Quantifying the direct and indirect components of COVID-19 vaccine effectiveness during the Delta variant era

Supplementary Tables and Figures

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Table S.1: The vaccine effectiveness components, i.e. the relative reduction of the cumulative incidences over the study period in the different populations, with efficacy against infectiousness set to 0%. The components include the 90% credible intervals of the posterior predictive distribution from the model for the Control Population.

	COVID-19 cases	**Hospitalizations**	**ICU admissions**	**Deaths**
Indirect effectiveness (%)	91.7 (91.5 – 92.0)	92.6 (92.1 – 92.9)	91.5 (90.8 – 92.2)	94.3 (93.8 – 94.7)
Overall effectiveness (%)	96.2 (96.1 – 96.3)	98.5 (98.5 – 98.6)	98.7 (98.6 – 98.8)	98.9 (98.8 – 99.0)
Total effectiveness (%)	97.7 (97.6 – 97.7)	99.4 (99.4 – 99.4)	99.6 (99.6 – 99.7)	99.2 (99.2 – 99.3)

Table S.2: Estimated disease burden averted by vaccination the during study period in Finland in the Control Population baseline and sensitivity analysis scenarios.

Averted disease burden (total numbers)	Control Population, baseline scenario[b]	Control Population sensitivity analysis scenarios [a]			
		Baseline VE,lower detection	Baseline VE,higher detection	Lower VE, baseline detection	Higher VE, baseline detection
COVID-19 cases	3 133 348 (1 546 408 – 5 151 394)	2 004 175 (968 535 – 3 322 101)	3 813 077 (1 882 356 – 6 272 226)	3 147 027 (1 421 260 – 5 397 345)	3 235 886 (1 607 487 – 5 303 367)
Hospitali-zations	209 645 (105 561 – 342 075)	1 44 385 (72 176 – 236 330)	247 924 (124 350 – 405 410)	223 690 (103 537 – 380 443)	244 267 (123 793 – 397 317)
ICU admissions	47 085 (23 724 – 76 812)	32 374 (16 202 – 52 968)	55 525 (27 861 – 90 784)	49 797 (23 068 – 84 668)	54 748 (27 756 – 89 042)
Deaths	66 273 (33 505 – 107 954)	43 015 (21 617 – 70 251)	79 940 (40 257 – 130 495)	67 022 (31 145 – 11 3817)	70 228 (35 713 – 114 059)

[a]Sensitivity analysis scenarios: Lower detection probability 0.5, higher detection 0.9. Lower VE: 0.6 against infection, 0.85 against infectiousness, 0.85 against severe disease. Higher VE: 0.8 against infection, 0.94 against infectiousness, 0.92 against severe disease.

[b]Baseline scenario: 0.75 detection probability, vaccine efficacy of 2+ doses (VE) 0.7 against infection, 0.85 against infectiousness, 0.85 against severe disease.

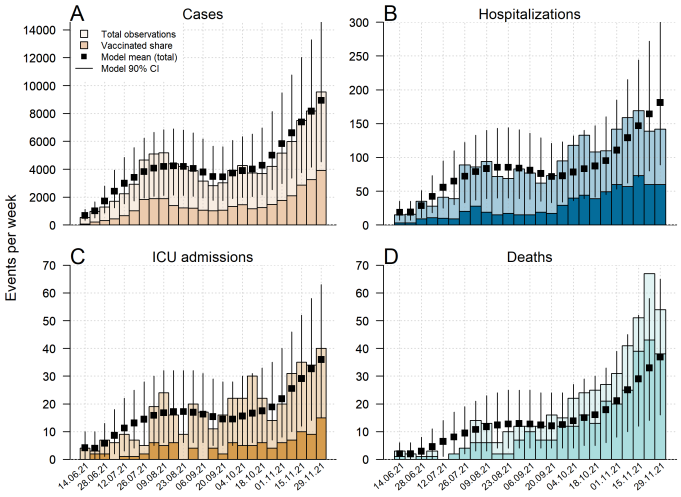

Figure S.1: Posterior prediction means and 90% credible intervals of the calibrated model for the total number of events per week in the *baseline vaccine efficacy and lower detection probability* scenario for A) COVID-19 cases, B) hospitalizations, C) ICU admissions, D) deaths. Figures include the weekly data from Finland (population approximately 5.6 million) during the Delta variant era. Darker coloured bars indicate the vaccinated (1+ doses) share of the total observations.

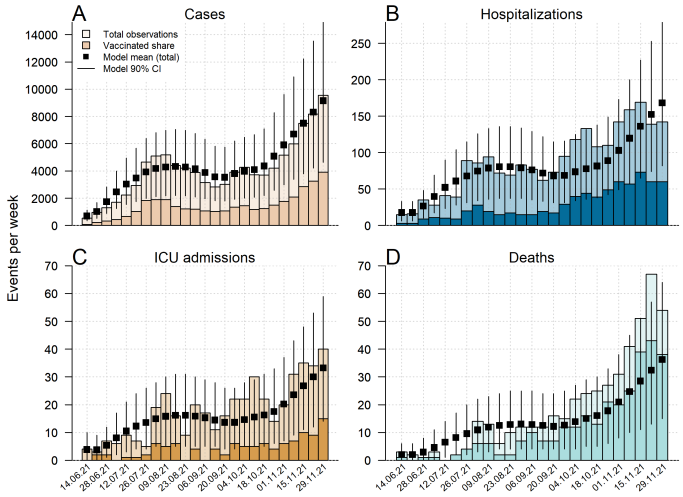

Figure S.2: Posterior prediction means and 90% credible intervals of the calibrated model for the total number of events per week in the *baseline vaccine efficacy and higher detection probability* scenario for A) COVID-19 cases, B) hospitalizations, C) ICU admissions, D) deaths. Figures include the weekly data from Finland (population approximately 5.6 million) during the Delta variant era. Darker coloured bars indicate the vaccinated (1+ doses) share of the total observations.

