Review 1: "Data From the COVID-19 Epidemic in Florida Suggest That Younger Cohorts Have Been Transmitting Their Infections to Less Socially Mobile Older Adults"

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RR:C19 Evidence Scale rating by reviewer:

- **Potentially informative.** The main claims made are not strongly justified by the methods and data, but may yield some insight. The results and conclusions of the study may resemble those from the hypothetical ideal study, but there is substantial room for doubt. Decision-makers should consider this evidence only with a thorough understanding of its weaknesses, alongside other evidence and theory. Decision-makers should not consider this actionable, unless the weaknesses are clearly understood and there is other theory and evidence to further support it.

Review:

The medRxiv preprint, "Data From the COVID-19 Epidemic in Florida Suggest That Younger Cohorts Have Been Transmitting Their Infections to Less Socially Mobile Older Adults," describes a 16-county assessment of the COVID-19 epidemic in Florida. This well-written manuscript uses publicly available data from the Florida Department of Public Health, the COVID Tracking Project, Google Community Mobility Reports, and OpenTable to display trends in various indicators (e.g., case rates, hospitalization rates, positivity rates). The paper also includes analysis of a compartmental dynamic model to explore transmission between older and younger adults.

The manuscript's central assertion is that younger Floridians (20-59 years) are responsible for transmitting SARS-CoV-2 to older Floridians (≥ 60 years), especially once Governor DeSantis initiated of 'Phase I' of re-opening. Although this hypothesis is epidemiologically likely it is not strongly supported by the study. Data to investigate this hypothesis are generated from a discrete-time SIR compartmental model, which should ideally be reviewed by a dynamic modeler. Intra- and inter-age group contact rates are estimated from the model and are reported to support the conclusion of "cross-infection of older by younger persons." Despite a careful description of how the model was parameterized, there are several limitations, for example: the model ignores the presence of symptoms which may modify contact rates (e.g., symptomatic individuals may self-isolate), the age categories are crude (20-59 vs. 60+), and information on model fitting and validation are sparse. Taken together, the simplicity of the model and limitations of the underlying data (e.g., test coverage) undermine internal validity and the potential impact of these findings (despite some agreement that age mixing is indeed a possible factor in COVID-19 resurgences).

The bulk of the paper (through page 17 of 23) focuses on visualizations of epidemic trends, which are nicely presented and clearly described. However, given that data are publicly available and many of the trends have been discussed in the popular media, there is little presented in this section that would be new to a scientific audience. In addition to the quality issues with surveillance data, there are also some problematic interpretations of data, such as referring to case counts/rates as population-level "incidence." Several county-level visualizations are presented although it is unclear how/why they were selected – the manuscript would be strengthened by increased transparency about the county-level findings.

Ultimately, the manuscript uses ecologic data and a simple compartmental model to make assertions about individual-level behavior, which is potentially fraught with challenges. The author is appropriately cautious and notes, "It may be difficult to determine definitively whether younger persons, having become infected as a result of increased interpersonal contact after Full Phase 1 reopening, then cross-infected older people, who remained largely at home. While more age-specific data on social mobility may be helpful, a more compelling approach will require large-scale case tracking that identifies infector-infected pairs." Consequently, the manuscript is potentially informative to generate hypotheses but does not provide immediately actionable information.