

**Supplementary 1 of comparative immunogenicity and reactogenicity of heterologous prime-boost immunization with COVID-19 vaccine: A systematic review and network meta-analysis**

**Supplementary Table 1: Searching strategy.**

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PubMed	<p>((coronavirus[Title/Abstract] OR "corona virus"[Title/Abstract] OR "corona pandemic"[Title/Abstract] OR coronavirinae[Title/Abstract] OR coronaviridae[Title/Abstract] OR betacoronavirus[Title/Abstract] OR covid19[Title/Abstract] OR covid[Title/Abstract] OR nCoV[Title/Abstract] OR "CoV 2"[Title/Abstract] OR CoV2[Title/Abstract] OR sarS2[Title/Abstract] OR sarsCoV2[Title/Abstract] OR 2019nCoV[Title/Abstract] OR "novel CoV"[Title/Abstract] OR "COVID-19"[Supplementary Concept]) AND ("severe acute respiratory"[Title/Abstract] OR pneumonia[Title/Abstract] OR "infection"[Title/Abstract] OR "respiratory infectious disease"[Title/Abstract]) AND (("vaccines"[Mesh] OR vaccin*[Title/Abstract])) Filters: Humans, from 2020 - 2021</p>
Scopus	<p>TITLE-ABS-KEY (coronavir* OR "corona virus" OR "corona pandemic" OR betacoronavir* OR covid19 OR covid OR nCoV OR "CoV 2" OR coV2 OR sarsCoV2 OR sarS2 OR 2019nCoV OR "novel CoV") OR TITLE-ABS-KEY(sars AND cov) AND (TITLE-ABS-KEY ("severe acute respiratory" OR pneumonia* OR infection OR "respiratory infectious disease")) AND (TITLE-ABS-KEY (vaccin*)) AND</p>

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(LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020)) AND (LIMIT-TO (DOCTYPE, "ar"))

Embase

(ncov OR (('coronavirus' OR 'coronavirus'/exp OR coronavirus) AND ('wuhan' OR 'wuhan'/exp OR wuhan)) OR 'novel coronavirus' OR 'covid' OR 2019ncov OR 'sars-cov'/exp OR 'sars-cov' OR 'covid'/exp OR covid OR (('coronavirus' OR 'coronavirus'/exp OR coronavirus) AND novel) OR 'corona virus':ti,ab OR 'coronavirus':ti,ab OR hcov OR 'sars virus'/exp OR 'sars virus' OR 'coronavirus disease 2019'/exp OR 'coronavirus disease 2019' OR 'novel coronavirus pneumonia' OR 'covid 19 virus' OR 'severe acute respiratory syndrome coronavirus 2'/exp OR 'severe acute respiratory syndrome coronavirus 2' OR 'coronavirinae'/exp OR 'coronavirinae' OR 'coronavirus infection'/exp OR 'coronavirus infection' OR 'covid19' OR 'covid19'/exp OR covid19 OR covid2019 OR 'corona pandemic' OR 'sarscov 2' OR 'sarscov-2' OR 'sars co v 2' OR coivd OR 'sars voc') AND ('severe acute respiratory':ab,ti OR pneumonia:ab,ti OR infection:ab,ti OR 'respiratory infectious disease':ab,ti) AND 'vaccine'/exp AND (2020:py OR 2021:py) AND 'human'/de

Web of Science

(TI = coronavirus OR TI = covid OR TI = Covid19 OR TI = ncov OR TI = (SARS NEAR/3 COV) OR TI = "novel coron\*virus" OR TI = 2019\*ncoV OR TI = 2019ncov OR TI = (CORON\*VIRUS NEAR/3 (OUTBREAK OR pandemic OR 2019 OR new OR novel)) OR TI = coronavirinae OR TI = coronaviridae OR TI = betacoronavirus OR TI = SarS2 OR TI = COV2 OR TI = "corona pandemic") AND (TI = "severe acute respiratory" OR TI =

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pneumonia OR TI = infection OR TI = "respiratory infectious disease") AND (TI = vaccin\*) Refined by: PUBLICATION YEARS: (2021 OR 2020) AND [excluding] Databases: (MEDLINE) Timespan: All years. Databases: WOS, BIOSIS, CSCD, DRCI, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO. Search language = Auto

Cochrane Library ((coronavirus or covid or covid19 or nCoV or coronavirinae or coronaviridae or betacoronavirus or SarS2 or COV2 or "novel coron\*virus" or 2019\*nCoV or 2019ncov):ti,ab,kw) AND (("severe acute respiratory" or pneumonia or infection or "respiratory infectious disease"):ti,ab,kw) AND ((vaccin\*):ti,ab,kw) Custom year range: 2020–2021

CNKI ((主题 = "2019 冠状病毒") OR (主题 = "新型冠状病毒") OR (主题 = "新冠肺炎") OR (主题 = 2019-nCoV) OR (主题 = SARS-CoV-2) OR (主题 = Novel coronavirus) OR (主题 = nCoV) OR (主题 = new coronavirus)) AND (主题 = "疫苗")

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**Supplementary Table 2: Risk of bias assessment of included studies.**

<b>Study ID</b>	<b>Randomization process</b>	<b>Deviations from intended interventions</b>	<b>Missing outcome data</b>	<b>Measurement of the outcome</b>	<b>Selection of the reported result</b>	<b>Overall bias</b>
Borobia 2021	Low	Some concerns	Some concerns	Low	Low	Some concerns
Li 2021	Low	Some concerns	Low	Low	Low	Some concerns
Liu 2021	Low	Some concerns	Some concerns	Some concerns	Low	Some concerns
Sablerolles 2021	Some concerns	Some concerns	Some concerns	Low	Low	Some concerns
Munro 2021	Low	Some concerns	Low	Low	Low	Some concerns
Stuart 2021	Low	Some concerns	Low	Low	Low	Some concerns
Mok 2022	Some concerns	Some concerns	Low	Low	Low	Some concerns
Clemens 2021	Low	Low	Low	Low	Low	Low
Intapiboon 2021	Some concerns	Some concerns	Low	Low	Low	Some concerns
Janssen 2021	Low	Some concerns	Low	Low	Low	Some concerns
Nanthapisal 2022	Low	Low	Low	Low	Low	Low

**Supplementary Table 3: GRADE assessment of CoronaVac priming regimens for neutralizing antibody against original strain.**

<b>Comparison</b>	<b>Number of studies</b>	<b>Within-study bias</b>	<b>Reporting bias</b>	<b>Indirectness</b>	<b>Imprecision</b>	<b>Heterogeneity</b>	<b>Incoherence</b>	<b>Confidence rating</b>	<b>Reason(s) for downgrading</b>
1 Coro + Coro 600 vs. 2 Coro + Coro 600	1	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number
2 Coro + Ad26 5 vs. 2 Coro + Coro 600	1	No concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Moderate	Insufficient research number
2 Coro + BNT 30 vs. 2 Coro + Coro 600	2	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Moderate	Within-study bias
2 Coro + ChAd 5 vs. 2 Coro + Coro 600	1	No concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Moderate	Insufficient research number
2 Coro + Convi 5 vs. 2 Coro + Coro 600	1	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number
1 Coro + Coro 600 vs. 1 Coro + Convi 5	1	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number
1 Coro + Convi 5 vs. 2 Coro + Ad26 5	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number
1 Coro + Coro 600 vs. 2 Coro + Ad26 5	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number
1 Coro + Convi 5 vs. 2 Coro + BNT 30	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number
1 Coro + Coro 600 vs. 2 Coro + BNT 30	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number

2 Coro + Ad26 5 vs. 2 Coro + BNT 30	0	Some concerns	No concerns	No concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number; imprecision outcome
1 Coro + Convi 5 vs. 2 Coro + ChAd 5	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number
1 Coro + Coro 600 vs. 2 Coro + ChAd 5	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; insufficient research number
1 Coro + Convi 5 vs. 2 Coro + Convi 5	1	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number
1 Coro + Coro 600 vs. 2 Coro + Convi 5	1	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number
2 Coro + BNT 30 vs. 2 Coro + Convi 5	0	Some concerns	No concerns	No concerns	No concerns	No concerns	No concerns	Low	Within-study bias; insufficient research number

GRADE: Grading of Recommendations Assessment, Development, and Evaluation.

**Supplementary Table 4: GRADE assessment of mRNA or non-replicate viral vector priming regimens for neutralizing antibody against original strain.**

<b>Comparison</b>	<b>Number of studies</b>	<b>Within-study bias</b>	<b>Reporting bias</b>	<b>Indirectness</b>	<b>Imprecision</b>	<b>Heterogeneity</b>	<b>Incoherence</b>	<b>Confidence rating</b>	<b>Reason(s) for downgrading</b>
1 BNT + BNT 30 vs. 1 BNT + mRNA-1273 100	2	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision
1 BNT + ChAd 5 vs. 1 BNT + mRNA-1273 100	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + mRNA-1273 100 vs. 1 BNT + NVX 5	1	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + BNT 30 vs. 1 ChAd + ChAd5	2	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Low	Within-study bias; indirectness
1 BNT + ChAd 5 vs. 1 ChAd + ChAd5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 BNT + mRNA-1273 100 vs. 1 ChAd + ChAd5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 BNT + NVX 5 vs. 1	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias;

ChAd + ChAd5		concerns	concern	concerns	concerns	concerns	concerns	low	indirectness; insufficient research number
1 ChAd + BNT 30 vs. 1 ChAd + ChAd5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 BNT + BNT 30 vs. 1 ChAd + mRNA-1273 100	1	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + ChAd 5 vs. 1 ChAd + mRNA-1273 100	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + NVX 5 vs. 1 ChAd + mRNA-1273 100	1	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + ChAd 5 vs. 1 ChAd + mRNA-1273 100	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 BNT + BNT 30 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + ChAd 5 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision;