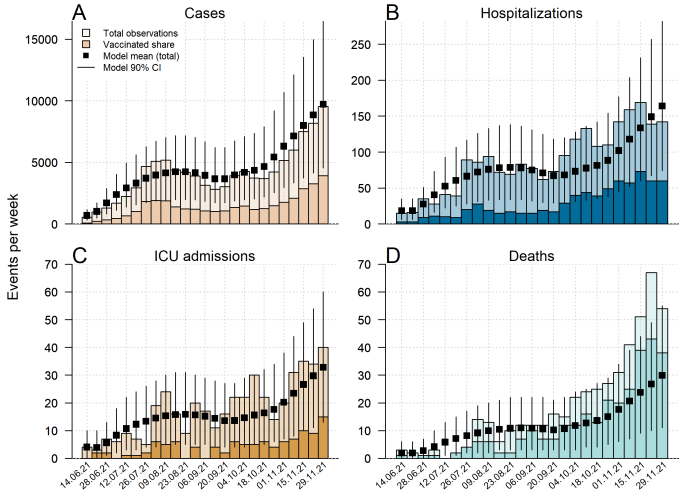

Figure S.3: Posterior prediction means and 90% credible intervals of the calibrated model for the total number of events per week in the *lower vaccine efficacy and baseline detection probability* scenario for A) COVID-19 cases, B) hospitalizations, C) ICU admissions, D) deaths. Figures include the weekly data from Finland (population approximately 5.6 million) during the Delta variant era. Darker coloured bars indicate the vaccinated (1+ doses) share of the total observations.

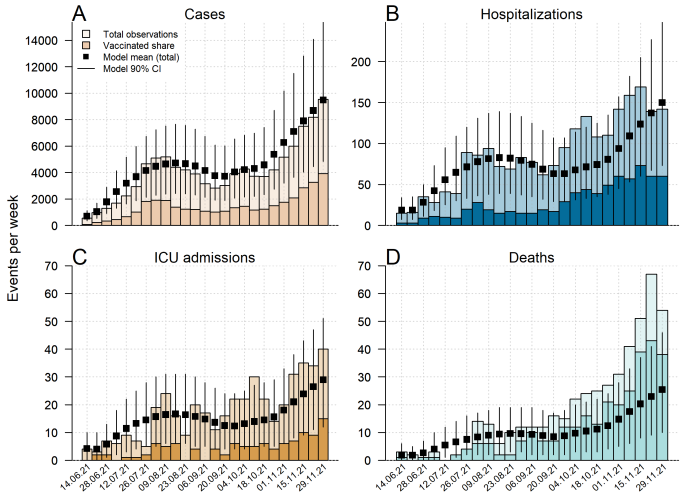

Figure S.4: Posterior prediction means and 90% credible intervals of the calibrated model for the total number of events per week in the *higher vaccine efficacy and baseline detection probability* scenario for A) COVID-19 cases, B) hospitalizations, C) ICU admissions, D) deaths. Figures include the weekly data from Finland (population approximately 5.6 million) during the Delta variant era. Darker coloured bars indicate the vaccinated (1+ doses) share of the total observations.

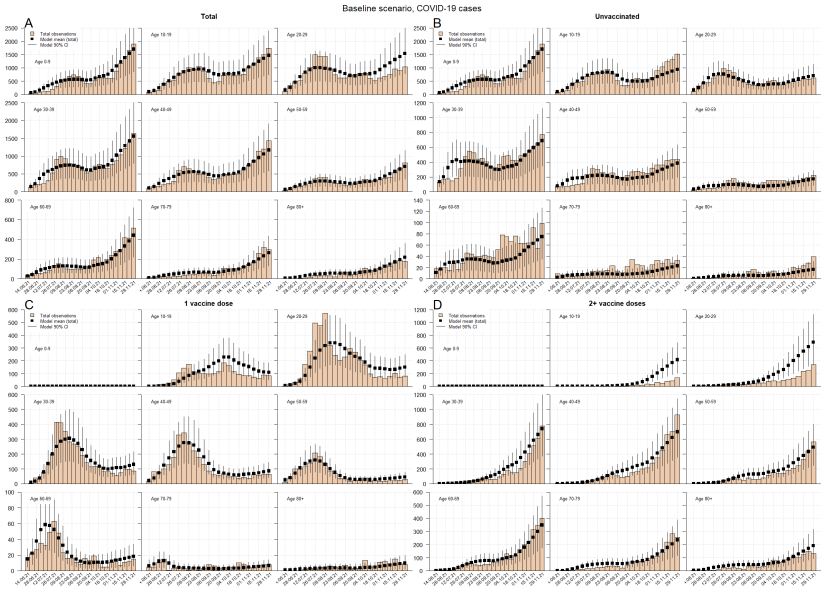

Figure S.5: Weekly COVID-19 cases in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline* scenario.

