

Supplemental Online Content

Watanabe A, Yasuhara J, Iwagami M, et al. Peripartum outcomes associated with COVID-19 vaccination during pregnancy: a systematic review and meta-analysis. *JAMA Pediatr*. Published online October 3, 2022. doi:10.1001/jamapediatrics.2022.3456

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. GRADE evidence profile for the included studies

First author	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Effect size	Dose-response	All plausible confounding and bias	Quality grading
Mayo RP ²⁴	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	Research question was to investigate immune-response.	No serious imprecision.	NA	Not large	NA	Older age in the vaccinated group.	Very low
Theiler RN ²⁵	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age and higher infertility treatment rate in the vaccinated group.	Low
Rottenstreich M ²⁶	Observational study	Low risk of bias	Inconsistency between NICU admission and the other	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age and higher rate of previous miscarriage,	Low

			neonatal outcomes.						cesarean delivery, and infertility treatment.	
Lipkind HS ¹⁷	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age.	Moderate
Blakeway H ²⁷	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age and higher proportion of comorbidities.	Low
Goldshtein I ¹⁵	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age and higher proportion of comorbidities.	Moderate
Dick A ²⁸	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Low

Fell DB ¹⁸	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Magnus MC ¹⁹	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	Older age and higher proportion of comorbidities.	Moderate

NA, not applicable

eTable 2. Outcomes of all studies

First author	Preterm birth	SGA	Low Apgar score (<7 at 5min)	NICU admission	IFD	SARS-CoV-2 infection	Cesarean delivery	Postpartum hemorrhage	Chorioamnionitis
Mayo RP ²⁴	OR 0.92 (0.44-1.92)	NA	NA	OR 0.68 (0.23-2.01)	NA	NA	NA	NA	NA
Theiler RN ²⁵	OR 1.10 (0.61-1.98)	NA	OR 1.05 (0.32-3.45)	OR 1.21 (0.16-9.15)	OR 1.02 (0.06-17.34)	OR 0.11 (0.03-0.40)	OR 1.08 (0.75-1.56)	OR 2.67 (0.31-23.00)	NA
Rottenstreich M ²⁶	OR 1.01 (0.61-1.67)	OR 1.26 (0.93-1.71)	OR 1.17 (0.65-2.11)	OR 0.90 (0.56-1.45)	OR 1.50 (0.43-5.23)	NA	OR 1.52 (1.15-2.01)	OR 0.71 (0.50-1.01)	OR 0.80 (0.41-1.56)
Lipkind HS ¹⁷	OR 0.68 (0.61-0.76)	OR 1.00 (0.92-1.09)	NA	NA	NA	OR 0.79 (0.69-0.90)	NA	NA	NA
Blakeway H ²⁷	NA	aOR 1.00 (0.55-1.82)	NA	aOR 1.05 (0.43-2.56)	aOR 1.00 (0.04-25.00)	OR 1.06 (0.24-4.67)	aOR 0.86 (0.56-1.32)	aOR 1.09 (0.56-2.12)	aOR 0.60 (0.03-12.00)
Goldshtein I ¹⁵	aOR 1.06 (0.92-1.22)	aOR 1.01 (0.90-1.13)	NA	NA	NA	aOR 0.16 (0.15-0.17)	NA	NA	NA
Dick A ²⁸	OR 0.89 (0.71-1.12)	OR 0.87 (0.70-1.08)	OR 0.96 (0.65-1.42)	NA	OR 0.87 (0.50-1.51)	NA	OR 0.97 (0.84-1.12)	OR 1.10 (0.81-1.49)	NA
Fell DB ¹⁸	NA	NA	OR 0.90 (0.80-1.01)	OR 0.83 (0.79-0.87)	NA	OR 0.86 (0.79-0.94)	OR 1.01 (0.97-1.05)	OR 0.95 (0.87-1.04)	OR 1.10 (0.88-1.38)

