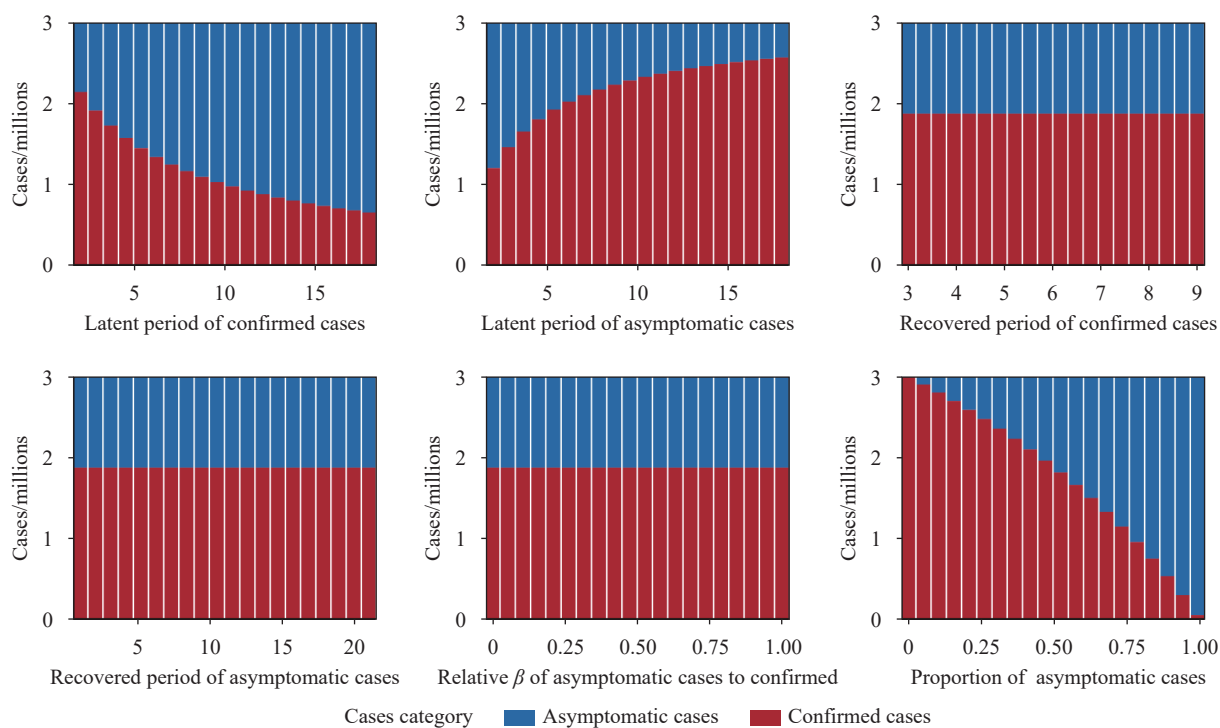


SUPPLEMENTARY TABLE 1. Parameters in the booster vaccination SEIAR model.

Parameter	Definition	Unit	Value	Range	Method
β	Transmission relative rate	/ (Individuals·days)	-	≥ 0	Basing on different R_{eff} values
$1-x$	VEI	1	-	0-1	Simulated
$1-y$	VES	1	-	0-1	Simulated
ω	Latent relative rate of the confirmed case	/days	0.33	0.056-0.500	Reference ⁽¹⁾
ω'	Latent relative rate of the asymptomatic case	/days	0.2	0.056-0.500	Reference ⁽¹⁾
γ	Recovered/Removed rate of the confirmed case	/days	0.2	0.111-0.333	Reference ⁽²⁾
γ'	Recovered/Removed rate of the asymptomatic case	/days	0.1	0.048-1.000	Reference ⁽²⁾
κ	Relative transmissibility rate of asymptomatic to confirmed cases		0.6	0-1	Reference ⁽²⁾
p	Proportion of the asymptomatic cases		0.5	0-1	Reference ⁽²⁾

