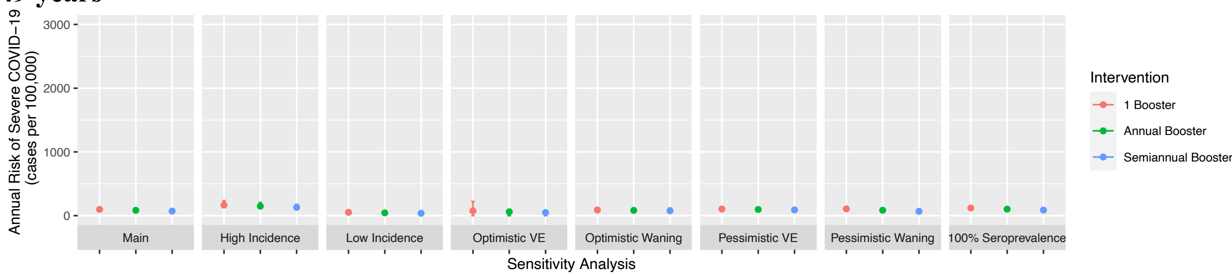
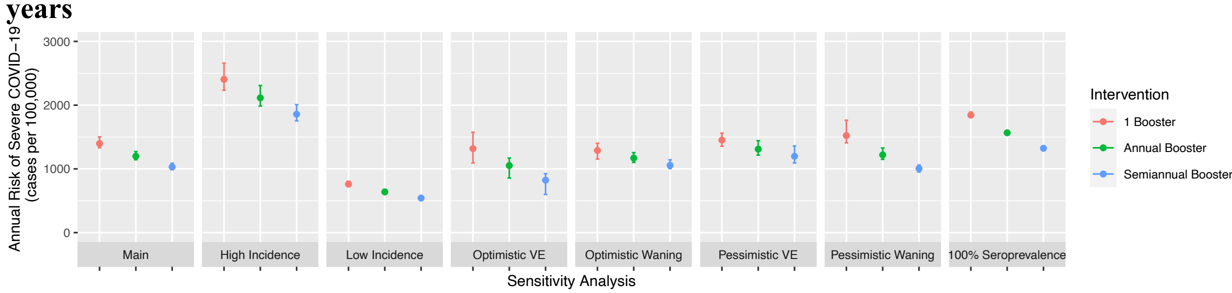
A. 18-49 years



B. 75+ years



C. Immunocompromised (Mild)

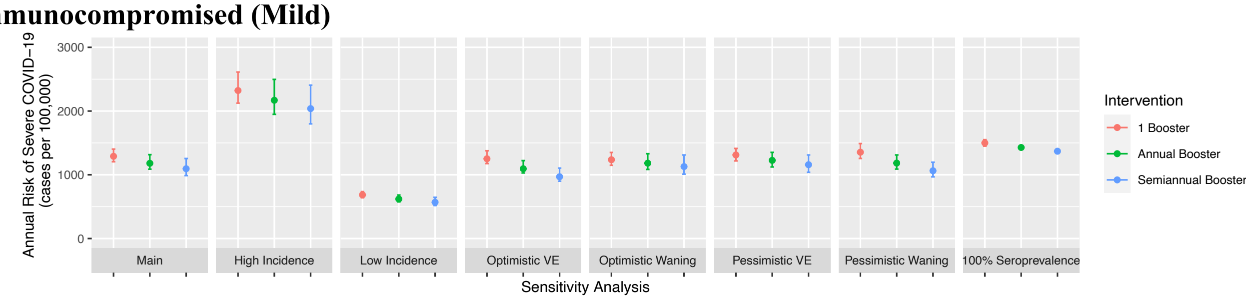


Figure 1: Sensitivity analysis of model parameters for COVID-19 risk and booster vaccination. This sensitivity analysis tested alternative model parameters and assumption on overall vaccine-induced protection (optimistic and pessimistic assumptions), waning vaccine-induced protection (optimistic and pessimistic assumptions), COVID-19 incidence (0.5x lower or 2x higher) and seroprevalence (100% previously infected). For each sensitivity analysis, we simulated three COVID-19 booster vaccine schedules plotted annual risk of severe COVID-19. We plotted results for three representative risk groups, and additional risk groups are available in the Appendix. The vertical bars represent uncertainty intervals and capture the full range of varied model parameters, while the point estimate uses base case assumptions of model inputs. Intervals are designed to demonstrate uncertainty within a single vaccine strategy; comparison between vaccine strategies should be use the same assumed baseline conditions.