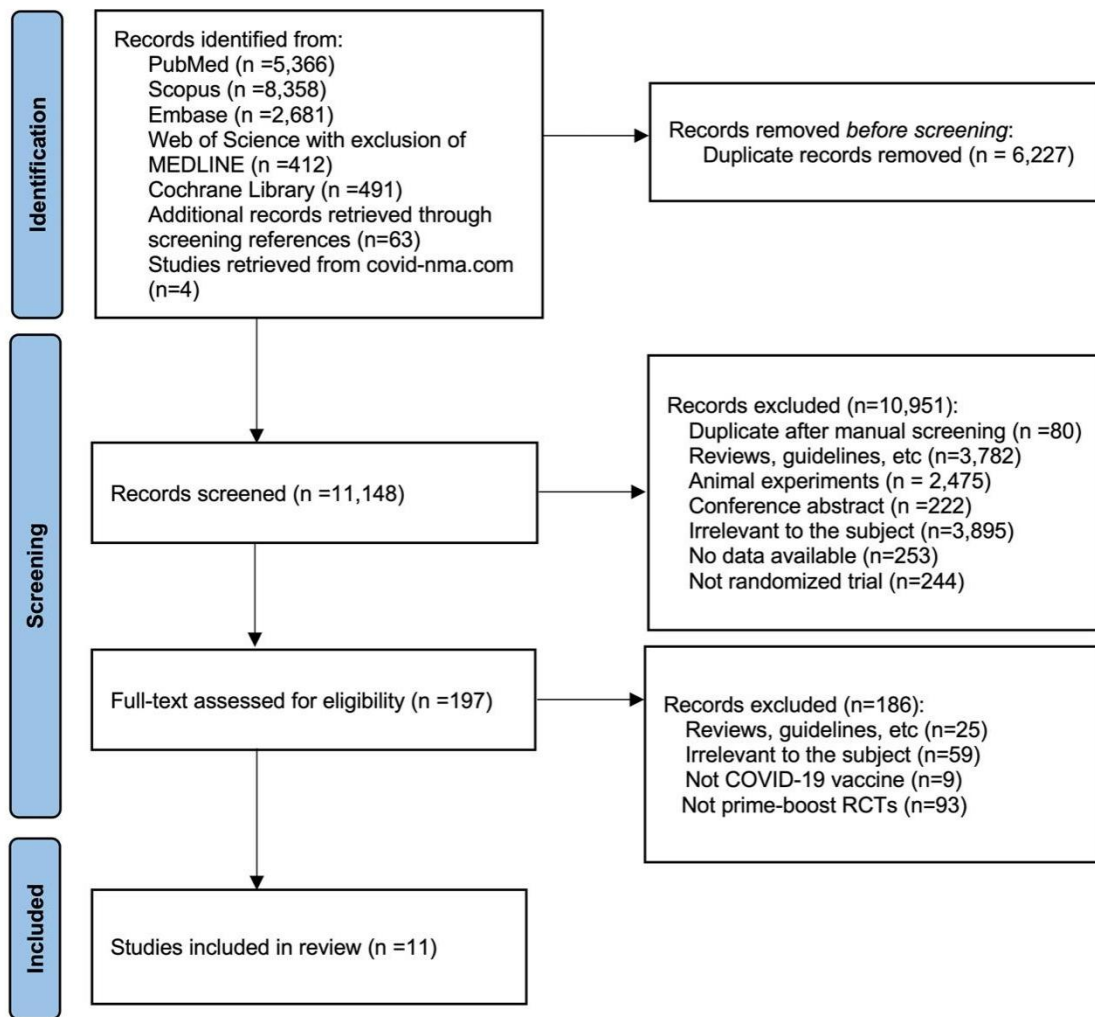


1 BNT + mRNA-1273 100 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	insufficient research number Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + NVX 5 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + BNT 30 vs. 1 ChAd + no	1	Some concerns	No concern	No concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + ChAd 5 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + mRNA-1273 100 vs. 1 ChAd + no	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + BNT 30 vs. 1 ChAd + NVX 5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 BNT + mRNA-1273 100	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias;

vs. 1 ChAd + NVX 5		concerns	concern	concerns	concerns	concerns	concerns	low	indirectness; insufficient research number
1 BNT + NVX 5 vs. 1 ChAd + NVX 5	1	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + BNT 30 vs. 1 ChAd + NVX 5	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + ChAd 5 vs. 1 ChAd + NVX 5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + mRNA-1273 100 vs. 1 ChAd + NVX 5	1	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + no vs. 1 ChAd + NVX 5	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + ChAd 5 vs. 1 mRNA-1273 + BNT 30	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + no vs. 1 mRNA-1273 + BNT 30	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + NVX5 5 vs. 1	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very	Within-study bias;

mRNA-1273 + BNT 30		concerns	concern	concerns	concerns	concerns	concerns	low	indirectness; insufficient research number
1 BNT + ChAd 5 vs. 1 mRNA-1273 + mRNA-1273 100	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 BNT + NVX 5 vs. 1 mRNA-1273 + mRNA-1273 100	0	Some concerns	No concern	Some concerns	Some concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; imprecision; insufficient research number
1 ChAd + ChAd 5 vs. 1 mRNA-1273 + mRNA-1273 100	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + no VS 1 mRNA-1273 + mRNA-1273 100	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number
1 ChAd + NVX 5 vs. 1 mRNA-1273 + mRNA-1273 100	0	Some concerns	No concern	Some concerns	No concerns	No concerns	No concerns	Very low	Within-study bias; indirectness; insufficient research number

GRADE: Grading of Recommendations Assessment, Development, and Evaluation.



**Supplementary Figure 1:** Flow diagram of study selection.

A

1 Coro+Convi 5	0.69 (0.55, 0.83)	.	.	.	.	.	.	-0.53 (-0.68, -0.39)	0.24 (0.10, 0.39)
0.69 (0.55, 0.83)	1 Coro+Coro 600	.	.	.	.	.	.	-1.22 (-1.36, -1.09)	-0.45 (-0.58, -0.32)
-0.62 (-0.78, -0.46)	-1.31 (-1.46, -1.16)	2 Coro+Ad26 5	.	-0.28 (-0.34, -0.23)	.	.	-0.02 (-0.09, 0.05)	.	0.86 (0.79, 0.93)
-0.70 (-0.86, -0.54)	-1.39 (-1.55, -1.24)	-0.09 (-0.15, -0.03)	2 Coro+BNT 15	-0.20 (-0.22, -0.18)	0.13 (0.11, 0.15)	.	.	.	.
-0.90 (-1.06, -0.74)	-1.59 (-1.74, -1.44)	-0.28 (-0.34, -0.23)	-0.20 (-0.22, -0.18)	2 Coro+BNT 30	0.32 (0.31, 0.34)	.	0.27 (0.20, 0.33)	.	1.14 (1.07, 1.22)
-0.58 (-0.74, -0.42)	-1.27 (-1.42, -1.12)	0.04 (-0.02, 0.10)	0.13 (0.11, 0.15)	0.32 (0.31, 0.34)	2 Coro+BNTintra 1/5	.	.	.	.
-0.56 (-0.73, -0.39)	-1.26 (-1.41, -1.09)	0.06 (-0.02, 0.14)	0.15 (0.06, 0.23)	0.34 (0.26, 0.42)	0.02 (-0.06, 0.10)	2 Coro+ChAd 2.5	-0.07 (-0.12, -0.03)	.	.
-0.63 (-0.80, -0.47)	-1.32 (-1.48, -1.17)	-0.02 (-0.09, 0.05)	0.07 (0.00, 0.14)	0.27 (0.20, 0.33)	-0.06 (-0.13, 0.01)	-0.07 (-0.12, -0.03)	2 Coro+ChAd 5	.	0.88 (0.80, 0.96)
-0.53 (-0.68, -0.39)	-1.22 (-1.36, -1.09)	0.08 (-0.07, 0.23)	0.17 (0.02, 0.32)	0.37 (0.22, 0.52)	0.04 (-0.11, 0.19)	0.02 (-0.14, 0.19)	0.10 (-0.06, 0.25)	2 Coro+Convi 5	0.78 (0.65, 0.91)
0.24 (0.10, 0.39)	-0.45 (-0.58, -0.32)	0.86 (0.79, 0.93)	0.95 (0.87, 1.02)	1.14 (1.07, 1.22)	0.82 (0.75, 0.89)	0.80 (0.71, 0.89)	0.88 (0.80, 0.96)	0.78 (0.65, 0.91)	2 Coro+Coro 600

B

1 Coro+Convi 5	0.60 (0.37, 0.83)	.	.	.	.	.	.	-0.62 (-0.87, -0.37)	0.20 (-0.06, 0.46)
0.60 (0.37, 0.83)	1 Coro+Coro 600	.	.	.	.	.	.	-1.21 (-1.39, -1.04)	-0.39 (-0.58, -0.21)
-0.84 (-1.30, -0.39)	-1.44 (-1.85, -1.03)	2 Coro+Ad26 5	.	-0.39 (-0.71, -0.07)	.	.	-0.02 (-0.35, 0.30)	.	1.05 (0.67, 1.42)
-0.93 (-1.60, -0.26)	-1.53 (-2.17, -0.88)	-0.09 (-0.71, 0.53)	2 Coro+BNT 15	-0.30 (-0.83, 0.24)	-0.09 (-0.63, 0.44)	.	.	.	.
-1.23 (-1.63, -0.83)	-1.83 (-2.18, -1.47)	-0.39 (-0.71, -0.07)	-0.30 (-0.83, 0.24)	2 Coro+BNT 30	0.21 (-0.32, 0.73)	0.37 (0.12, 0.62)	.	.	1.43 (1.13, 1.74)
-1.02 (-1.68, -0.36)	-1.62 (-2.25, -0.98)	-0.18 (-0.79, 0.43)	-0.09 (-0.63, 0.44)	0.21 (-0.32, 0.73)	2 Coro+BNTintra 1/5	.	.	.	.
-0.86 (-1.27, -0.46)	-1.46 (-1.82, -1.10)	-0.02 (-0.35, 0.30)	0.07 (-0.52, 0.66)	0.37 (0.12, 0.62)	0.16 (-0.42, 0.74)	2 Coro+ChAd 5	.	.	1.07 (0.75, 1.38)
-0.62 (-0.87, -0.37)	-1.21 (-1.39, -1.04)	0.22 (-0.20, 0.65)	0.31 (-0.34, 0.97)	0.61 (0.24, 0.99)	0.40 (-0.24, 1.05)	0.25 (-0.13, 0.62)	2 Coro+Convi 5	0.82 (0.61, 1.03)	.
0.20 (-0.06, 0.46)	-0.39 (-0.58, -0.21)	1.05 (0.67, 1.42)	1.13 (0.52, 1.75)	1.43 (1.13, 1.74)	1.23 (0.62, 1.83)	1.07 (0.75, 1.38)	0.82 (0.61, 1.03)	2 Coro+Coro 600	.

**Supplementary Figure 2: NMA results of CoronaVac primed regimens for immunogenicity outcomes. (A) RBD antibody. (B) Neutralizing antibody against Delta strain.  $\log_{10}$ GMRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 Coro + Convi 5: one dose of CoronaVac primer followed by Convidecia  $5 \times 10^{10}$  viral particles as booster; 1 Coro + Coro 600: one dose of CoronaVac primer followed by CoronaVac 600SU as booster; 2 Coro + Ad26 5: two doses of CoronaVac primer followed by Ad26.COV2.S  $5 \times 10^{10}$  viral particles as booster; 2 Coro + BNT 15: two doses of CoronaVax primer followed by BNT162b2 15  $\mu$ g as booster; 2 Coro + BNT 30: two doses of CoronaVac primer followed by BNT162b2 30  $\mu$ g as booster; 2 Coro + BNTintra 1/5: two doses of CoronaVac primer followed by BNT162b2 injected intradermally with 1/5 dose as booster; 2 Coro + ChAd 2.5: two doses of CoronaVac primer followed by ChAdOx1  $2.5 \times 10^{10}$  viral particles as booster; 2 Coro + ChAd 5: two doses of CoronaVac primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 2 Coro + Convi 5: two doses of CoronaVac primer followed by Convidecia 5  $\mu$ g as booster; 2 Coro + Coro 600: two doses of CoronaVac primer followed by**

CoronaVac 600SU as a booster. CIs: Confidence intervals; GMR: Geometric mean ratio; NMA: Network meta-analysis; RBD: Receptor-binding domain.