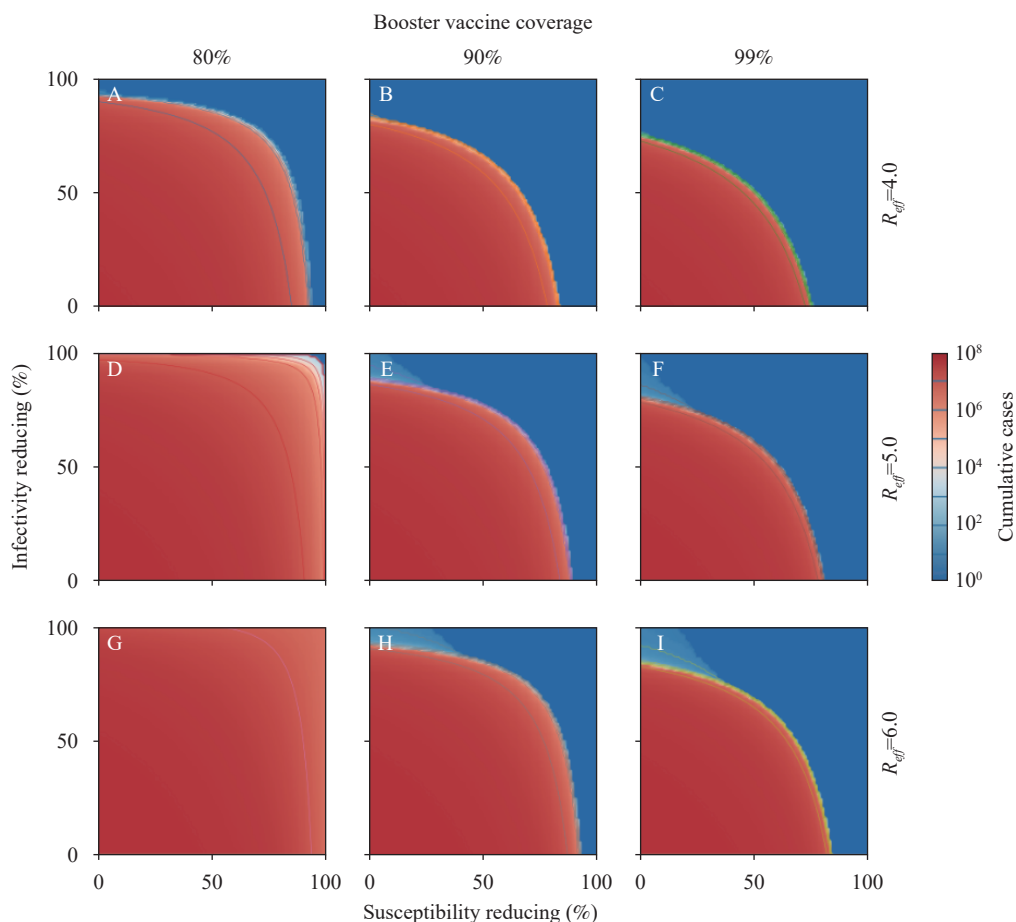
Abbreviations: SEIAR=Susceptible-Exposed-Symptomatic-Asymptomatic-Recovered/Removed; VEI=vaccine efficacy against infectivity; VES=vaccine efficacy against susceptibility; R_{eff} =effective reproduction number.



SUPPLEMENTARY FIGURE S1. Sensitivity analysis of SEIAR model.