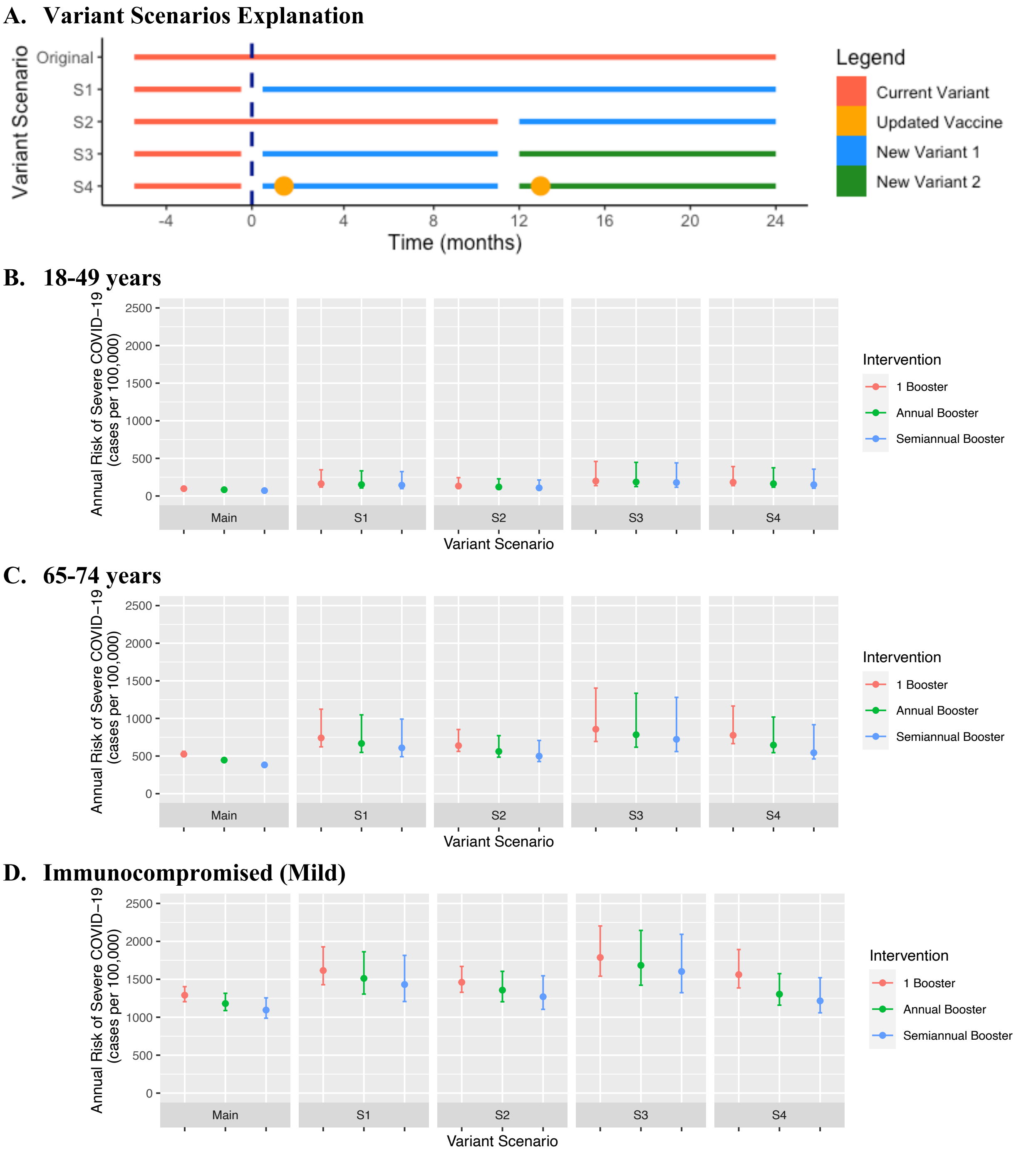
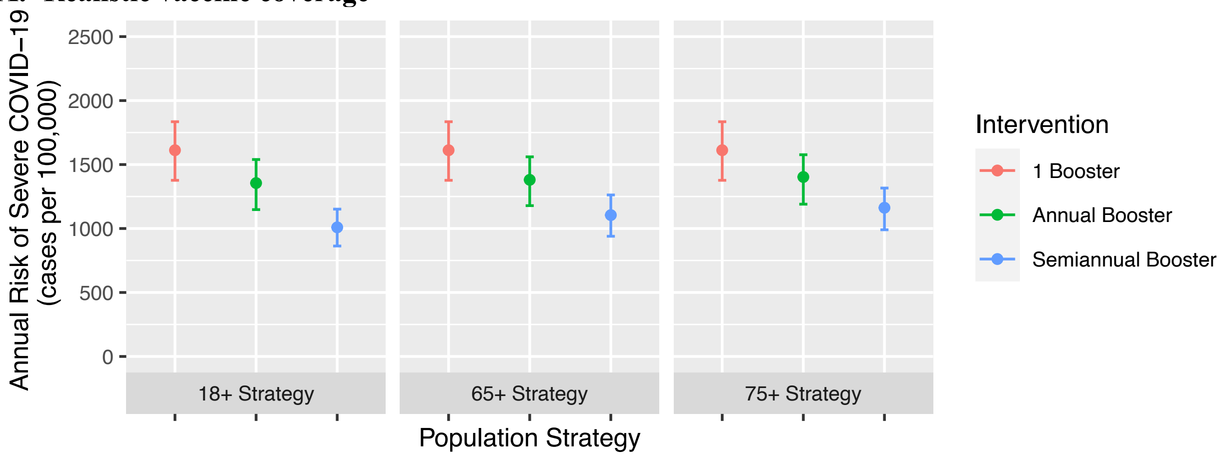