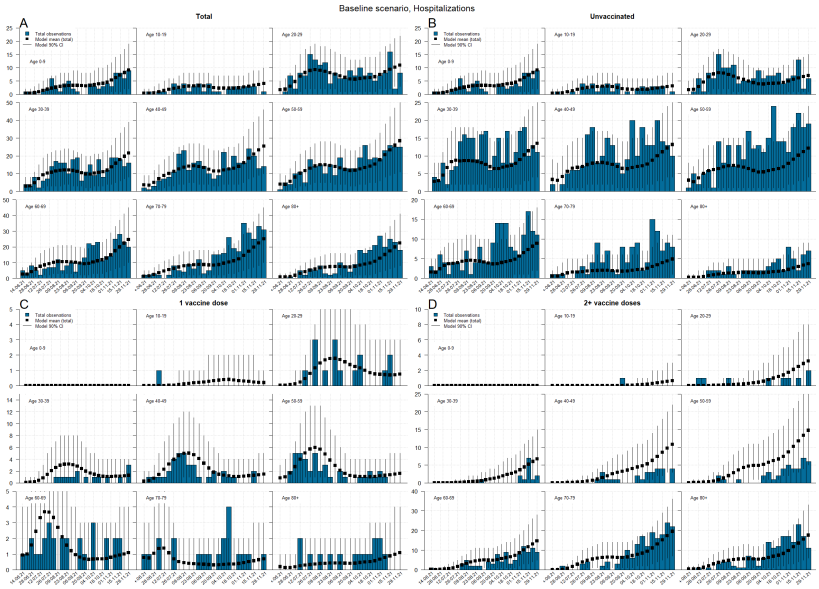

Figure S.6: Weekly hospitalizations in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline* scenario.

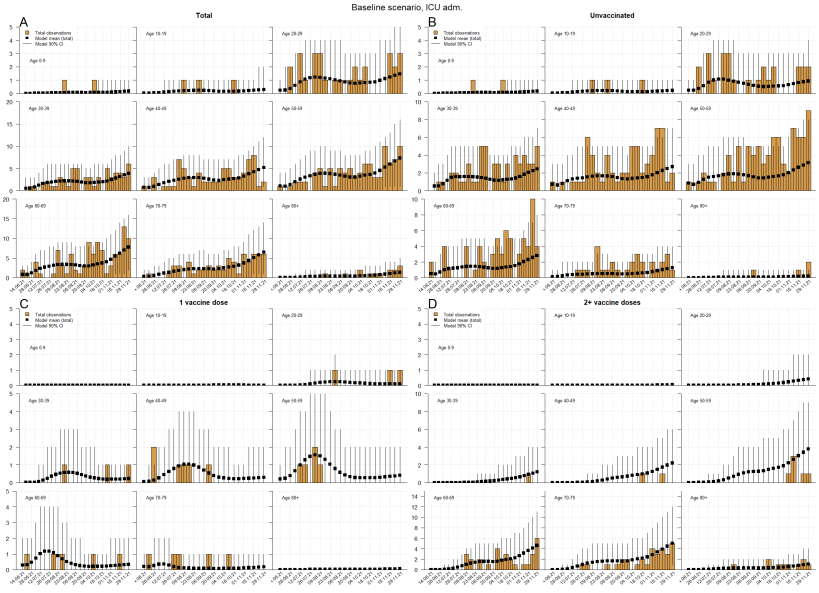

Figure S.7: Weekly ICU admissions in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline* scenario.

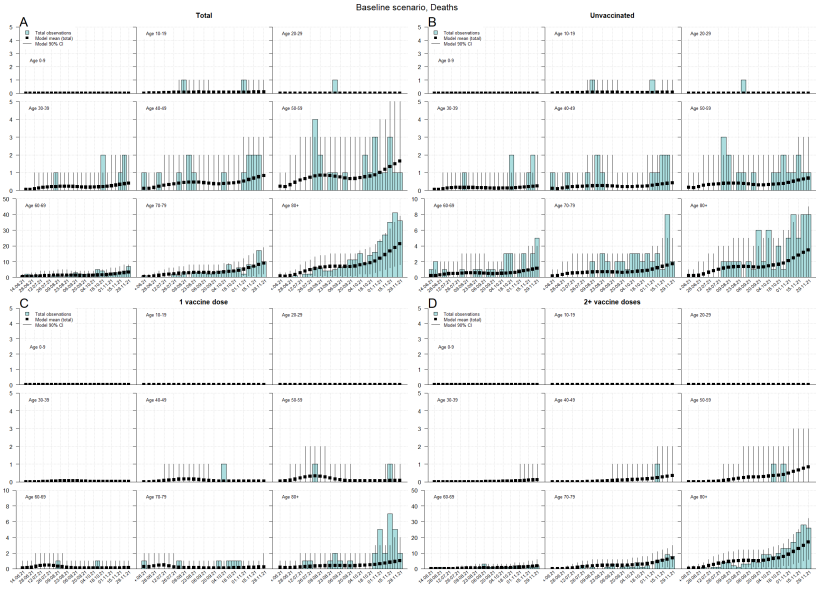

Figure S.8: Weekly deaths in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline* scenario.