A

1 Coro+Convi 5	9.80 (1.25, 76.59)	.	.	.	.	.	.	0.75 (0.35, 1.61)	6.67 (1.81, 24.59)
9.80 (1.25, 76.59)	1 Coro+Coro 600	.	.	.	.	.	.	0.08 (0.01, 0.57)	0.68 (0.07, 6.59)
4.08 (1.04, 16.00)	0.42 (0.04, 4.18)	2 Coro+Ad26 5	.	0.79 (0.53, 1.19)	.	.	0.95 (0.63, 1.43)	.	1.53 (1.00, 2.34)
4.15 (0.97, 17.78)	0.42 (0.04, 4.49)	1.02 (0.52, 1.98)	2 Coro+BNT 15	0.74 (0.43, 1.27)	1.95 (0.93, 4.11)	.	.	.	.
3.07 (0.79, 11.86)	0.31 (0.03, 3.12)	0.75 (0.51, 1.11)	0.74 (0.43, 1.27)	2 Coro+BNT 30	2.64 (1.31, 5.33)	.	1.20 (0.80, 1.79)	.	2.17 (1.53, 3.08)
8.11 (1.77, 37.18)	0.83 (0.07, 9.14)	1.99 (0.89, 4.44)	1.95 (0.93, 4.11)	2.64 (1.31, 5.33)	2 Coro+BNTintra 1/5	.	.	.	.
4.22 (1.02, 17.55)	0.43 (0.04, 4.48)	1.04 (0.58, 1.84)	1.02 (0.47, 2.21)	1.38 (0.79, 2.41)	0.52 (0.21, 1.28)	2 Coro+ChAd 2.5	0.92 (0.61, 1.37)	.	.
3.87 (0.99, 15.19)	0.40 (0.04, 3.97)	0.95 (0.63, 1.43)	0.93 (0.48, 1.81)	1.26 (0.85, 1.86)	0.48 (0.21, 1.07)	0.92 (0.61, 1.37)	2 Coro+ChAd 5	.	1.61 (1.05, 2.46)
0.75 (0.35, 1.61)	0.08 (0.01, 0.57)	0.18 (0.05, 0.67)	0.18 (0.05, 0.72)	0.25 (0.07, 0.88)	0.09 (0.02, 0.40)	0.19 (0.05, 0.69)	0.19 (0.05, 0.71)	2 Coro+Convi 5	8.85 (2.99, 30.24)
6.67 (1.81, 24.59)	0.68 (0.07, 6.59)	1.63 (1.09, 2.45)	1.61 (0.85, 3.03)	2.17 (1.53, 3.08)	0.82 (0.38, 1.80)	1.58 (0.89, 2.79)	1.72 (1.15, 2.58)	8.85 (2.99, 30.24)	2 Coro+Coro 600

B

1 Coro+Convi 5	10.79 (0.61, 190.03)	.	.	.	.	.	.	0.82 (0.32, 2.12)	21.89 (1.23, 388.31)
10.79 (0.61, 190.03)	1 Coro+Coro 600	.	.	.	.	.	.	0.08 (0.00, 1.28)	2.03 (0.04, 100.82)
9.93 (0.52, 188.88)	0.92 (0.02, 48.16)	2 Coro+Ad26 5	.	0.67 (0.43, 1.03)	.	.	0.65 (0.42, 1.02)	.	2.18 (1.14, 4.15)
3.67 (0.14, 97.43)	0.34 (0.01, 22.94)	0.37 (0.06, 1.70)	2 Coro+BNT 15	1.89 (0.42, 7.77)	0.17 (0.07, 0.40)	.	.	.	.
6.60 (0.35, 124.32)	0.61 (0.01, 31.78)	0.66 (0.43, 1.03)	1.80 (0.42, 7.77)	2 Coro+BNT 30	0.09 (0.03, 0.31)	.	0.98 (0.67, 1.43)	.	3.32 (1.84, 5.99)
0.82 (0.03, 14.78)	0.06 (0.00, 3.56)	0.06 (0.02, 0.22)	0.17 (0.07, 0.40)	0.09 (0.03, 0.31)	2 Coro+BNTintra 1/5	.	.	.	.
11.93 (0.48, 294.50)	1.11 (0.02, 70.50)	1.20 (0.31, 4.88)	3.25 (0.45, 23.64)	1.81 (0.47, 6.90)	19.25 (3.20, 115.84)	2 Coro+ChAd 2.5	0.54 (0.15, 1.97)	.	.
6.48 (0.34, 122.37)	0.60 (0.01, 31.26)	0.65 (0.42, 1.02)	1.77 (0.38, 8.01)	0.98 (0.67, 1.44)	10.46 (2.98, 38.68)	0.54 (0.15, 1.97)	2 Coro+ChAd 5	.	3.33 (1.81, 6.12)
0.82 (0.32, 2.12)	0.08 (0.00, 1.25)	0.08 (0.00, 1.49)	0.22 (0.01, 5.66)	0.12 (0.01, 2.21)	1.33 (0.06, 29.32)	0.07 (0.00, 1.61)	0.13 (0.01, 2.26)	2 Coro+Convi 5	26.55 (1.59, 442.39)
21.89 (1.23, 388.31)	2.03 (0.04, 100.82)	2.20 (1.16, 4.17)	5.97 (1.23, 28.81)	3.32 (1.84, 5.99)	35.33 (9.31, 134.04)	1.84 (0.44, 7.58)	3.38 (1.85, 6.18)	26.55 (1.59, 442.39)	2 Coro+Coro 600

C

1 Coro+Convi 5	10.79 (0.61, 190.03)	.	.	.	.	.	.	1.08 (0.40, 2.93)	21.89 (1.23, 388.31)
10.79 (0.61, 190.03)	1 Coro+Coro 600	.	.	.	.	.	.	0.10 (0.01, 1.69)	2.03 (0.04, 100.82)
9.02 (0.47, 171.82)	0.84 (0.02, 43.79)	2 Coro+Ad26 5	.	0.59 (0.38, 0.93)	.	.	0.61 (0.50, 1.32)	.	2.66 (1.29, 5.49)
16.36 (0.65, 409.73)	1.82 (0.02, 97.76)	1.81 (0.44, 7.44)	2 Coro+BNT 15	0.33 (0.09, 1.27)	0.16 (0.05, 0.54)	.	.	.	.
5.45 (0.29, 101.97)	0.51 (0.01, 26.11)	0.60 (0.38, 0.94)	0.33 (0.09, 1.27)	2 Coro+BNT 30	0.47 (0.23, 0.96)	.	1.37 (0.90, 2.07)	.	4.01 (2.31, 6.96)
2.56 (0.13, 52.05)	0.24 (0.00, 13.05)	0.28 (0.12, 0.65)	0.16 (0.05, 0.54)	0.47 (0.23, 0.95)	2 Coro+BNTintra 1/5	.	.	.	.
10.49 (0.44, 250.34)	0.97 (0.02, 90.40)	1.16 (0.32, 4.19)	0.84 (0.10, 4.02)	1.92 (0.55, 6.78)	4.10 (0.97, 17.30)	2 Coro+ChAd 2.5	0.70 (0.21, 2.29)	.	.
7.33 (0.39, 139.01)	0.68 (0.01, 35.47)	0.61 (0.50, 1.32)	0.45 (0.11, 1.82)	1.34 (0.89, 2.09)	2.86 (1.27, 6.48)	0.70 (0.21, 2.29)	2 Coro+ChAd 5	.	3.27 (1.62, 6.63)
1.08 (0.40, 2.93)	0.10 (0.01, 1.69)	0.12 (0.01, 2.19)	0.07 (0.00, 1.59)	0.20 (0.01, 3.56)	0.42 (0.02, 8.29)	0.10 (0.00, 2.37)	0.15 (0.01, 2.68)	2 Coro+Convi 5	20.18 (1.19, 342.05)
21.89 (1.23, 388.31)	2.03 (0.04, 100.82)	2.43 (1.28, 4.61)	1.34 (0.31, 5.71)	4.01 (2.31, 6.98)	6.55 (3.48, 20.96)	2.09 (0.55, 7.96)	2.99 (1.60, 5.59)	20.18 (1.19, 342.05)	2 Coro+Coro 600

**Supplementary Figure 3: NMA results of CoronaVac primed regimens for safety outcomes (local AEs). (A) Pain at the injection site, (B) erythema, and (C) swelling.** RRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 Coro + Convi 5: one dose of CoronaVac primer followed by Convidecia  $5 \times 10^{10}$  viral particles as booster; 1 Coro + Coro 600: one dose of CoronaVac primer followed by CoronaVac 600SU as booster; 2 Coro + Ad26 5: two doses of CoronaVac primer followed by Ad26.COV2.S  $5 \times 10^{10}$  viral particles as booster; 2 Coro + BNT 15: two doses of CoronaVax primer followed by BNT162b2 15  $\mu\text{g}$  as booster; 2 Coro + BNT 30: two doses of CoronaVac primer followed by BNT162b2 30  $\mu\text{g}$  as booster; 2 Coro + BNTintra 1/5: two doses of CoronaVac primer followed by BNT162b2 injected intradermally with 1/5 dose as booster; 2 Coro + ChAd 2.5: two doses of CoronaVac primer followed by ChAdOx1  $2.5 \times 10^{10}$  viral particles as booster; 2 Coro + ChAd 5: two doses of CoronaVac primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 2 Coro + Convi 5:

two doses of CoronaVac primer followed by Convidecia 5 µg as booster; 2 Coro +  
Coro 600: two doses of CoronaVac primer followed by CoronaVac 600SU as a  
booster. AEs: Adverse events; CIs: Confidence intervals; NMA: Network  
meta-analysis; RRs: Relative risks.

A

1 Coro+Convi 5	2.94 (0.12, 70.53)	.	.	.	.	.	.	.	1.12 (0.15, 8.27)	5.97 (0.25,144.02)
2.94 (0.12, 70.53)	1 Coro+Coro 600	.	.	.	.	.	.	.	0.38 (0.02, 7.81)	2.03 (0.04,100.82)
2.63 (0.11, 64.08)	0.89 (0.02, 44.77)	2 Coro+Ad26 5	.	1.03 (0.87, 1.22)	.	.	.	1.34 (1.09, 1.63)	.	2.24 (1.73, 2.91)
5.15 (0.19,142.06)	1.75 (0.03, 97.07)	1.96 (0.78, 4.90)	2 Coro+BNT 15	0.52 (0.21, 1.29)	2.27 (0.55, 9.30)	.	.	.	.	.
2.70 (0.11, 65.68)	0.92 (0.02, 45.89)	1.03 (0.86, 1.22)	0.52 (0.21, 1.29)	2 Coro+BNT 30	4.34 (1.20, 15.70)	.	.	1.30 (1.07, 1.58)	.	2.21 (1.72, 2.85)
11.69 (0.37,365.60)	3.98 (0.06,244.61)	4.45 (1.21, 16.29)	2.27 (0.55, 9.30)	4.34 (1.20, 15.70)	2 Coro+BNTintra 1/5	.	.	.	.	.
4.34 (0.18,106.34)	1.48 (0.03, 74.23)	1.65 (1.28, 2.13)	0.84 (0.33, 2.15)	1.61 (1.25, 2.07)	0.37 (0.10, 1.38)	2 Coro+ChAd 2.5	0.81 (0.69, 0.95)	.	.	.
3.52 (0.14, 85.60)	1.20 (0.02, 59.93)	1.34 (1.09, 1.63)	0.68 (0.27, 1.72)	1.30 (1.07, 1.59)	0.30 (0.08, 1.10)	0.81 (0.69, 0.95)	2 Coro+ChAd 5	.	.	1.68 (1.27, 2.22)
1.12 (0.15, 8.27)	0.38 (0.02, 7.81)	0.43 (0.02, 8.89)	0.22 (0.01, 5.18)	0.42 (0.02, 8.67)	0.10 (0.00, 2.59)	0.26 (0.01, 5.41)	0.32 (0.02, 6.66)	2 Coro+Convi 5	.	5.31 (0.26,109.22)
5.97 (0.25,144.02)	2.03 (0.04,100.82)	2.27 (1.76, 2.93)	1.16 (0.45, 2.96)	2.21 (1.72, 2.85)	0.51 (0.14, 1.89)	1.38 (1.00, 1.88)	1.70 (1.29, 2.23)	5.31 (0.26,109.22)	.	2 Coro+Coro 600