Magnus MC ¹⁹	OR 0.90 (0.84-0.96)	aOR 0.97 (0.90-1.05)	aOR 0.97 (0.87-1.08)	aOR 0.97 (0.87-1.08)	OR 0.67 (0.50-0.90)	OR 0.60 (0.57-0.63)	NA	NA	NA
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aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; IFD, intrauterine fetal death; NA, not available; NICU, neonatal intensive care unit; OR, odds ratio; SGA, small for gestational age;

Value is shown as OR or aOR (95% confidence interval).

eTable 3. The results of Egger's linear regression tests of the primary outcomes

Outcome	Intercept	<i>t</i>	<i>p</i>
NICU admission	0.99	1.11	0.303
IFD	-0.39	-0.75	0.479
Preterm birth	0.40	0.28	0.787
SGA	0.82	1.79	0.116
Low Apgar score (<7 at 5min)	1.85	1.89	0.101

IFD, intrauterine fetal death; *NICU*, neonatal intensive care units; *SGA*, small-for-gestational-age

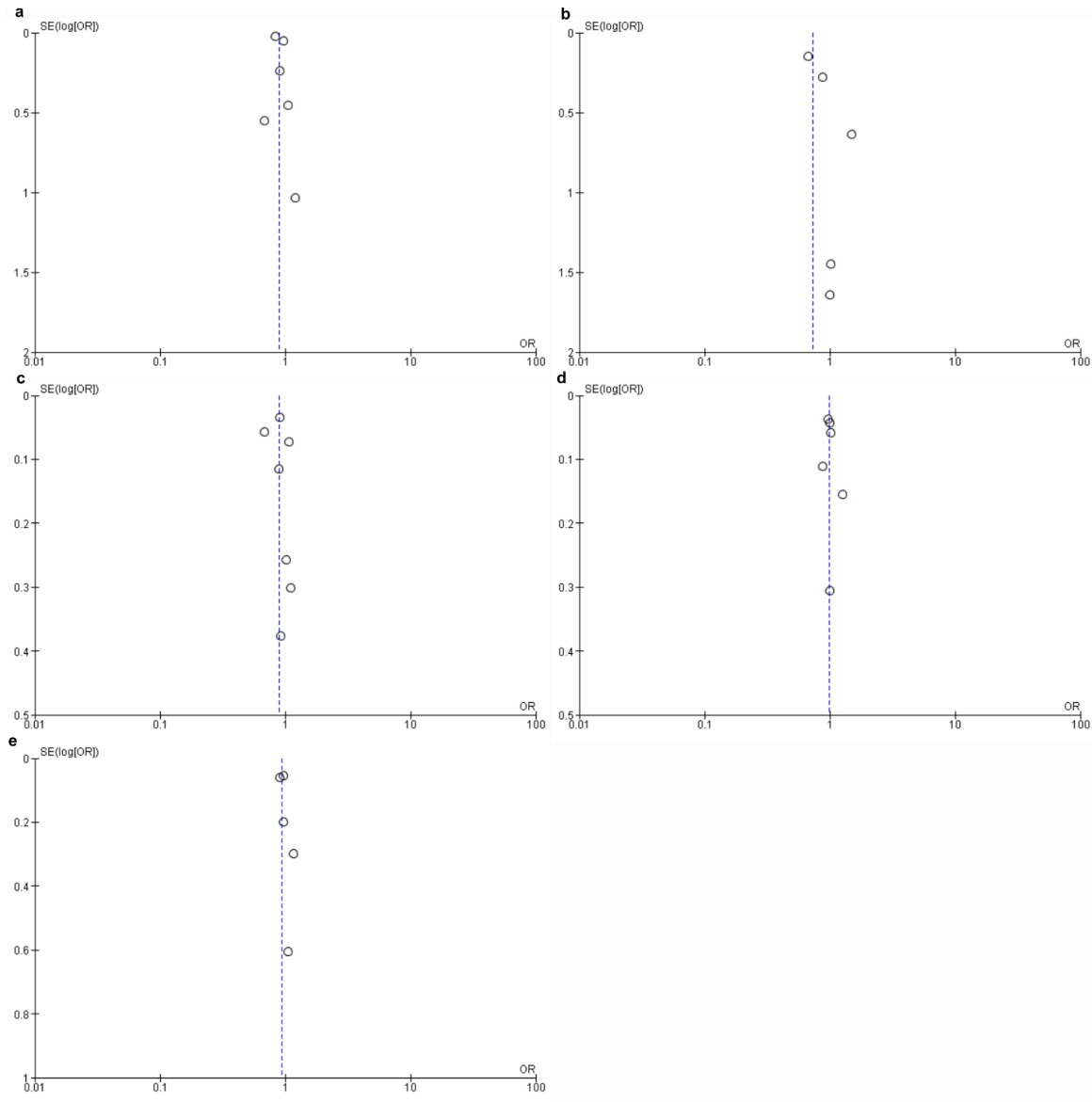
eTable 4. Definitions of postpartum hemorrhage in each study