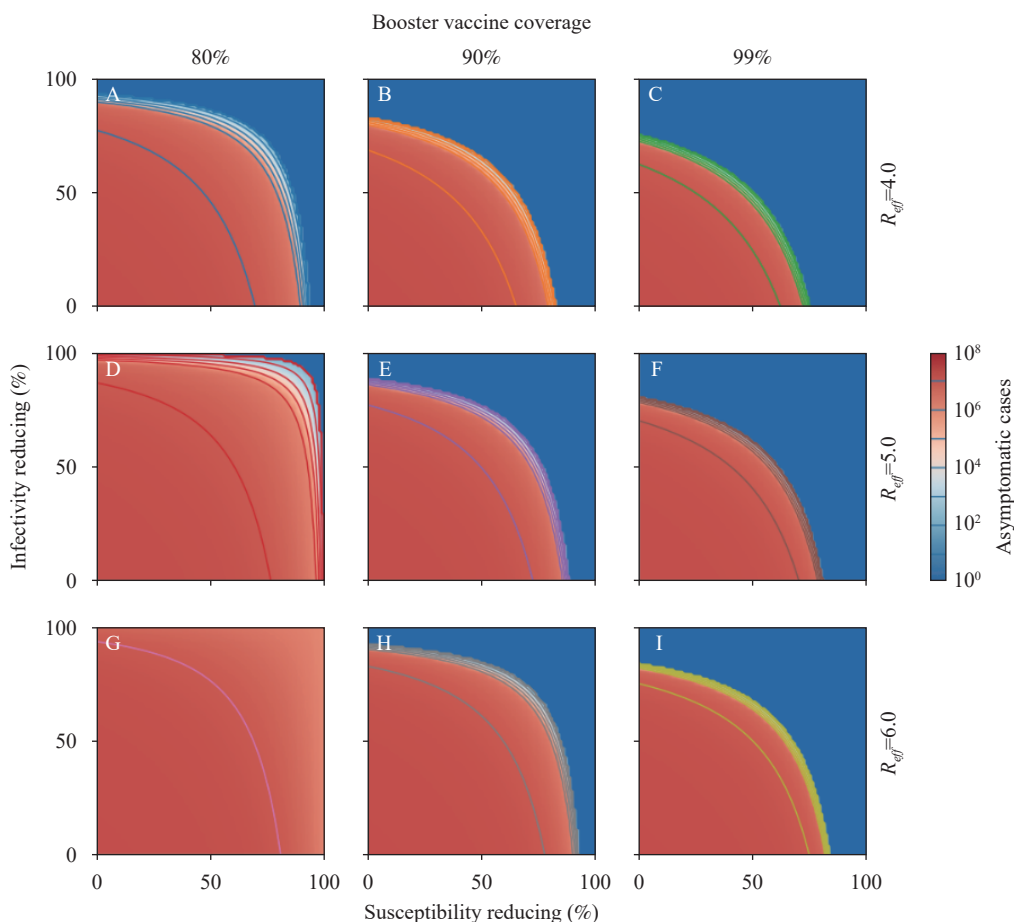
Note: Variable parameters will influence the proportion of asymptomatic cases and confirmed cases. However, cumulative cases do not seem to be influenced by parameters.

Abbreviation: SEIAR=Susceptible-Exposed-Symptomatic-Asymptomatic-Recovered/Removed.



