

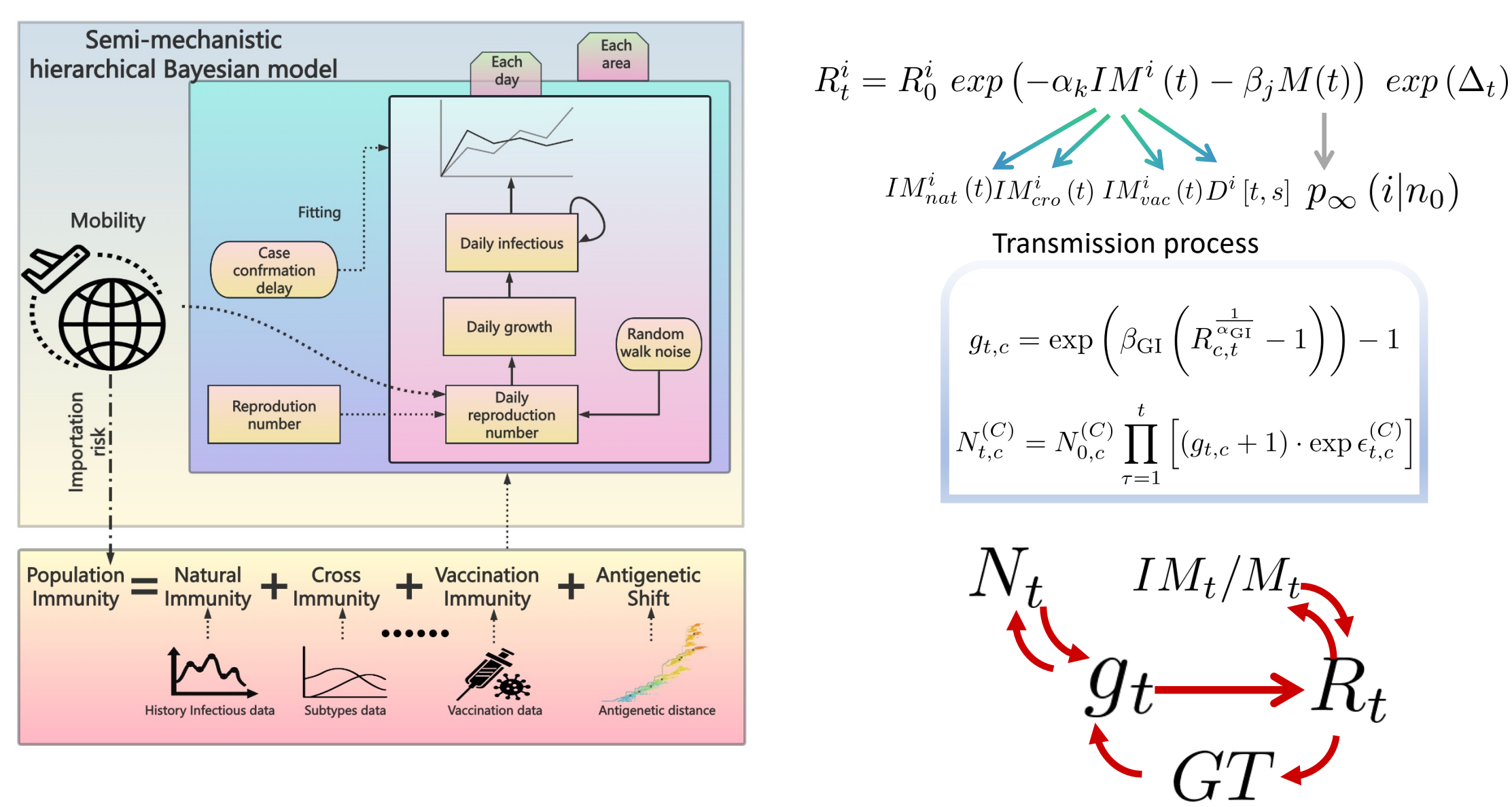
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