



Figure 1: The SIRV Compartmental Model for COVID-19 Disease Dynamics

Description: The SIRV compartmental model for COVID-19 disease dynamics consists of five compartments: Susceptible (S), Exposed (E), Quarantined (U), Recovered (R), and Vaccinated (V). Three doses of vaccination are assumed, with the second and third vaccinations occurring 28 and 180 days after the first dose. The transmission rate is β , the recovery rate is δ , the rate of returning to susceptibility after infection is γ , the vaccination rates are α_i for the i^{th} vaccination, calculated as a proportion of those who received the previous vaccine, and ϕ_i represents the rate at which vaccination immunity wears off for the i^{th} vaccination.