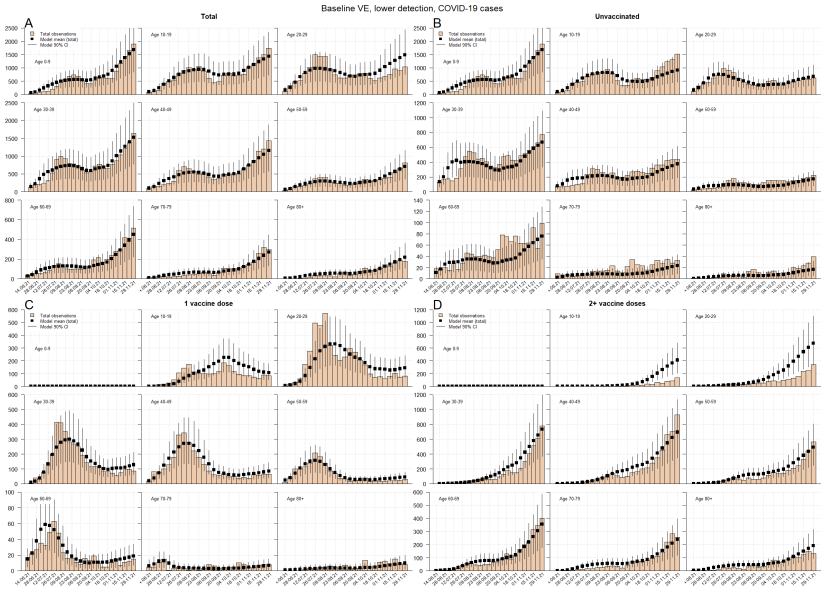

Figure S.9: Weekly COVID-19 cases in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and lower detection probability* scenario.

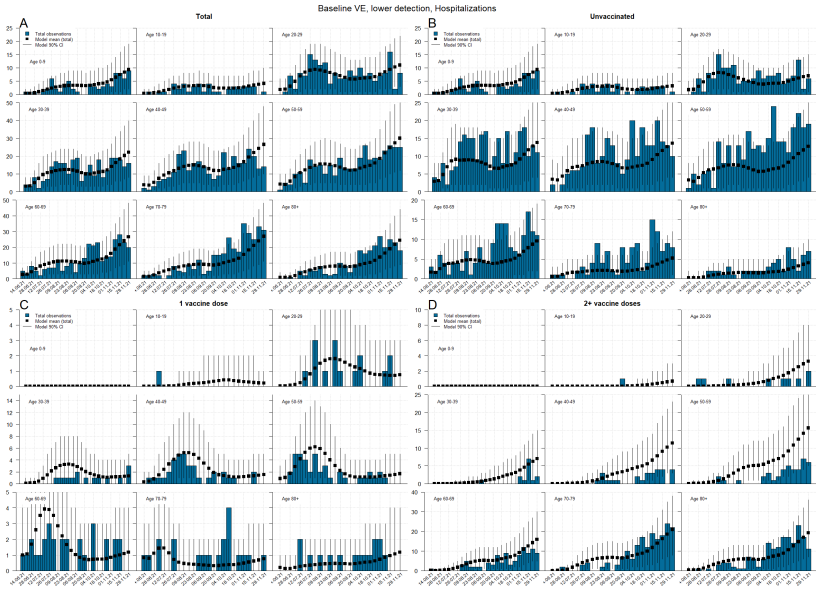

Figure S.10: Weekly hospitalizations in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and lower detection probability* scenario.

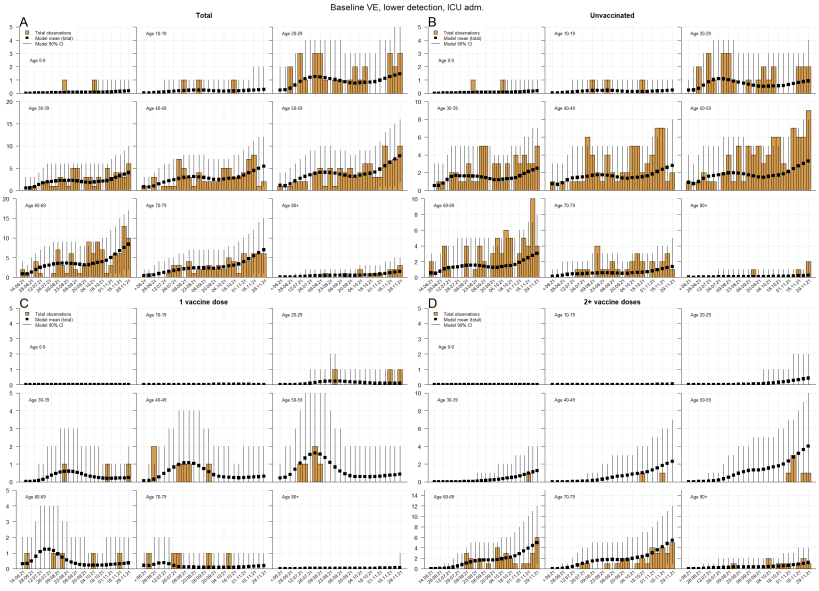

Figure S.11: Weekly ICU admissions in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and lower detection probability* scenario.

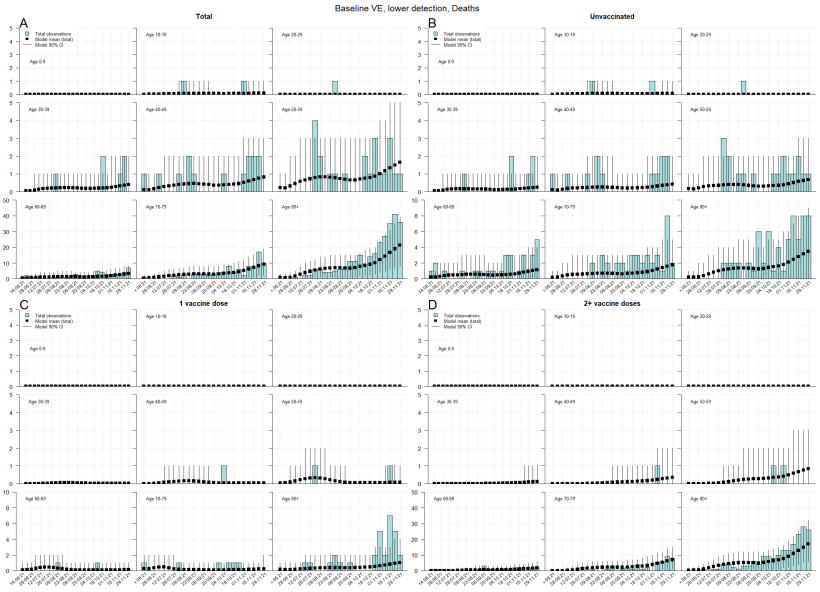

Figure S.12: Weekly deaths in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and lower detection probability* scenario.