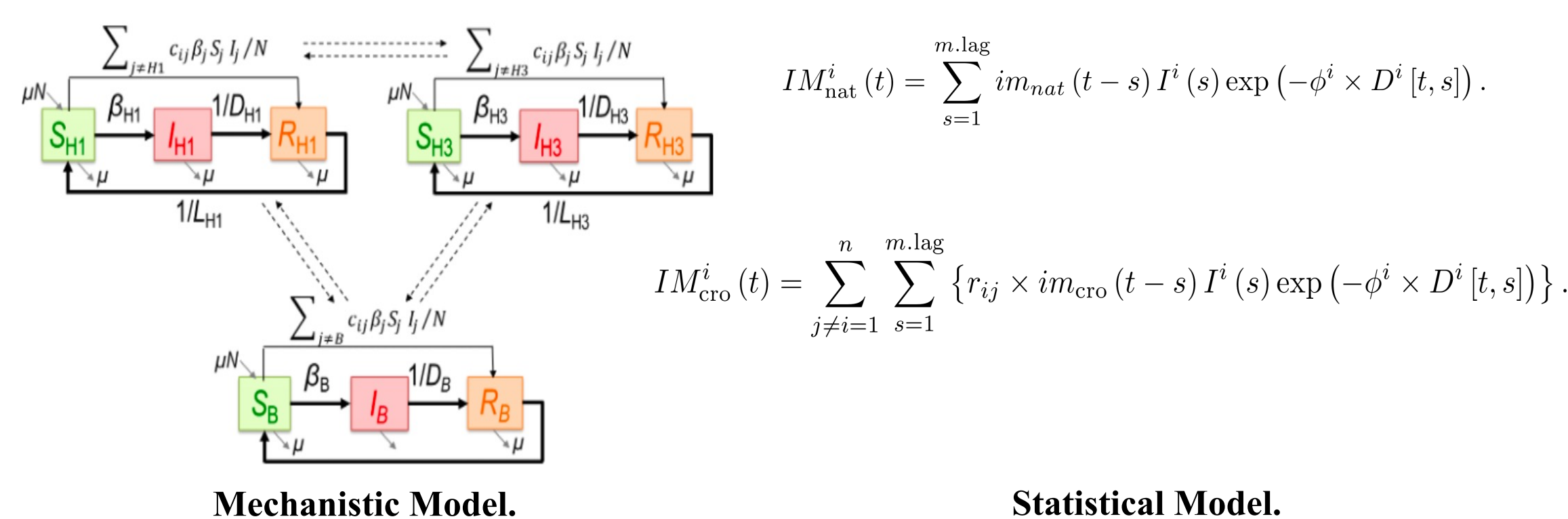
Introduction