First author	Definition of postpartum hemorrhage
Theiler RN ²⁵	Hemorrhage that required blood transfusion.
Rottenstreich M ²⁶	More than 1,000 mL of estimated blood loss and/or more than 3 g/dL of hemoglobin drop from the baseline.
Blakeway H ²⁷	More than 1,000 mL of estimated blood loss.
Dick A ²⁸	More than 500 mL of estimated blood loss.
Fell DB ¹⁸	Not available

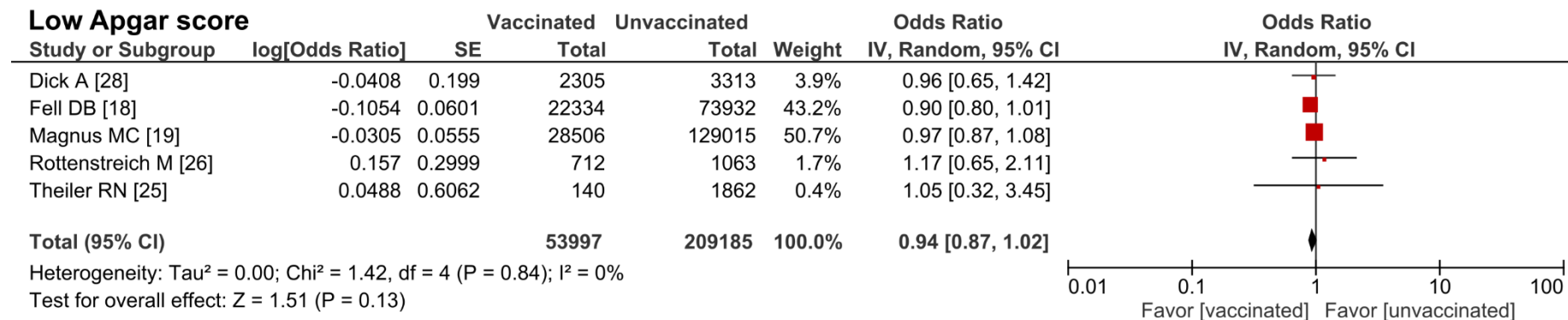
eFigure 1 Risk of bias summary

	Risk of bias due to confounding	Risk of bias arising from measurement of the exposure	Risk of bias in selection of participants into the study	Risk of bias due to post-exposure interventions	Risk of bias due to missing data	Risk of bias arising from measurement of the outcome	Risk of bias in selection of the reported result
Blakeway H [27]	-	+	+	?	+	+	+
Dick A [28]	+	+	+	?	+	+	+
Fell DB [18]	-	+	+	?	+	+	+
Goldshstein I [15]	+	+	+	?	+	+	+
Lipkind HS [17]	-	+	+	?	?	+	+
Magnus MC [19]	-	+	+	?	+	+	+
Mayo RP [24]	-	+	-	?	+	?	+
Rottenstreich M [26]	-	+	+	?	+	+	+
Theiler RN [25]	-	+	+	?	+	+	+