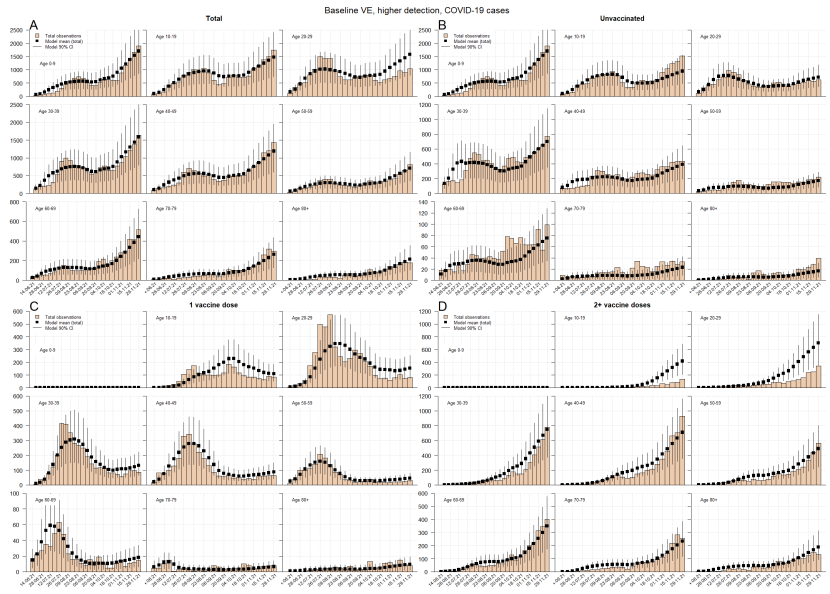

Figure S.13: Weekly COVID-19 cases in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and higher detection probability* scenario.

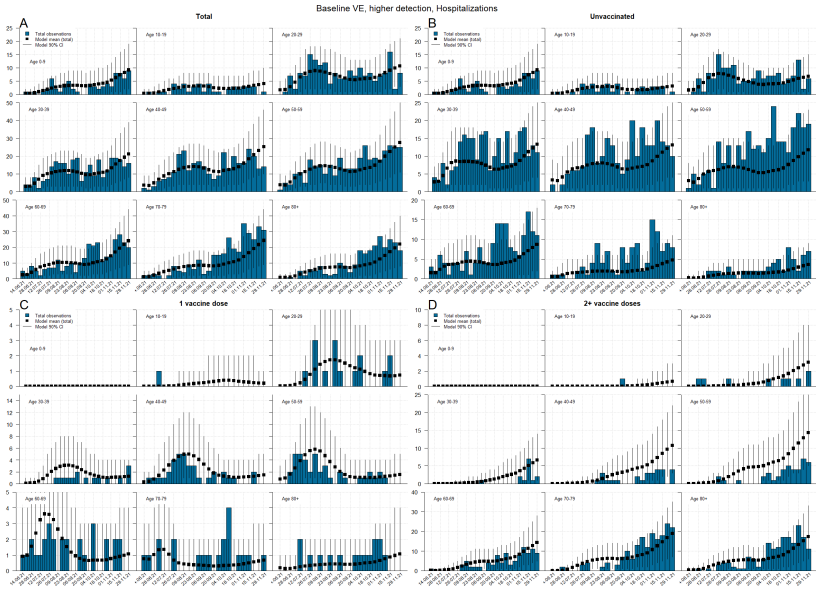

Figure S.14: Weekly hospitalizations in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and higher detection probability* scenario.

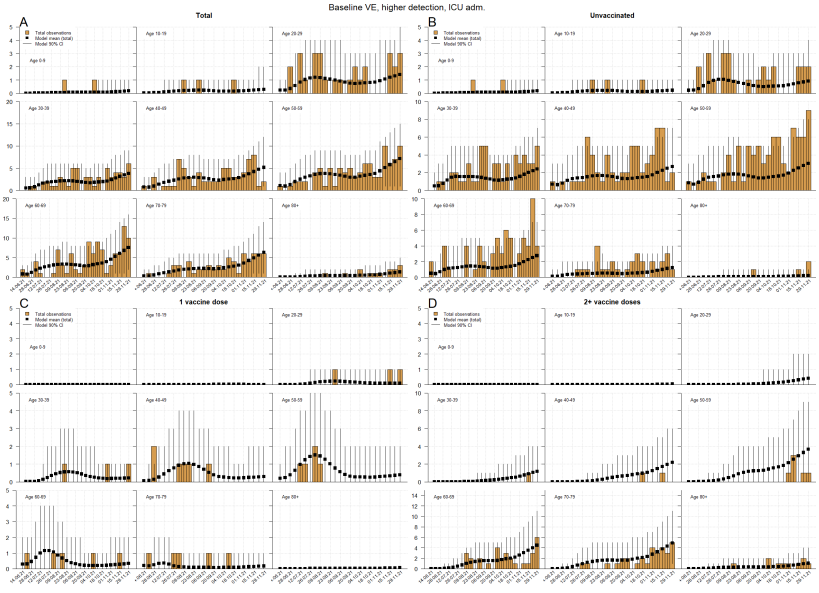

Figure S.15: Weekly ICU admissions in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and higher detection probability* scenario.