Global dynamics of recurrent epidemics for directly transmitted respiratory viruses are the combined outcomes of infection and vaccine-driven immunity/cross-immunity, viral antigenic changes, population mobility, human behavior, public health social measures (PHSMs) and other extrinsic drivers. The dynamics of these viruses has been changed in post COVID-19 pandemic period across the globe. This study aims to elucidate how population immunity and importation risks influenced the co-circulation dynamics and combined burden of multiple pathogens including influenza, RSV and COVID-19 across the study period.

Methods



Using a Comprehensive Dataset within a New Data-driven Sem-mechanistic Framework.



Results

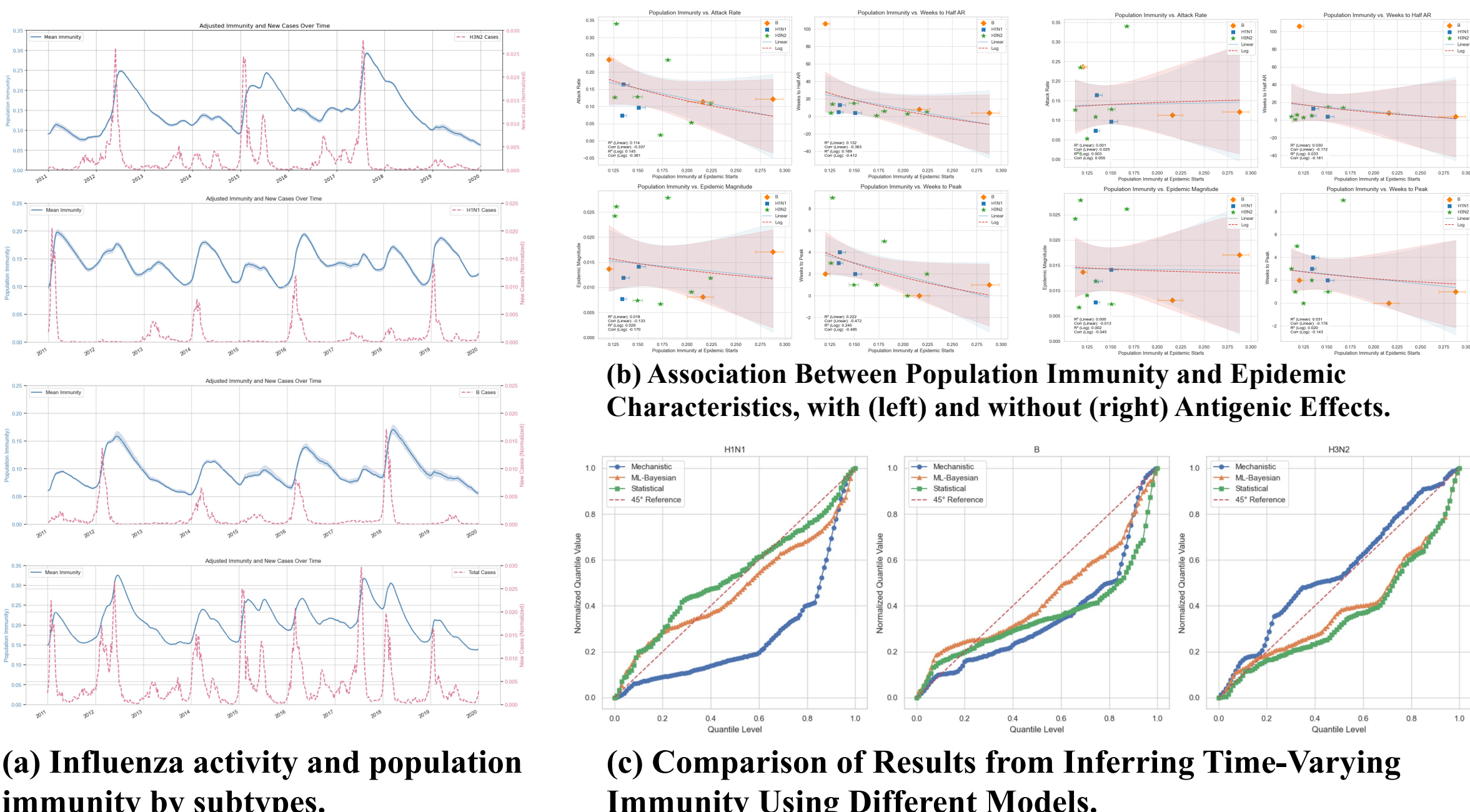


Figure 1. Inferring Time-Varying Population Immunity with Mechanistic, Semi-Mechanistic, and Statistical Models.