Figure 2: Scenario analysis on emergence of novel SARS-CoV-2 variants comparing severe COVID-19 risk with different frequencies of COVID-19 booster vaccination. We simulated four scenarios on emergence of novel variant(s) with reduced susceptibility to protection generated by prior vaccination and natural infection (panel A). Under each variant scenario analysis, we simulated three frequencies of COVID-19 booster vaccine for each key group. Additional variant scenarios and risk groups available in the Appendix. We plotted absolute annual risk of severe COVID-19 over a two-year simulation. The vertical bars represent uncertainty intervals and capture the full range of varied model parameters, while the point

estimate uses base case assumptions of model inputs. Intervals are designed to demonstrate uncertainty within a single vaccine strategy; comparison between vaccine strategies should be use the same assumed baseline conditions.

A. Realistic vaccine coverage



B. Optimistic vaccine coverage

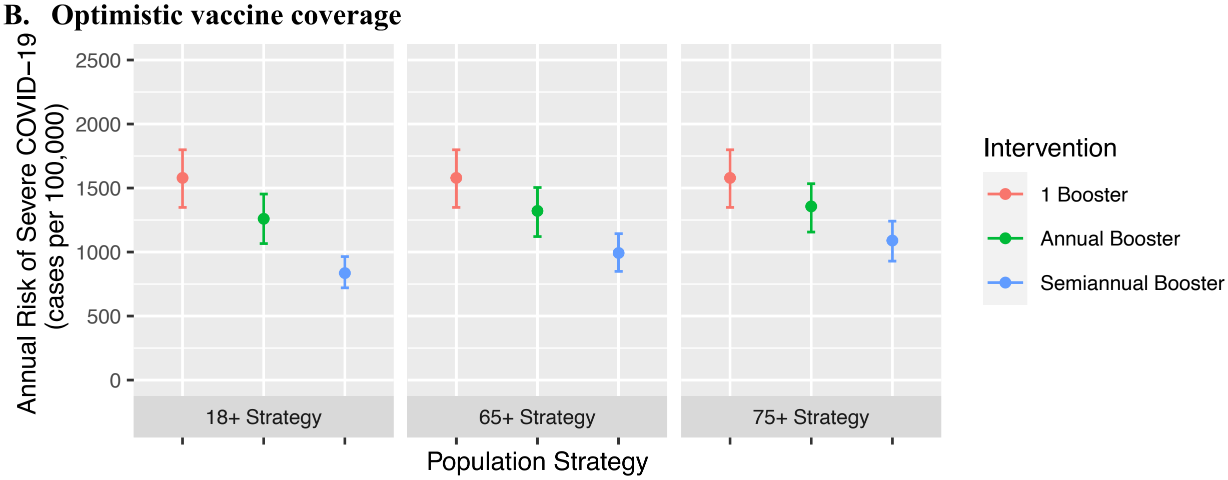


Figure 3: Scenario analysis using a dynamic transmission model to estimate the impact of indirect effects on COVID-19 booster vaccination strategies in the 75 years and older group. We used a dynamic transmission model to estimate the impact of different frequencies of COVID-19 booster vaccination across different groups would affect transmission in the highest risk populations (75+ years). We simulated booster vaccination with varying levels of inclusiveness: (i) 18+ years in all groups (most inclusive); (ii) 65+ years and all immunocompromised groups; and (iii) 75+ years, moderate/severe immunocompromised group (most restrictive). We simulated under realistic vaccine coverage (panel A) and optimistic coverage (panel B) assumptions. We assumed a background of one-time booster vaccination at the start of the simulation in adults (18+ years) with age-specific, imperfect vaccine uptake. We plotted absolute annual risk of severe COVID-19 over a two-year simulation in the 75+ year risk group, to compare the indirect effects of booster vaccination on this high-risk group. The largest indirect effects from vaccination are expected with more inclusive vaccine strategies. The vertical bars represent uncertainty intervals and capture the full range of varied model parameters, while the point estimate uses base case assumptions of model inputs. Intervals are designed to demonstrate uncertainty within a single vaccine strategy; comparison between vaccine strategies should be use the same assumed baseline conditions. A full description of the Methods and results for additional risk groups are available in the Appendix.