B

1 Coro+Convi 5	2.29 (0.34, 15.52)	.	.	.	.	.	.	.	1.46 (0.36, 5.98)	13.93 (0.71,271.77)
2.29 (0.34, 15.52)	1 Coro+Coro 600	.	.	.	.	.	.	.	0.64 (0.10, 4.09)	6.09 (0.25,150.49)
1.49 (0.06, 35.65)	0.65 (0.02, 19.47)	2 Coro+Ad26 5	.	0.89 (0.50, 1.57)	.	.	.	4.72 (1.98, 11.23)	.	13.55 (3.57, 51.37)
15.09 (0.21,1078.49)	6.60 (0.08, 557.55)	10.11 (0.54, 190.06)	2 Coro+BNT 15	0.09 (0.01, 1.62)	0.34 (0.01, 8.33)	.	.	.	.	.
1.37 (0.06, 32.10)	0.60 (0.02, 17.55)	0.92 (0.52, 1.62)	0.09 (0.01, 1.62)	2 Coro+BNT 30	3.79 (0.64, 22.46)	.	.	5.32 (2.26, 12.52)	.	10.15 (3.54, 29.16)
5.20 (0.14, 194.08)	2.27 (0.05, 103.25)	3.48 (0.54, 22.54)	0.34 (0.01, 8.33)	3.79 (0.64, 22.46)	2 Coro+BNTintra 1/5	.	.	.	.	.
25.27 (0.93, 888.99)	11.04 (0.33, 373.05)	16.92 (5.63, 50.83)	1.67 (0.08, 36.33)	18.41 (6.20, 54.68)	4.86 (0.60, 39.17)	2 Coro+ChAd 2.5	0.28 (0.14, 0.55)	.	.	.
7.05 (0.28, 179.14)	3.08 (0.10, 97.42)	4.72 (1.98, 11.23)	0.47 (0.02, 9.40)	5.13 (2.19, 12.04)	1.36 (0.19, 9.76)	0.28 (0.14, 0.55)	2 Coro+ChAd 5	.	.	2.87 (0.66, 12.57)
1.46 (0.36, 5.98)	0.64 (0.10, 4.09)	0.98 (0.04, 22.54)	0.10 (0.00, 6.73)	1.06 (0.05, 24.03)	0.28 (0.01, 10.18)	0.06 (0.00, 1.52)	0.21 (0.01, 5.09)	2 Coro+Convi 5	.	9.56 (0.51,179.99)
13.93 (0.71, 271.77)	6.09 (0.25, 150.49)	9.33 (3.06, 28.42)	0.92 (0.04, 19.80)	10.15 (3.54, 29.16)	2.68 (0.34, 21.23)	0.55 (0.13, 2.35)	1.98 (0.55, 7.13)	9.56 (0.51, 179.99)	.	2 Coro+Coro 600

C

1 Coro+Convi 5	1.96 (0.38,10.23)	.	.	.	.	.	.	.	0.68 (0.23, 2.04)	2.67 (0.62,11.47)
1.96 (0.38,10.23)	1 Coro+Coro 600	.	.	.	.	.	.	.	0.35 (0.08, 1.51)	1.36 (0.23, 7.88)
0.58 (0.12, 2.79)	0.30 (0.05, 1.88)	2 Coro+Ad26 5	.	1.54 (1.00, 2.38)	.	.	.	0.78 (0.54, 1.12)	.	5.86 (2.68,12.82)
0.71 (0.09, 5.69)	0.36 (0.04, 3.61)	1.22 (0.28, 5.30)	2 Coro+BNT 15	1.33 (0.33, 5.45)	0.83 (0.25, 2.79)	.	.	.	.	.
0.95 (0.20, 4.39)	0.48 (0.08, 2.98)	1.62 (1.07, 2.47)	1.33 (0.33, 5.45)	2 Coro+BNT 30	0.62 (0.16, 2.37)	.	.	0.51 (0.33, 0.76)	.	2.82 (1.75, 4.55)
0.59 (0.08, 4.50)	0.30 (0.03, 2.87)	1.01 (0.25, 4.10)	0.83 (0.25, 2.79)	0.62 (0.16, 2.37)	2 Coro+BNTintra 1/5	.	.	.	.	.
0.54 (0.11, 2.56)	0.27 (0.04, 1.73)	0.92 (0.62, 1.36)	0.76 (0.17, 3.28)	0.57 (0.37, 0.86)	0.91 (0.22, 3.72)	2 Coro+ChAd 2.5	0.85 (0.74, 0.97)	.	.	.
0.45 (0.10, 2.16)	0.23 (0.04, 1.46)	0.78 (0.54, 1.12)	0.64 (0.15, 2.77)	0.48 (0.32, 0.71)	0.77 (0.19, 3.13)	0.85 (0.74, 0.97)	2 Coro+ChAd 5	.	.	7.52 (3.48,16.24)
0.68 (0.23, 2.04)	0.35 (0.08, 1.51)	1.18 (0.30, 4.63)	0.97 (0.14, 6.72)	0.72 (0.19, 2.75)	1.17 (0.18, 7.74)	1.28 (0.32, 5.03)	1.51 (0.39, 5.90)	2 Coro+Convi 5	.	3.90 (1.12,13.54)
2.67 (0.62,11.47)	1.36 (0.23, 7.88)	4.58 (2.59, 8.11)	3.76 (0.85,16.65)	2.82 (1.75, 4.55)	4.55 (1.10,18.89)	4.98 (2.82, 8.79)	5.88 (3.38,10.22)	3.90 (1.12,13.54)	.	2 Coro+Coro 600

D

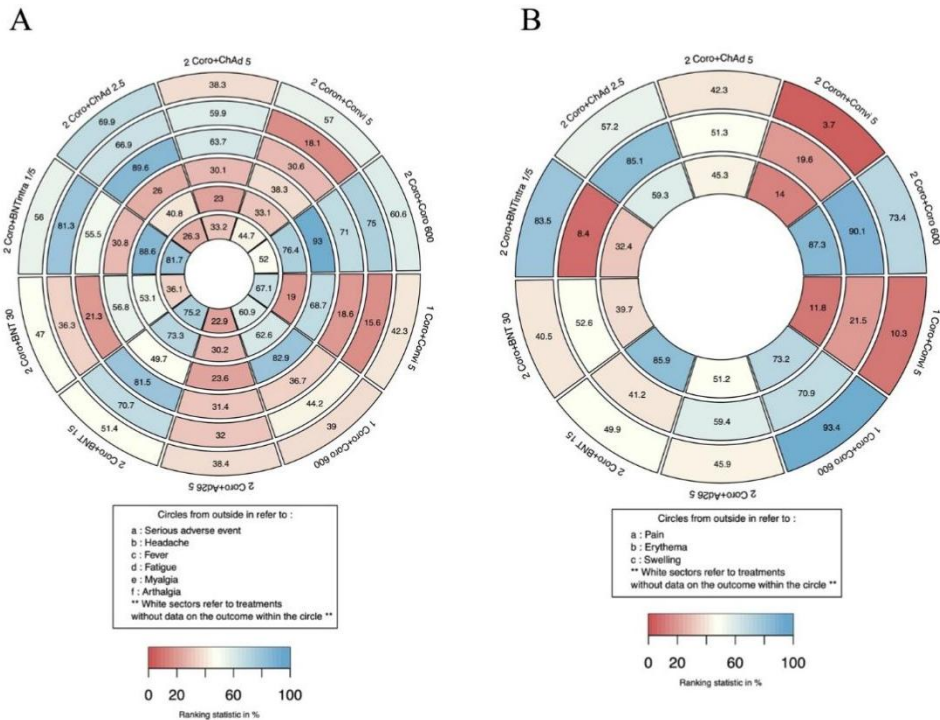
1 Coro+Convi 5	2.94 (0.12, 70.53)	.	.	.	.	.	.	.	1.87 (0.20, 17.56)	5.97 (0.25,144.02)
2.94 (0.12, 70.53)	1 Coro+Coro 600	.	.	.	.	.	.	.	0.64 (0.03, 15.35)	2.03 (0.04,100.82)
1.52 (0.06, 37.37)	0.52 (0.01, 26.07)	2 Coro+Ad26 5	.	1.74 (1.37, 2.21)	.	.	.	0.93 (0.77, 1.12)	.	3.80 (2.64, 5.46)
5.41 (0.20,144.14)	1.84 (0.03, 99.11)	3.56 (1.88, 7.55)	2 Coro+BNT 15	0.48 (0.24, 0.99)	3.10 (0.81, 11.86)	.	.	.	.	.
2.62 (0.11, 64.49)	0.89 (0.02, 44.97)	1.72 (1.36, 2.18)	0.48 (0.24, 0.99)	2 Coro+BNT 30	6.40 (1.85, 22.12)	.	.	0.53 (0.42, 0.67)	.	2.28 (1.59, 3.27)
16.77 (0.54,520.48)	5.70 (0.09,348.67)	11.03 (3.12, 38.97)	3.10 (0.81, 11.86)	6.40 (1.85, 22.12)	2 Coro+BNTintra 1/5	.	.	.	.	.
1.92 (0.08, 47.29)	0.65 (0.01, 32.97)	1.26 (0.99, 1.61)	0.35 (0.16, 0.76)	0.73 (0.55, 0.97)	0.11 (0.03, 0.41)	2 Coro+ChAd 2.5	0.74 (0.63, 0.86)	.	.	.
1.41 (0.06, 34.67)	0.48 (0.01, 24.18)	0.93 (0.77, 1.12)	0.26 (0.12, 0.55)	0.54 (0.43, 0.68)	0.08 (0.02, 0.30)	0.74 (0.63, 0.86)	2 Coro+ChAd 5	.	.	4.10 (2.86, 5.87)
1.87 (0.20, 17.56)	0.64 (0.03, 15.35)	1.23 (0.05, 30.46)	0.35 (0.01, 9.26)	0.72 (0.03, 17.70)	0.11 (0.00, 3.48)	0.98 (0.04, 24.24)	1.33 (0.05, 32.81)	2 Coro+Convi 5	.	3.19 (0.13, 77.28)
5.97 (0.25,144.02)	2.03 (0.04,100.82)	3.93 (2.78, 5.56)	1.10 (0.50, 2.45)	2.28 (1.59, 3.27)	0.36 (0.10, 1.29)	3.11 (2.13, 4.54)	4.23 (3.00, 5.97)	3.19 (0.13, 77.28)	.	2 Coro+Coro 600