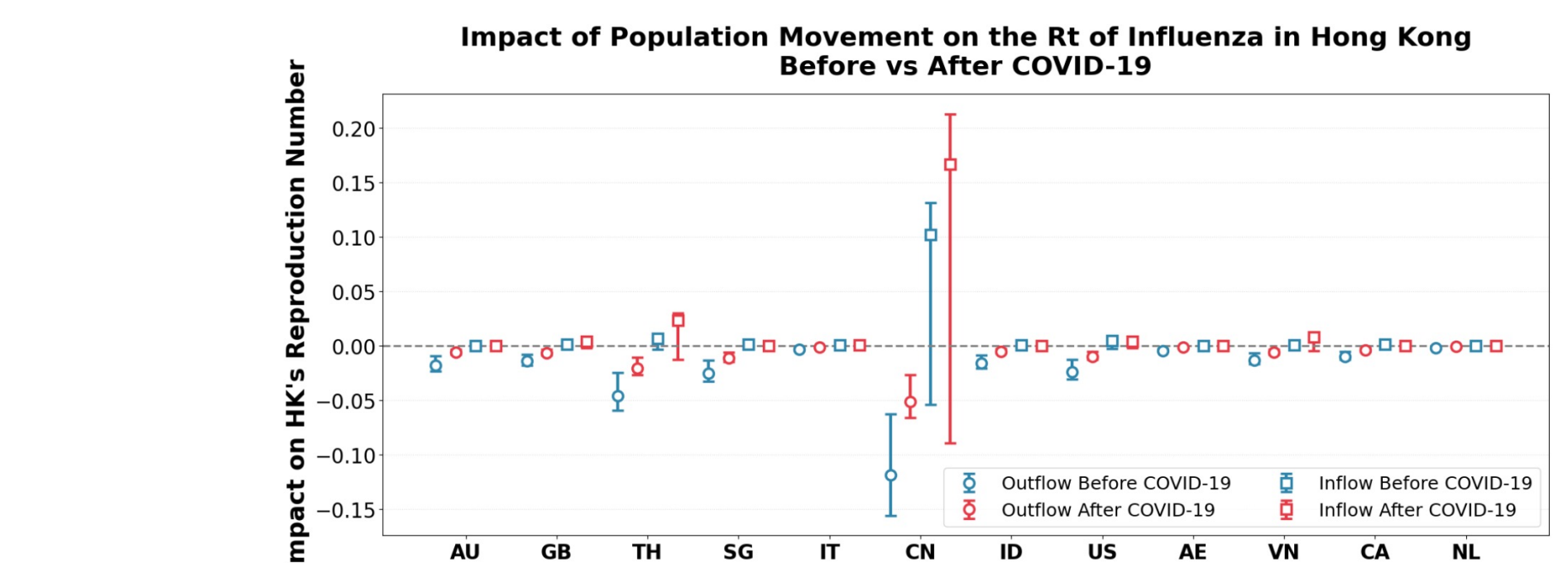
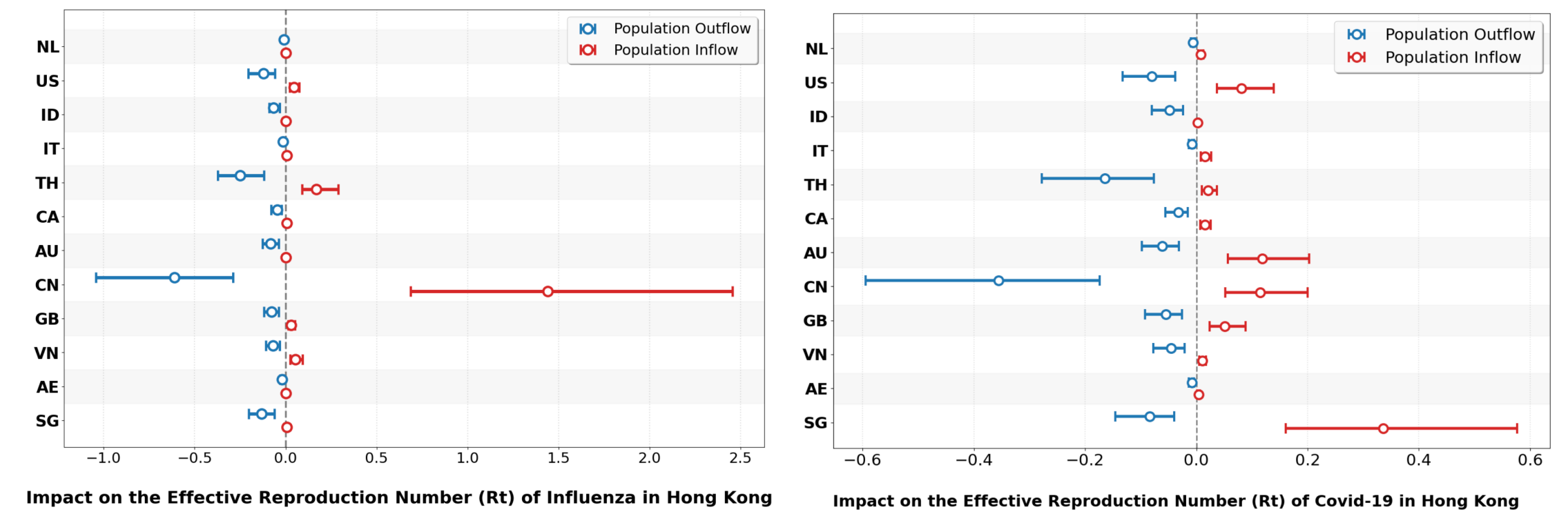


Figure 2. The impact of mobility on Rt reduction for COVID-19 and influenza.



Figure 3. The Impact of Mobility on Co-circulation Before, During, and After the Pandemic.

Conclusion

- Time-varying immunity to seasonal influenza was inferred using statistical, semi-mechanistic, and mechanistic models.
- Antigenic factors are crucial for accurately predicting immunity.
- Inferred the Co-circulation dynamics and interactions (cross-immunity) between influenza and COVID-19 Before, During, and After the Pandemic.
- The pandemic reshaped the transmission patterns of seasonal influenza, and its patterns have not yet recovered fully in the pandemic period.

References

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[2] Chen Z, Tsui J L H, Gutierrez B, et al. COVID-19 pandemic interventions reshaped the global dispersal of seasonal influenza viruses[J]. Science, 2024, 386(6722): eadq3003.

Acknowledgement

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