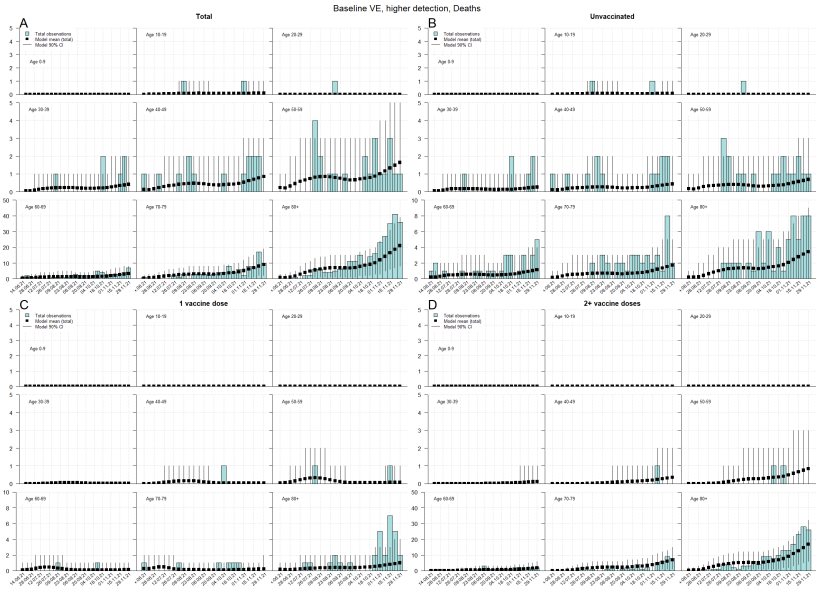

Figure S.16: Weekly deaths in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *baseline vaccine efficacy and higher detection probability* scenario.

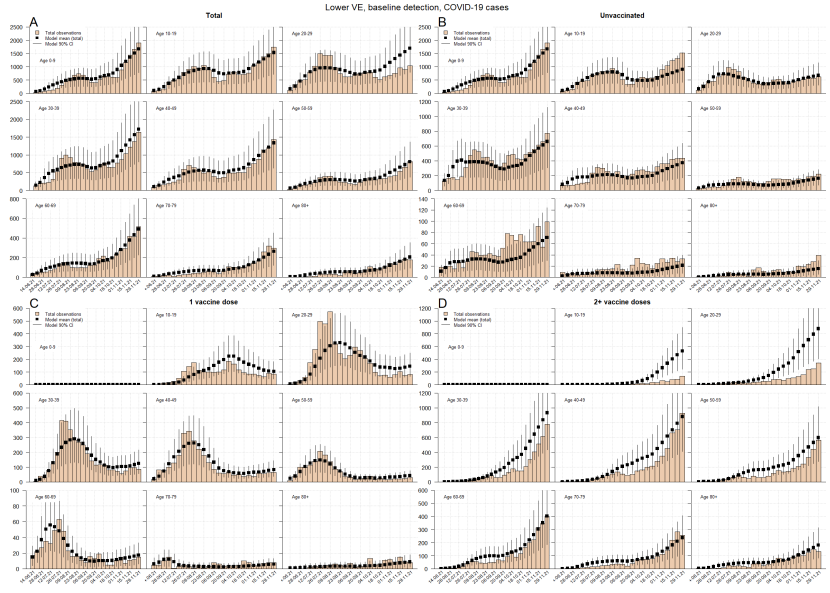

Figure S.17: Weekly COVID-19 cases in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *lower vaccine efficacy and baseline detection probability* scenario.

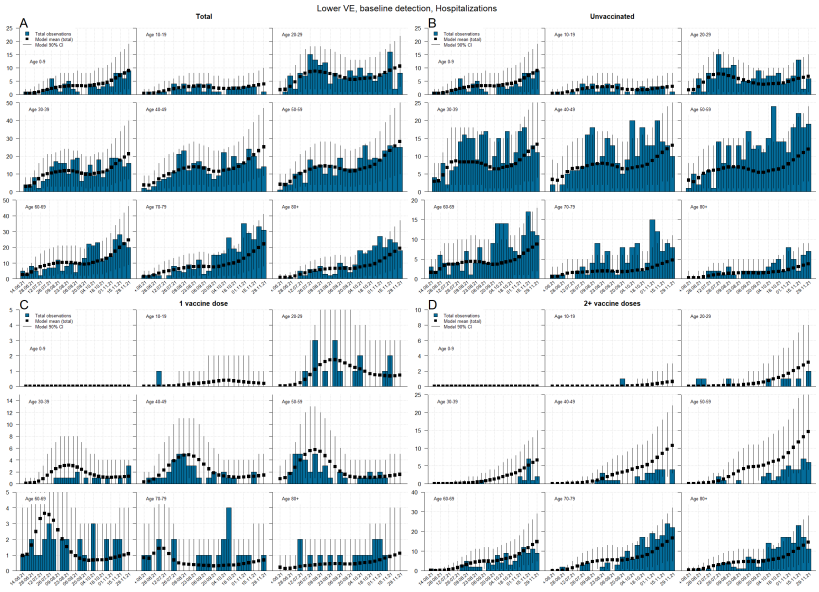

Figure S.18: Weekly hospitalizations in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *lower vaccine efficacy and baseline detection probability* scenario.

