and prevention cost using cost-effectiveness analysis.