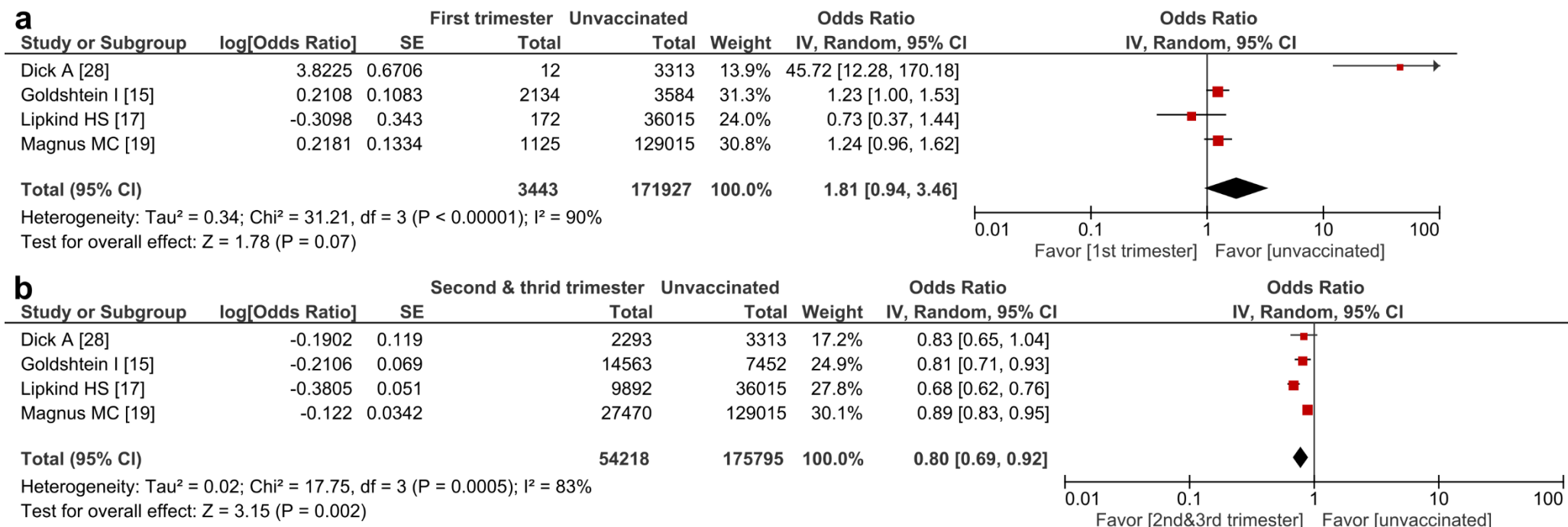
eFigure 2. Funnel plots of the primary outcomes (a. neonatal intensive care units admission, b. intrauterine fetal death, c. preterm birth, d. small-for-gestational-age, e. low Apgar score)



eFigure 3. Forest plot showing the odds ratio of low Apgar score (<7 at 5 min of birth)



eFigure 4. Forest plots showing the odds ratio of preterm birth (a: women who received COVID-19 vaccination during the first trimester vs. women who did not receive COVID-19 vaccination during pregnancy, b: women who received COVID-19 vaccination during the second or third trimester vs. women who did not receive COVID-19 vaccination during pregnancy)



eFigure 5. Forest plots showing the odds ratio of small size for gestational age (a: women who received COVID-19 vaccination during the first trimester vs. women who did not receive COVID-19 vaccination during pregnancy, b: women who received COVID-19 vaccination during the second or third trimester vs. women who did not receive COVID-19 vaccination during pregnancy)