E

1 Coro+Convi 5	0.98 (0.02,48.48)	.	.	.	.	.	.	.	0.62 (0.03,15.06)	0.66 (0.03,16.00)
0.98 (0.02, 48.48)	1 Coro+Coro 600	.	.	.	.	.	.	.	0.64 (0.03,15.35)	0.68 (0.03,16.32)
0.21 (0.01, 5.38)	0.22 (0.01, 5.49)	2 Coro+Ad26 5	.	2.15 (1.34, 3.45)	.	.	.	0.78 (0.54, 1.10)	.	2.99 (1.70, 5.29)
1.35 (0.01,123.70)	1.37 (0.01,126.13)	6.31 (0.26,153.87)	2 Coro+BNT 15	0.33 (0.01, 7.86)	1.03 (0.02,50.42)	.	.	.	.	.
0.45 (0.02, 11.37)	0.46 (0.02, 11.59)	2.10 (1.33, 3.33)	0.33 (0.01, 7.86)	2 Coro+BNT 30	3.10 (0.13,73.15)	.	.	0.36 (0.23, 0.57)	.	1.48 (0.84, 2.60)
1.39 (0.02,127.81)	1.42 (0.02,130.32)	6.51 (0.27,159.02)	1.03 (0.02, 50.42)	3.10 (0.13, 73.15)	2 Coro+BNTintra 1/5	.	.	.	.	.
0.28 (0.01, 7.59)	0.29 (0.01, 7.74)	1.32 (0.62, 2.82)	0.21 (0.01, 5.46)	0.63 (0.28, 1.40)	0.20 (0.01, 5.29)	2 Coro+ChAd 2.5	0.59 (0.30, 1.15)	.	.	.
0.17 (0.01, 4.16)	0.17 (0.01, 4.24)	0.78 (0.54, 1.10)	0.12 (0.01, 2.99)	0.37 (0.24, 0.57)	0.12 (0.00, 2.90)	0.59 (0.30, 1.15)	2 Coro+ChAd 5	.	.	3.86 (2.22, 6.71)
0.62 (0.03, 15.06)	0.64 (0.03, 15.35)	2.93 (0.29, 29.50)	0.46 (0.01, 23.37)	1.39 (0.14, 14.11)	0.45 (0.01, 22.64)	2.22 (0.20, 24.47)	3.78 (0.38, 37.89)	2 Coro+Convi 5	.	1.06 (0.11,10.04)
0.66 (0.03, 16.00)	0.68 (0.03, 16.32)	3.11 (1.81, 5.33)	0.49 (0.02, 12.23)	1.48 (0.84, 2.60)	0.48 (0.02, 11.85)	2.36 (1.01, 5.50)	4.01 (2.38, 6.76)	1.06 (0.11, 10.04)	.	2 Coro+Coro 600



**Supplementary Figure 4:** NMA results of CoronaVac primed regimens for safety outcomes (systemic adverse events). (A) Headache, (B) fever, (C) fatigue, (D) myalgia, and (E) arthralgia. RRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 Coro + Convi 5: one dose of CoronaVac primer followed by Convidecia  $5 \times 10^{10}$  viral particles as booster; 1 Coro + Coro 600: one dose of CoronaVac primer followed by CoronaVac 600SU as booster; 2 Coro + Ad26 5: two doses of CoronaVac primer followed by Ad26.COVS  $5 \times 10^{10}$  viral particles as booster; 2 Coro + BNT 15: two doses of CoronaVac primer followed by BNT162b2 15  $\mu\text{g}$  as booster; 2 Coro + BNT 30: two doses of CoronaVac primer followed by BNT162b2 30  $\mu\text{g}$  as booster; 2 Coro + BNTintra 1/5: two doses of CoronaVac primer followed by BNT162b2 injected intradermally with 1/5 dose as booster; 2 Coro + ChAd 2.5: two doses of CoronaVac primer followed by ChAdOx1  $2.5 \times 10^{10}$  viral particles as booster; 2 Coro + ChAd 5: two doses of CoronaVac primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 2 Coro + Convi 5: two doses of CoronaVac primer followed by Convidecia 5  $\mu\text{g}$  as booster; 2 Coro + Coro 600: two doses of CoronaVac primer followed by CoronaVac 600SU as a booster. CIs: Confidence intervals; NMA: Network meta-analysis; RRs: Relative risks.



**Supplementary Figure 5:** Ranking heat plot of schedules initiated with CoronaVac for safety outcomes: a larger figure in a given sector means a higher probability of lower risk for AEs in that sector. (A) Systemic adverse events. (B) Local AEs. Each sector is colored according to the SUCRA value of the corresponding treatment from red (0%) to blue (100%). 1 Coro + Convi 5: one dose of CoronaVac followed by Convidecia  $5 \times 10^{10}$  viral particles; 1 Coro + Coro 600: one dose of CoronaVac followed by CoronaVac 600SU; 2 Coro + Ad26 5: two doses of CoronaVac followed by Ad26.COV2.S  $5 \times 10^{10}$  viral particles; 2 Coro + BNT 15: two doses of CoronaVac followed by BNT162b2 15  $\mu\text{g}$ ; 2 Coro + BNT 30: two doses of CoronaVac followed by BNT162b2 30  $\mu\text{g}$ ; 2 Coro + BNTintra 1/5: two doses of CoronaVac followed by BNT162b2 injected intradermally with 1/5 dose (6  $\mu\text{g}$ ); 2 Coro + ChAd 2.5: two doses of CoronaVac followed by ChAdOx1  $2.5 \times 10^{10}$  viral particles; 2 Coro + ChAd 5: two doses of CoronaVac followed by ChAdOx1  $5 \times 10^{10}$  viral particles; 2 Coro + Convi 5: two doses of CoronaVac followed by Convidecia 5  $\mu\text{g}$ ; 2 Coro + Coro 600: two doses of CoronaVac followed by CoronaVac 600SU. AEs: Adverse events; SUCRA: Surface under the cumulative ranking curve.

A

1 BNT+BNT 30	0.29 (0.22, 0.36)	-0.14 (-0.19, -0.08)	0.28 (0.18, 0.37)	0.03 (-0.04, 0.10)	0.97 (0.91, 1.02)	-0.08 (-0.15, -0.02)	.	0.49 (0.40, 0.58)	0.00 (-0.10, 0.10)	-0.17 (-0.26, -0.08)
0.28 (0.21, 0.34)	1 BNT+ChAd 5	.	.	-0.26 (-0.33, -0.19)	0.71 (0.63, 0.78)	.	.	.	.	.
-0.13 (-0.18, -0.08)	-0.41 (-0.49, -0.33)	1 BNT+mRNA-1273 100	0.42 (0.33, 0.50)	.	1.07 (1.00, 1.15)	0.06 (-0.01, 0.12)	.	0.63 (0.55, 0.71)	0.14 (0.05, 0.23)	-0.03 (-0.12, 0.05)
0.29 (0.20, 0.37)	0.01 (-0.10, 0.12)	0.42 (0.33, 0.50)	1 BNT+NVX 5	.	0.66 (0.56, 0.76)	-0.36 (-0.45, -0.27)	.	0.21 (0.11, 0.32)	.	.
0.02 (-0.05, 0.09)	-0.26 (-0.33, -0.19)	0.15 (0.06, 0.23)	-0.27 (-0.38, -0.16)	1 ChAd+BNT 30	0.97 (0.89, 1.06)	.	1.56 (1.47, 1.66)	.	.	.
0.96 (0.91, 1.02)	0.69 (0.62, 0.76)	1.09 (1.03, 1.16)	0.68 (0.58, 0.77)	0.95 (0.87, 1.02)	1 ChAd+ChAd 5	-1.02 (-1.09, -0.94)	.	-0.44 (-0.54, -0.35)	.	.
-0.07 (-0.13, -0.01)	-0.35 (-0.43, -0.26)	0.06 (0.00, 0.12)	-0.36 (-0.45, -0.27)	-0.09 (-0.18, 0.00)	-1.04 (-1.10, -0.97)	1 ChAd+mRNA-1273 100	.	0.57 (0.49, 0.66)	.	.
1.58 (1.46, 1.70)	1.30 (1.18, 1.42)	1.71 (1.58, 1.83)	1.29 (1.15, 1.43)	1.56 (1.47, 1.66)	0.61 (0.49, 0.73)	1.66 (1.52, 1.78)	1 ChAd+no	.	.	.
0.50 (0.42, 0.58)	0.22 (0.12, 0.33)	0.63 (0.55, 0.71)	0.21 (0.11, 0.32)	0.49 (0.38, 0.59)	-0.46 (-0.55, -0.38)	0.57 (0.49, 0.66)	-1.08 (-1.22, -0.94)	1 ChAd+NVX 5	.	.
0.01 (-0.08, 0.10)	-0.27 (-0.38, -0.16)	0.14 (0.05, 0.22)	-0.28 (-0.40, -0.16)	-0.01 (-0.12, 0.10)	-0.96 (-1.06, -0.86)	0.08 (-0.02, 0.18)	-1.57 (-1.72, -1.43)	-0.50 (-0.61, -0.38)	1 mRNA-1273+BNT 30	-0.17 (-0.26, -0.08)
-0.17 (-0.25, -0.09)	-0.44 (-0.54, -0.34)	-0.04 (-0.11, 0.04)	-0.45 (-0.56, -0.34)	-0.18 (-0.29, -0.08)	-1.13 (-1.22, -1.04)	-0.09 (-0.19, 0.00)	-1.74 (-1.88, -1.60)	-0.67 (-0.77, -0.56)	-0.17 (-0.26, -0.08)	1 mRNA-1273+mRNA-1273 100

B

1 BNT+BNT 30	-0.08 (-0.34, 0.17)	-0.19 (-0.45, 0.07)	0.23 (-0.03, 0.48)	-0.36 (-0.60, -0.12)	0.13 (-0.05, 0.31)	-0.48 (-0.73, -0.23)	.	-0.59 (-0.83, -0.35)
-0.13 (-0.36, 0.11)	1 BNT+ChAd 5	.	.	-0.28 (-0.52, -0.03)	0.31 (0.05, 0.56)	.	.	.
-0.15 (-0.39, 0.09)	-0.02 (-0.33, 0.30)	1 BNT+mRNA-1273 100	0.42 (0.16, 0.68)	.	0.23 (-0.04, 0.49)	-0.29 (-0.54, -0.04)	.	-0.40 (-0.64, -0.15)
0.27 (0.03, 0.51)	0.40 (0.08, 0.71)	0.42 (0.16, 0.68)	1 BNT+NVX 5	.	-0.19 (-0.46, 0.08)	-0.71 (-0.96, -0.45)	.	-0.82 (-1.06, -0.57)
-0.41 (-0.63, -0.18)	-0.28 (-0.52, -0.03)	-0.26 (-0.57, 0.05)	-0.68 (-0.99, -0.37)	1 ChAd+BNT 30	0.58 (0.34, 0.83)	.	0.63 (0.36, 0.89)	.
0.13 (-0.05, 0.31)	0.26 (0.02, 0.50)	0.28 (0.03, 0.52)	-0.14 (-0.39, 0.11)	0.54 (0.31, 0.77)	1 ChAd+ChAd 5	-0.52 (-0.78, -0.26)	.	-0.63 (-0.88, -0.37)
-0.44 (-0.67, -0.20)	-0.31 (-0.62, 0.00)	-0.29 (-0.54, -0.04)	-0.71 (-0.96, -0.45)	-0.03 (-0.33, 0.27)	-0.57 (-0.81, -0.33)	1 ChAd+mRNA-1273 100	.	-0.11 (-0.35, 0.13)
0.22 (-0.12, 0.57)	0.35 (-0.01, 0.71)	0.37 (-0.04, 0.77)	-0.05 (-0.45, 0.36)	0.63 (0.36, 0.89)	0.09 (-0.26, 0.44)	0.66 (0.26, 1.06)	1 ChAd+no	.
-0.54 (-0.77, -0.32)	-0.42 (-0.72, -0.11)	-0.40 (-0.64, -0.15)	-0.82 (-1.06, -0.57)	-0.14 (-0.43, 0.16)	-0.68 (-0.91, -0.45)	-0.11 (-0.35, 0.13)	-0.77 (-1.16, -0.37)	1 ChAd+NVX 5