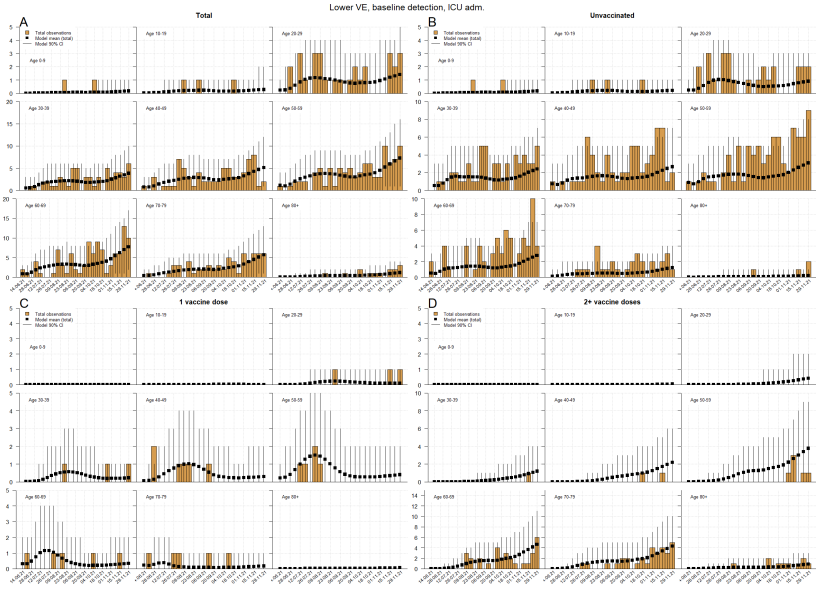

Figure S.19: Weekly ICU admissions in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *lower vaccine efficacy and baseline detection probability* scenario.

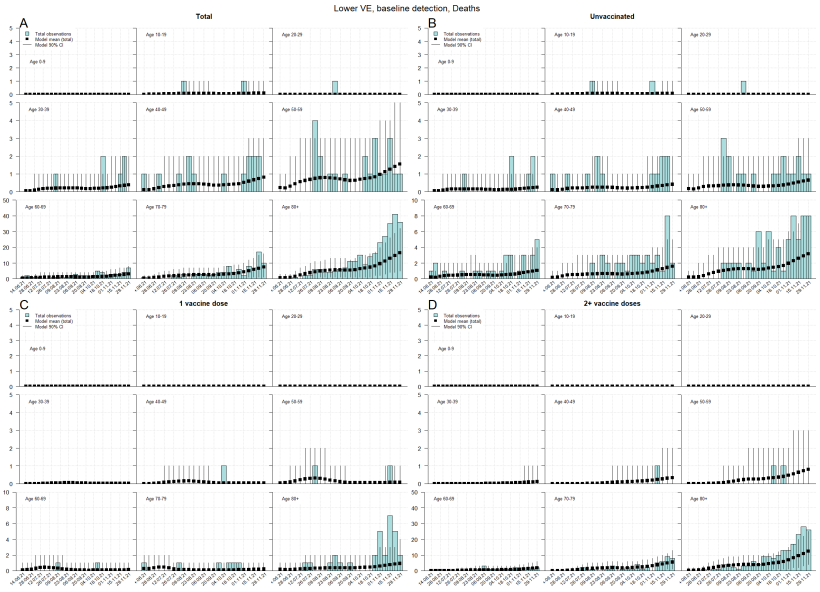

Figure S.20: Weekly deaths in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *lower vaccine efficacy and baseline detection probability* scenario.

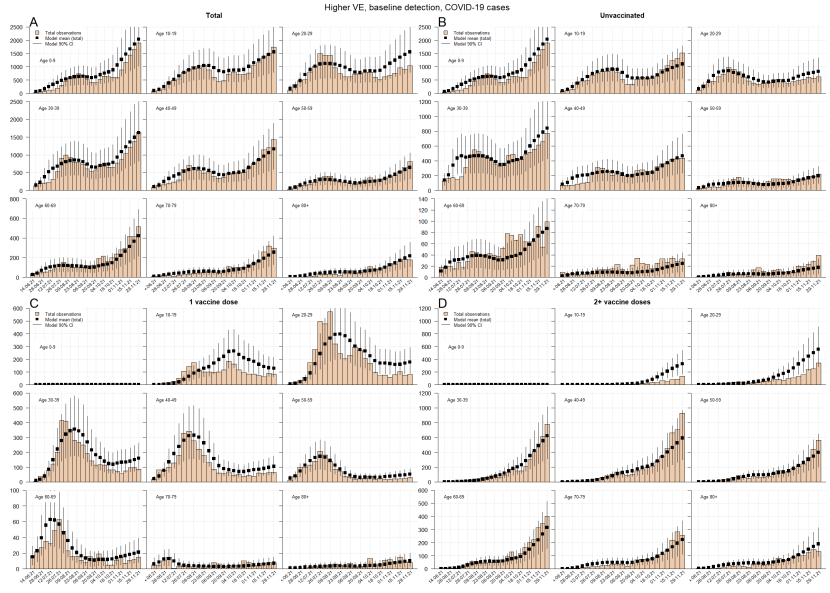

Figure S.21: Weekly COVID-19 cases in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *higher vaccine efficacy and baseline detection probability* scenario.