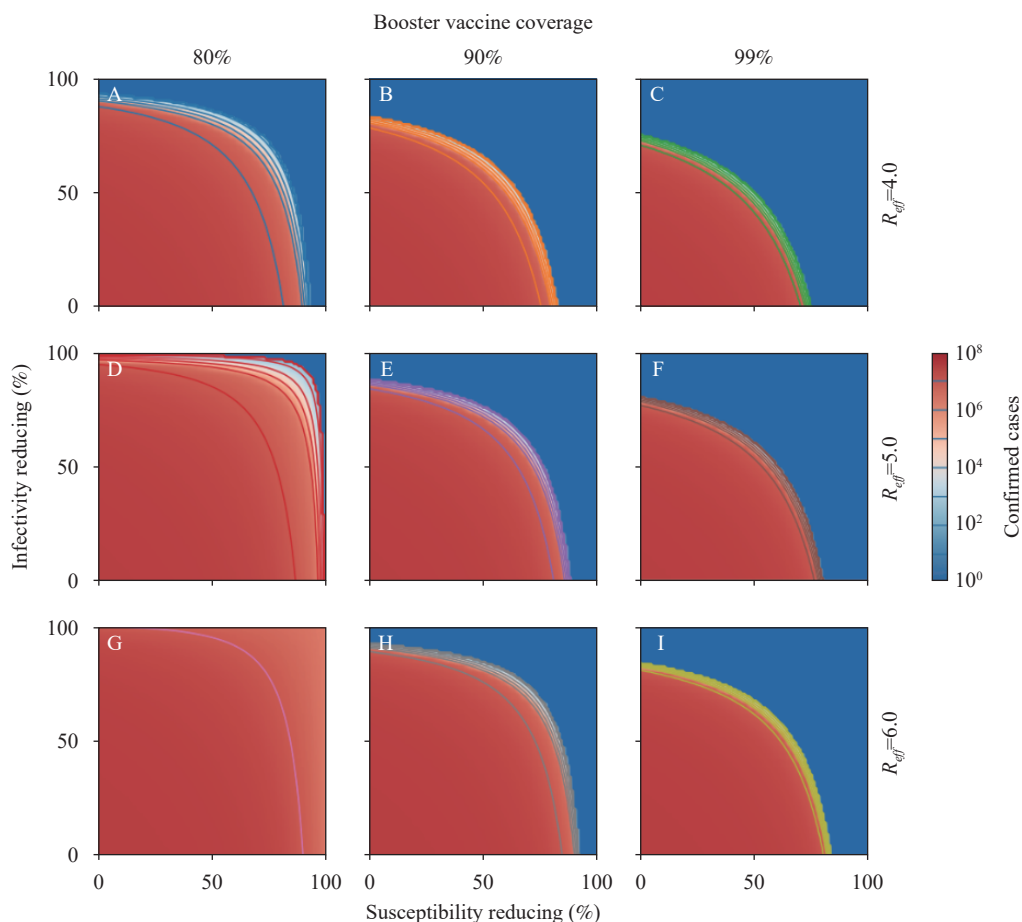
SUPPLEMENTARY FIGURE S2. Simulated cumulative cases of COVID-19 for different effective reproduction numbers (R_{eff}) and booster vaccine coverage. (A) Booster vaccine coverage of 80% and R_{eff} at 4.0, (B) Booster vaccine coverage of 90% and R_{eff} at 4.0, (C) Booster vaccine coverage of 99% and R_{eff} at 4.0, (D) Booster vaccine coverage of 80% and R_{eff} at 5.0, (E) Booster vaccine coverage of 90% and R_{eff} at 5.0, (F) Booster vaccine coverage of 99% and R_{eff} at 5.0, (G) Booster vaccine coverage of 80% and R_{eff} at 6.0, (H) Booster vaccine coverage of 90% and R_{eff} at 6.0, (I) Booster vaccine coverage of 99% and R_{eff} at 6.0.

Note: We re-run the model based on adjusting parameters (ω' and ω both are 1 days⁻¹, γ' and γ both are 0.5 days⁻¹, κ is 0.25 and p is 0.5). Logarithmic contour is adopted to display the outcome of this study because the outcome varies considerably between different conditions.



SUPPLEMENTARY FIGURE S3. Simulated asymptomatic cases and index case of COVID-19 for different effective reproduction numbers (R_{eff}) and booster vaccine coverage. (A) Booster vaccine coverage of 80% and R_{eff} at 4.0, (B) Booster vaccine coverage of 90% and R_{eff} at 4.0, (C) Booster vaccine coverage of 99% and R_{eff} at 4.0, (D) Booster vaccine coverage of 80% and R_{eff} at 5.0, (E) Booster vaccine coverage of 90% and R_{eff} at 5.0, (F) Booster vaccine coverage of 99% and R_{eff} at 5.0, (G) Booster vaccine coverage of 80% and R_{eff} at 6.0, (H) Booster vaccine coverage of 90% and R_{eff} at 6.0, (I) Booster vaccine coverage of 99% and R_{eff} at 6.0.

Note: Adding index case, instead of only asymptomatic cases, was selected as the outcome index of this study. Because asymptomatic cases do not generate in our model in some situations and logarithmic transform cannot deal with 0 asymptomatic case.



SUPPLEMENTARY FIGURE S4. Simulated confirmed cases of COVID-19 for different effective reproduction numbers (R_{eff}) and booster vaccine coverage. (A) Booster vaccine coverage of 80% and R_{eff} at 4.0, (B) Booster vaccine coverage of 90% and R_{eff} at 4.0, (C) Booster vaccine coverage of 99% and R_{eff} at 4.0, (D) Booster vaccine coverage of 80% and R_{eff} at 5.0, (E) Booster vaccine coverage of 90% and R_{eff} at 5.0, (F) Booster vaccine coverage of 99% and R_{eff} at 5.0, (G) Booster vaccine coverage of 80% and R_{eff} at 6.0, (H) Booster vaccine coverage of 90% and R_{eff} at 6.0, (I) Booster vaccine coverage of 99% and R_{eff} at 6.0.

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