**Supplementary Figure 6:** NMA results of mRNA or non-replicating viral vector vaccines primed regimens for immunogenicity outcomes. (A) S-protein antibody. (B) T cell response.  $\log_{10}$ GMRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 ChAd + NVX 5: one dose of ChAdOx1 primer followed by NVX-2373 5  $\mu$ g as booster; 1 mRNA-1273 + BNT 30: one dose of mRNA-1273 primer followed by BNT162b2 30  $\mu$ g as booster; 1 mRNA-1273 + mRNA-1273 100: one dose of mRNA-1273 primer followed by mRNA-1273 100  $\mu$ g as booster; 1 BNT + BNT 30: one dose of BNT162b2 primer followed by BNT162b1 30  $\mu$ g as booster; 1 BNT + ChAd 5: one dose of BNT162b2 primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 1 BNT + mRNA-1273 100: one dose of BNT162b2 primer followed by mRNA-1273 100  $\mu$ g as booster; 1 BNT + NVX 5: one dose of BNT162b2 primer followed by NVX-2373 5  $\mu$ g as booster; 1 ChAd + BNT 30: one dose of ChAdOx1 primer followed by BNT162b2 30  $\mu$ g as booster; 1 ChAd + ChAd 5: one dose of ChAdOx1 primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 1 ChAd + mRNA-1273 100: one dose of ChAdOx1 primer followed by mRNA-1273 100  $\mu$ g as

booster; 1 ChAd + no: one dose of ChAdOx1 primer with no booster. CIs: Confidence intervals; GMR: Geometric mean ratio; NMA: Network meta-analysis; S-protein: Spike protein.

A

1BNT-BNT 30	1.24 (1.08, 1.54)	0.83 (0.72, 0.93)	2.08 (1.63, 2.67)	1.86 (0.87, 1.28)	1.61 (1.36, 1.88)	0.84 (0.72, 0.98)	-	1.79 (1.42, 2.29)	1.95 (0.88, 1.37)	0.81 (0.64, 1.02)
1.21 (0.93, 1.49)	1BNT-ChAd 5	-	-	0.85 (0.88, 1.00)	1.57 (1.04, 1.87)	-	-	-	-	-
0.85 (0.74, 0.98)	0.70 (0.55, 0.90)	1BNT+mRNA-1273 100	2.26 (1.96, 3.00)	-	1.71 (1.41, 2.10)	0.85 (0.82, 1.11)	-	2.85 (1.62, 2.53)	1.45 (1.11, 1.77)	1.08 (0.88, 1.32)
2.26 (1.42, 2.29)	1.69 (1.24, 2.30)	2.43 (1.92, 3.07)	1BNT-NVX 5	-	0.71 (0.56, 0.99)	0.40 (0.32, 0.51)	-	0.85 (0.64, 1.14)	-	-
1.83 (0.98, 1.29)	0.85 (0.68, 1.19)	1.22 (0.98, 1.52)	0.56 (0.37, 0.80)	1 ChAd-BNT 30	1.61 (1.54, 2.08)	-	288.47 (24.88, 6388.84)	-	-	-
1.50 (1.33, 1.69)	1.29 (1.02, 1.63)	1.85 (1.55, 2.20)	0.76 (0.58, 0.99)	1.51 (1.22, 1.88)	1 ChAd-ChAd 5	0.51 (0.45, 0.68)	-	1.17 (0.91, 1.52)	-	-
0.83 (0.72, 0.98)	0.69 (0.53, 0.93)	0.68 (0.48, 1.13)	0.46 (0.32, 0.61)	0.85 (0.64, 1.07)	0.51 (0.44, 0.64)	1 ChAd+mRNA-1273 100	-	2.12 (1.71, 2.68)	-	-
413.17 (25.87, 8649.73)	145.43 (21, 10,542.10)	488.33 (30.27, 7078.80)	281.08 (12.38, 3584.84)	388.47 (24.68, 2088.84)	284.25 (16.38, 4282.05)	487.94 (30.84, 8039.58)	1 ChAd-no	-	-	-
1.76 (1.42, 2.20)	1.45 (1.08, 1.93)	2.06 (1.08, 2.69)	0.86 (0.64, 1.14)	1.70 (1.29, 2.28)	1.51 (0.88, 1.44)	2.82 (1.71, 2.64)	0.80 (0.60, 0.97)	1 ChAd-NVX 5	-	-
1.14 (0.80, 1.44)	0.84 (0.68, 1.28)	1.54 (1.07, 1.69)	0.55 (0.42, 0.70)	1.10 (0.82, 1.40)	0.73 (0.55, 0.99)	1.07 (1.06, 1.77)	0.80 (0.60, 0.94)	0.84 (0.48, 0.87)	1 mRNA-1273-BNT 30	0.77 (0.61, 0.98)
0.87 (0.71, 1.07)	0.72 (0.54, 0.98)	1.03 (0.85, 1.29)	0.47 (0.32, 0.67)	0.84 (0.64, 1.17)	0.91 (0.64, 0.77)	1.85 (0.84, 1.32)	0.80 (0.60, 0.92)	0.49 (0.37, 0.69)	0.77 (0.60, 0.98)	1 mRNA-1273+mRNA-1273 100

B

1BNT-BNT 30	0.97 (0.13, 7.15)	0.17 (0.02, 1.32)	1.70 (0.14, 21.46)	1.72 (0.20, 15.02)	1.18 (0.24, 5.68)	0.10 (0.01, 0.72)	-	1.70 (0.14, 21.46)
0.70 (0.11, 4.72)	1BNT-ChAd 5	-	-	1.78 (0.20, 15.54)	3.00 (0.28, 32.71)	-	-	-
0.27 (0.04, 1.69)	0.38 (0.03, 4.37)	1BNT+mRNA-1273 100	9.83 (1.02, 94.95)	-	3.22 (0.50, 20.59)	0.58 (0.11, 2.89)	-	9.83 (1.02, 94.95)
2.61 (0.24, 28.52)	3.71 (0.21, 66.07)	9.83 (1.02, 94.95)	1BNT-NVX 5	-	0.33 (0.03, 3.59)	0.06 (0.01, 0.54)	-	1.00 (0.07, 15.29)
1.28 (0.16, 10.00)	1.78 (0.20, 15.54)	4.73 (0.36, 62.83)	0.48 (0.02, 8.84)	1 ChAd-BNT 30	1.88 (0.13, 21.69)	-	140.90 (5.92, 3524.47)	-
1.18 (0.24, 5.98)	1.87 (0.21, 13.58)	4.43 (0.77, 25.37)	0.45 (0.04, 4.55)	0.84 (0.10, 8.88)	1 ChAd-ChAd 5	0.17 (0.03, 1.08)	-	3.05 (0.28, 33.43)
0.15 (0.02, 0.82)	0.21 (0.02, 2.40)	0.58 (0.11, 2.93)	0.68 (0.01, 0.54)	0.12 (0.01, 1.54)	0.13 (0.02, 0.70)	1 ChAd+mRNA-1273 100	-	17.47 (1.86, 184.34)
177.08 (4.01, 7817.93)	251.42 (5.42, 11671.98)	667.02 (11.18, 38859.41)	67.85 (0.87, 5320.21)	140.90 (5.92, 3324.47)	150.61 (3.08, 7351.58)	1195.46 (20.13, 68811.74)	1 ChAd-no	-
2.61 (0.24, 28.52)	3.71 (0.21, 66.07)	9.83 (1.02, 94.95)	1.00 (0.07, 15.29)	2.06 (0.10, 41.58)	2.22 (0.22, 22.40)	17.47 (1.86, 184.34)	0.01 (0.00, 1.18)	1 ChAd-NVX 5

C

1BNT-BNT 30	3.38 (0.72, 15.94)	0.67 (0.42, 1.06)	6.14 (0.75, 50.49)	3.35 (0.71, 15.90)	2.07 (0.78, 5.48)	0.34 (0.14, 0.83)	2.05 (0.52, 8.05)	0.55 (0.34, 0.92)	3.06 (1.27, 7.39)
3.10 (0.67, 14.29)	1BNT-ChAd 5	-	-	0.89 (0.14, 6.92)	1.00 (0.14, 6.98)	-	-	-	-
0.88 (0.43, 1.08)	0.22 (0.05, 1.07)	1BNT+mRNA-1273 100	12.20 (1.60, 92.87)	-	3.00 (0.99, 9.19)	0.89 (0.34, 1.38)	4.07 (1.17, 14.17)	0.78 (0.43, 1.19)	4.21 (1.80, 9.82)
7.80 (1.03, 59.65)	2.52 (0.20, 31.24)	11.43 (1.53, 85.38)	1BNT-NVX 5	-	0.25 (0.03, 2.18)	0.06 (0.01, 0.42)	0.33 (0.04, 3.17)	-	-
3.07 (0.67, 14.14)	0.59 (0.14, 6.92)	4.50 (0.93, 21.90)	0.39 (0.03, 4.88)	1 ChAd-BNT 30	1.01 (0.14, 7.94)	-	-	-	-
2.25 (0.91, 5.59)	0.73 (0.14, 3.87)	3.30 (1.32, 8.23)	0.29 (0.03, 2.41)	0.73 (0.14, 3.93)	1 ChAd-ChAd 5	0.23 (0.08, 0.68)	1.28 (0.31, 5.97)	-	-
0.44 (0.22, 0.67)	0.14 (0.03, 0.73)	0.64 (0.34, 1.22)	0.06 (0.01, 0.42)	0.14 (0.03, 0.74)	0.19 (0.08, 0.53)	1 ChAd+mRNA-1273 100	5.50 (1.78, 18.78)	-	-
2.80 (0.75, 8.99)	0.84 (0.12, 5.87)	3.81 (1.13, 12.85)	0.33 (0.04, 3.17)	0.85 (0.12, 5.19)	1.16 (0.29, 4.88)	5.30 (1.78, 18.78)	1 ChAd-NVX 5	-	-
0.53 (0.33, 0.86)	0.17 (0.04, 0.65)	0.78 (0.51, 1.20)	0.07 (0.01, 0.53)	0.17 (0.04, 0.65)	0.24 (0.09, 0.62)	1.22 (0.59, 2.52)	0.21 (0.06, 0.72)	1 mRNA-1273-BNT 30	5.51 (2.41, 12.56)
2.94 (1.24, 7.00)	0.95 (0.17, 5.46)	4.22 (1.96, 10.00)	0.38 (0.04, 3.29)	0.96 (0.17, 5.51)	1.31 (0.38, 4.37)	6.72 (2.41, 18.78)	1.13 (0.26, 4.86)	5.51 (2.41, 12.56)	1 mRNA-1273+mRNA-1273 100