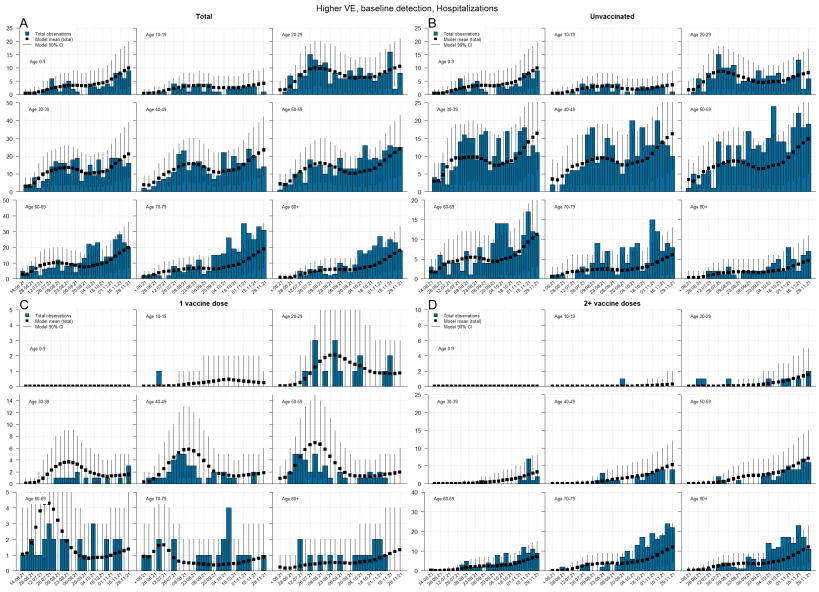

Figure S.22: Weekly hospitalizations in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *higher vaccine efficacy and baseline detection probability* scenario.

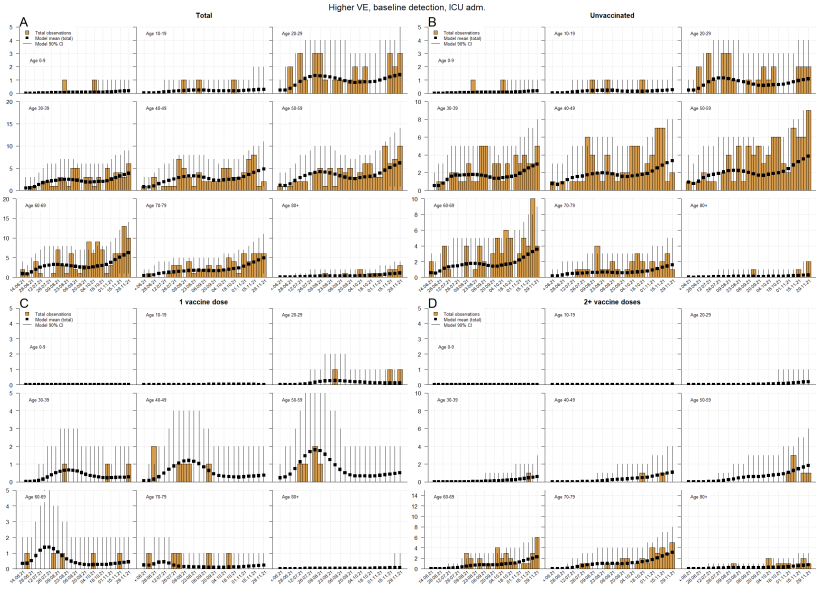

Figure S.23: Weekly ICU admissions in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *higher vaccine efficacy and baseline detection probability* scenario.

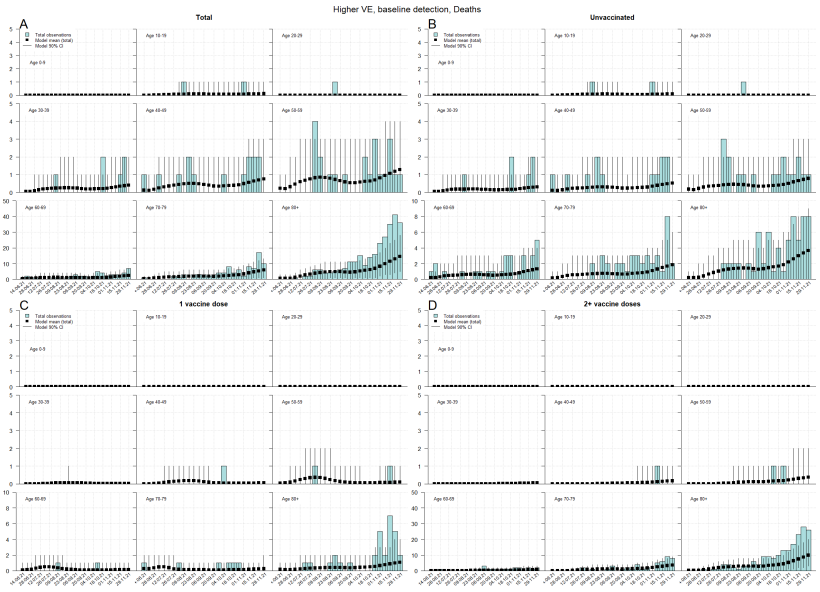

Figure S.24: Weekly deaths in Finland during the Delta variant era by age and vaccination status, A) Total, B) Unvaccinated, C) Vaccinated with one dose, D) Vaccinated with 2+ doses. Figures include the age- and vaccine status specific posterior prediction means and 90% credible intervals of the calibrated model in the *higher vaccine efficacy and baseline detection probability* scenario.