**Supplementary Figure 7: NMA results of mRNA and non-replicating viral vector vaccines primed regimens for safety outcomes (local AEs). (A) Pain at the injection site, (B) erythema, and (C) swelling. RRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 ChAd + NVX 5: one dose of ChAdOx1 primer followed by NVX-2373 5 µg as booster; 1 mRNA-1273 + BNT 30: one dose of mRNA-1273 primer followed by BNT162b2 30 µg as booster; 1 mRNA-1273 + mRNA-1273 100: one dose of mRNA-1273 primer followed by mRNA-1273 100 µg as booster; 1 BNT + BNT 30: one dose of BNT162b2 primer followed by BNT162b1 30 µg as booster; 1 BNT + ChAd 5: one dose of BNT162b2 primer followed by ChAdOx1 5 × 10<sup>10</sup> viral particles as booster; 1 BNT + mRNA-1273 100: one dose of BNT162b2 primer followed by mRNA-1273 100 µg as booster; 1 BNT + NVX 5: one dose of BNT162b2 primer followed by NVX-2373 5 µg as booster; 1 ChAd + BNT 30: one dose of ChAdOx1**

primer followed by BNT162b2 30 µg as booster; 1 ChAd + ChAd 5: one dose of ChAdOx1 primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 1 ChAd + mRNA-1273 100: one dose of ChAdOx1 primer followed by mRNA-1273 100 µg as booster; 1 ChAd + no: one dose of ChAdOx1 primer with no booster. CIs: Confidence intervals; NMA: Network meta-analysis; RRs: Relative risks.

## A

1 BNT+BNT 30	0.66 (0.41, 1.04)	0.92 (0.67, 1.28)	0.99 (0.62, 1.59)	0.68 (0.43, 1.07)	1.18 (0.83, 1.67)	0.58 (0.38, 0.92)	.	1.04 (0.65, 1.67)	1.39 (0.86, 2.26)	2.02 (1.20, 3.42)
0.64 (0.42, 0.97)	1 BNT+ChAd 5	.	.	1.03 (0.67, 1.59)	2.04 (1.25, 3.32)	.	.	.	.	.
0.94 (0.68, 1.29)	1.48 (0.90, 2.43)	1 BNT+mRNA-1273 100	1.33 (0.84, 2.09)	.	1.41 (0.89, 2.24)	0.79 (0.51, 1.21)	.	1.39 (0.88, 2.20)	1.21 (0.74, 1.98)	1.75 (1.03, 2.99)
1.14 (0.74, 1.73)	1.79 (1.02, 3.14)	1.21 (0.79, 1.86)	1 BNT+NVX 5	.	1.06 (0.66, 1.71)	0.58 (0.38, 0.93)	.	1.05 (0.65, 1.68)	.	.
0.66 (0.43, 1.00)	1.03 (0.67, 1.59)	0.70 (0.42, 1.15)	0.58 (0.33, 1.01)	1 ChAd+BNT 30	1.98 (1.21, 3.22)	.	201.50 (12.29,3304.11)	.	.	.
1.25 (0.89, 1.75)	1.96 (1.27, 3.04)	1.33 (0.91, 1.95)	1.10 (0.70, 1.71)	1.90 (1.22, 2.95)	1 ChAd+ChAd 5	0.56 (0.36, 0.87)	.	0.98 (0.61, 1.59)	.	.
0.67 (0.46, 1.00)	1.06 (0.62, 1.62)	0.72 (0.48, 1.07)	0.59 (0.38, 0.93)	1.03 (0.60, 1.77)	0.54 (0.36, 0.82)	1 ChAd+mRNA-1273 100	.	1.76 (1.13, 2.76)	.	.
132.18 (7.81,2238.38)	208.14 (12.28,3527.47)	140.91 (8.22,2416.09)	116.34 (6.71,2018.11)	201.50 (12.29,3304.11)	105.99 (6.25,1798.75)	195.86 (11.34,3383.31)	1 ChAd+no	.	.	.
1.19 (0.78, 1.82)	1.87 (1.07, 3.30)	1.27 (0.82, 1.96)	1.05 (0.65, 1.68)	1.82 (1.03, 3.20)	0.95 (0.61, 1.49)	1.76 (1.13, 2.76)	0.01 (0.00, 0.16)	1 ChAd+NVX 5	.	.
1.26 (0.80, 1.99)	1.99 (1.08, 3.66)	1.35 (0.85, 2.13)	1.11 (0.62, 1.99)	1.93 (1.05, 3.55)	1.01 (0.59, 1.73)	1.87 (1.07, 3.28)	0.01 (0.00, 0.17)	1 mRNA-1273+BNT 30	1.45 (0.84, 2.50)	.
1.83 (1.11, 3.02)	2.89 (1.52, 5.49)	1.95 (1.18, 3.23)	1.61 (0.87, 2.99)	2.79 (1.47, 5.32)	1.47 (0.83, 2.61)	2.72 (1.49, 4.94)	0.01 (0.00, 0.24)	1.54 (0.83, 2.89)	1.45 (0.84, 2.50)	1 mRNA-1273+mRNA-1273 100

## B

1 BNT+BNT 30	0.62 (0.03, 13.66)	0.09 (0.00, 5.13)	0.34 (0.00, 23.96)	0.45 (0.02, 9.64)	1.61 (0.08, 30.44)	0.03 (0.00, 1.66)	1.02 (0.01, 126.45)
0.40 (0.02, 7.86)	1 BNT+ChAd 5	.	.	0.73 (0.04, 14.67)	11.00 (0.20, 615.66)	.	.
0.25 (0.01, 8.38)	0.63 (0.01, 43.01)	1 BNT+mRNA-1273 100	3.73 (0.13, 104.36)	.	3.67 (0.13, 102.61)	0.34 (0.02, 6.63)	11.19 (0.20, 627.95)
0.93 (0.02, 40.36)	2.34 (0.03, 198.84)	3.73 (0.13, 104.36)	1 BNT+NVX 5	.	0.98 (0.03, 36.00)	0.09 (0.00, 2.40)	3.00 (0.04, 210.88)
0.29 (0.02, 5.54)	0.73 (0.04, 14.67)	1.16 (0.02, 77.85)	0.31 (0.00, 25.91)	1 ChAd+BNT 30	15.13 (0.28, 827.42)	.	.
1.61 (0.08, 30.44)	4.03 (0.12, 134.87)	6.43 (0.28, 149.22)	1.72 (0.06, 53.13)	5.54 (0.17, 180.64)	1 ChAd+ChAd 5	0.09 (0.00, 2.44)	3.05 (0.04, 214.46)
0.09 (0.00, 2.69)	0.21 (0.00, 13.95)	0.34 (0.02, 6.63)	0.09 (0.00, 2.40)	0.30 (0.00, 18.76)	0.05 (0.00, 1.15)	1 ChAd+mRNA-1273 100	32.64 (0.62, 1728.46)
2.79 (0.03, 226.74)	7.01 (0.05, 1026.84)	11.19 (0.20, 627.95)	3.00 (0.04, 210.88)	9.65 (0.07, 1386.24)	1.74 (0.03, 105.82)	32.64 (0.62, 1728.46)	1 ChAd+NVX 5

## C

1 BNT+BNT 30	0.80 (0.65, 0.99)	0.67 (0.57, 0.79)	0.95 (0.75, 1.20)	0.72 (0.59, 0.88)	1.11 (0.93, 1.32)	0.64 (0.52, 0.78)	1.05 (0.82, 1.34)	0.90 (0.66, 1.23)	0.70 (0.53, 0.93)
0.80 (0.66, 0.97)	1 BNT+ChAd 5	.	.	0.90 (0.76, 1.06)	1.38 (1.10, 1.73)	.	.	.	.
0.67 (0.58, 0.78)	0.84 (0.67, 1.06)	1 BNT+mRNA-1273 100	1.37 (1.12, 1.67)	.	1.60 (1.29, 2.00)	0.92 (0.79, 1.07)	1.52 (1.23, 1.88)	1.42 (1.11, 1.82)	1.11 (0.90, 1.37)
0.93 (0.75, 1.15)	1.16 (0.89, 1.52)	1.38 (1.14, 1.68)	1 BNT+NVX 5	.	1.17 (0.92, 1.50)	0.67 (0.55, 0.81)	1.11 (0.87, 1.41)	.	.
0.72 (0.60, 0.86)	0.90 (0.76, 1.06)	1.07 (0.86, 1.33)	0.77 (0.60, 1.00)	1 ChAd+BNT 30	1.53 (1.23, 1.90)	.	.	.	.
1.09 (0.92, 1.30)	1.37 (1.12, 1.68)	1.63 (1.35, 1.96)	1.18 (0.94, 1.47)	1.52 (1.26, 1.84)	1 ChAd+ChAd 5	0.57 (0.46, 0.71)	0.95 (0.73, 1.22)	.	.
0.62 (0.53, 0.74)	0.78 (0.62, 0.99)	0.93 (0.80, 1.08)	0.67 (0.55, 0.81)	0.87 (0.69, 1.09)	0.57 (0.47, 0.69)	1 ChAd+mRNA-1273 100	1.65 (1.35, 2.03)	.	.
1.03 (0.83, 1.29)	1.29 (0.98, 1.70)	1.54 (1.25, 1.89)	1.11 (0.87, 1.41)	1.44 (1.10, 1.88)	0.94 (0.74, 1.19)	1.65 (1.35, 2.03)	1 ChAd+NVX 5	.	.
0.94 (0.72, 1.22)	1.17 (0.85, 1.61)	1.40 (1.10, 1.78)	1.01 (0.75, 1.37)	1.31 (0.96, 1.78)	0.86 (0.64, 1.15)	1.51 (1.14, 1.98)	0.91 (0.67, 1.24)	1 mRNA-1273+BNT 30	0.78 (0.60, 1.01)
0.73 (0.58, 0.92)	0.92 (0.69, 1.23)	1.09 (0.89, 1.34)	0.79 (0.60, 1.04)	1.02 (0.77, 1.35)	0.67 (0.52, 0.87)	1.18 (0.92, 1.50)	0.71 (0.54, 0.94)	0.78 (0.60, 1.01)	1 mRNA-1273+mRNA-1273 100

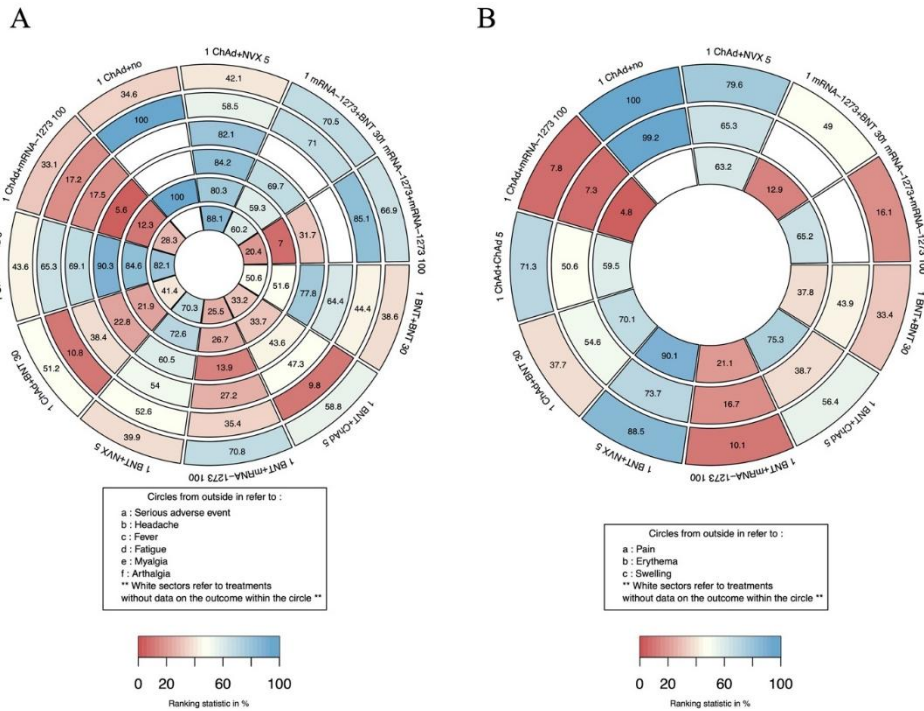
## D

1 BNT+BNT 30	0.78 (0.59, 1.04)	0.70 (0.56, 0.88)	1.41 (0.99, 2.01)	0.69 (0.53, 0.91)	1.80 (1.35, 2.39)	0.58 (0.45, 0.75)	.	1.62 (1.11, 2.34)	1.13 (0.71, 1.80)	0.58 (0.40, 0.84)
0.75 (0.57, 0.98)	1 BNT+ChAd 5	.	.	0.89 (0.70, 1.13)	2.72 (1.78, 4.15)	.	.	.	.	.
0.72 (0.58, 0.90)	0.96 (0.69, 1.34)	1 BNT+mRNA-1273 100	2.02 (1.47, 2.79)	.	2.28 (1.62, 3.20)	0.83 (0.67, 1.02)	.	2.31 (1.64, 3.26)	1.61 (1.06, 2.44)	0.82 (0.60, 1.13)
1.46 (1.05, 2.04)	1.95 (1.29, 2.95)	2.03 (1.48, 2.78)	1 BNT+NVX 5	.	1.13 (0.75, 1.69)	0.41 (0.30, 0.56)	.	1.14 (0.76, 1.72)	.	.
0.66 (0.51, 0.86)	0.89 (0.70, 1.13)	0.92 (0.67, 1.27)	0.45 (0.30, 0.68)	1 ChAd+BNT 30	3.07 (2.03, 4.64)	.	196.45 (12.30,3137.50)	.	.	.
1.79 (1.35, 2.36)	2.38 (1.70, 3.33)	2.48 (1.85, 3.32)	1.22 (0.84, 1.78)	2.69 (1.95, 3.72)	1 ChAd+ChAd 5	0.36 (0.26, 0.51)	.	1.02 (0.67, 1.59)	.	.
0.60 (0.48, 0.75)	0.80 (0.57, 1.12)	0.83 (0.68, 1.02)	0.41 (0.30, 0.56)	0.90 (0.65, 1.25)	0.34 (0.25, 0.45)	1 ChAd+mRNA-1273 100	.	2.79 (2.01, 3.88)	.	.
130.56 (8.08,2110.34)	173.94 (10.78,2806.86)	181.03 (11.12,2946.18)	89.19 (5.42,1467.12)	196.45 (12.30,3137.50)	73.00 (4.49,1188.09)	217.72 (13.37,3544.75)	1 ChAd+no	.	.	.
1.68 (1.18, 2.38)	2.23 (1.45, 3.44)	2.32 (1.66, 3.26)	1.14 (0.76, 1.72)	2.52 (1.65, 3.65)	0.94 (0.63, 1.39)	2.79 (2.01, 3.88)	0.01 (0.00, 0.21)	1 ChAd+NVX 5	.	.
1.15 (0.76, 1.74)	1.53 (0.94, 2.50)	1.59 (1.07, 2.38)	0.79 (0.48, 1.29)	1.73 (1.07, 2.80)	0.64 (0.40, 1.03)	1.92 (1.24, 2.95)	0.01 (0.00, 0.15)	0.69 (0.41, 1.14)	1 mRNA-1273+BNT 30	0.51 (0.34, 0.76)
0.59 (0.43, 0.80)	0.78 (0.52, 1.18)	0.81 (0.61, 1.09)	0.40 (0.27, 0.61)	0.88 (0.59, 1.32)	0.33 (0.22, 0.48)	0.98 (0.70, 1.37)	0.00 (0.00, 0.07)	0.35 (0.23, 0.54)	0.51 (0.34, 0.76)	1 mRNA-1273+mRNA-1273 100

## E

1 BNT+BNT 30	0.77 (0.27, 2.19)	0.47 (0.21, 1.06)	0.91 (0.30, 2.71)	0.85 (0.30, 2.43)	1.74 (0.78, 3.90)	0.47 (0.16, 1.35)	1.44 (0.47, 4.47)	0.92 (0.23, 3.63)	0.45 (0.12, 1.61)
0.60 (0.23, 1.61)	1 BNT+ChAd 5	.	.	1.10 (0.39, 3.10)	4.00 (1.25, 12.78)	.	.	.	.
0.55 (0.25, 1.20)	0.91 (0.28, 2.98)	1 BNT+mRNA-1273 100	1.88 (0.66, 5.41)	.	2.17 (0.75, 6.31)	0.97 (0.35, 2.69)	2.99 (1.00, 8.93)	2.08 (0.59, 7.31)	1.01 (0.32, 3.22)
1.10 (0.41, 2.95)	1.83 (0.49, 6.78)	2.02 (0.74, 5.50)	1 BNT+NVX 5	.	1.15 (0.39, 3.46)	0.52 (0.18, 1.48)	1.59 (0.52, 4.88)	.	.
0.66 (0.25, 1.78)	1.10 (0.39, 3.10)	1.21 (0.37, 4.01)	0.60 (0.16, 2.24)	1 ChAd+BNT 30	3.63 (1.13, 11.66)	.	.	.	.
1.67 (0.77, 3.65)	2.77 (0.98, 7.83)	3.06 (1.23, 7.58)	1.52 (0.55, 4.23)	2.52 (0.89, 7.15)	1 ChAd+ChAd 5	0.45 (0.15, 1.29)	1.38 (0.44, 4.28)	.	.
0.57 (0.22, 1.47)	0.94 (0.26, 3.40)	1.04 (0.39, 2.74)	0.52 (0.18, 1.48)	0.85 (0.24, 3.10)	0.34 (0.13, 0.91)	1 ChAd+mRNA-1273 100	3.08 (1.03, 9.19)	.	.
1.75 (0.63, 4.89)	2.90 (0.76, 11.11)	3.20 (1.13, 9.10)	1.59 (0.52, 4.88)	2.64 (0.69, 10.13)	1.05 (0.36, 3.03)	3.08 (1.03, 9.19)	1 ChAd+NVX 5	.	.
1.04 (0.30, 3.59)	1.73 (0.37, 8.12)	1.91 (0.58, 6.25)	0.95 (0.22, 4.10)	1.57 (0.33, 7.39)	0.62 (0.16, 2.47)	1.84 (0.43, 7.78)	0.60 (0.13, 2.66)	1 mRNA-1273+BNT 30	0.49 (0.14, 1.71)
0.51 (0.16, 1.57)	0.84 (0.19, 3.64)	0.93 (0.31, 2.73)	0.46 (0.12, 1.83)	0.76 (0.18, 3.32)	0.30 (0.08, 1.10)	0.89 (0.23, 3.47)	0.29 (0.07, 1.19)	0.49 (0.14, 1.71)	1 mRNA-1273+mRNA-1273 100

**Supplementary Figure 8:** NMA results of mRNA and non-replicating viral vector vaccines primed regimens for safety outcomes (systemic adverse events). (A) Headache, (B) fever, (C) fatigue, (D) myalgia, and (E) arthralgia. RRs and 95% CIs of mixed comparisons are presented in the lower area, and those of direct comparisons are presented in the upper area. 1 ChAd + NVX 5: one dose of ChAdOx1 primer followed by NVX-2373 5 µg as booster; 1 mRNA-1273 + BNT 30: one dose of mRNA-1273 primer followed by BNT162b2 30 µg as booster; 1 mRNA-1273 + mRNA-1273 100: one dose of mRNA-1273 primer followed by mRNA-1273 100 µg as booster; 1 BNT + BNT 30: one dose of BNT162b2 primer followed by BNT162b1 30 µg as booster; 1 BNT + ChAd 5: one dose of BNT162b2 primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 1 BNT + mRNA-1273 100: one dose of BNT162b2 primer followed by mRNA-1273 100 µg as booster; 1 BNT + NVX 5: one dose of BNT162b2 primer followed by NVX-2373 5 µg as booster; 1 ChAd + BNT 30: one dose of ChAdOx1 primer followed by BNT162b2 30 µg as booster; 1 ChAd + ChAd 5: one dose of ChAdOx1 primer followed by ChAdOx1  $5 \times 10^{10}$  viral particles as booster; 1 ChAd + mRNA-1273 100: one dose of ChAdOx1 primer followed by mRNA-1273 100 µg as booster; 1 ChAd + no: one dose of ChAdOx1 primer with no booster. CIs: Confidence intervals; NMA: Network meta-analysis; RRs: Relative risks.



**Supplementary Figure 9:** Ranking heat plot of schedules initiated with mRNA or non-replicating viral vector for safety outcomes: a larger figure in a given sector means a higher probability of lower risk for AEs in that sector. (A) Systemic adverse events. (B) Local AEs. Each sector is colored according to the SUCRA value of the corresponding treatment and outcome from red (0%) to blue (100%). 1 ChAd + NVX 5: one dose of ChAdOx1 followed by NVX-2373 5  $\mu$ g; 1 mRNA-1273 + BNT 30: one dose of mRNA-1273 followed by BNT162b2 30  $\mu$ g; 1 mRNA-1273 + mRNA-1273 100: one dose of mRNA-1273 followed by mRNA-1273 100  $\mu$ g; 1 BNT + BNT 30: one dose of BNT162b2 followed by BNT162b1 30  $\mu$ g; 1 BNT + ChAd 5: one dose of BNT162b2 followed by ChAdOx1 5  $\times 10^{10}$  viral particles; 1 BNT + mRNA-1273 100: one dose of BNT162b2 followed by mRNA-1273 100  $\mu$ g; 1 BNT + NVX 5: one dose of BNT162b2 followed by NVX-2373 5  $\mu$ g; 1 ChAd + BNT 30: one dose of ChAdOx1 followed by BNT162b2 30  $\mu$ g; 1 ChAd + ChAd 5: one dose of ChAdOx1 followed by ChAdOx1 5  $\times 10^{10}$  viral particles; 1 ChAd + mRNA-1273 100: one dose of ChAdOx1 followed by mRNA-1273 100  $\mu$ g; 1 ChAd + no: one dose of ChAdOx1 only. AEs: Adverse events; SUCRA: Surface under the cumulative ranking curve.