Peripartum Outcomes Associated With COVID-19 Vaccination during Pregnancy
A Systematic Review and Meta-analysis

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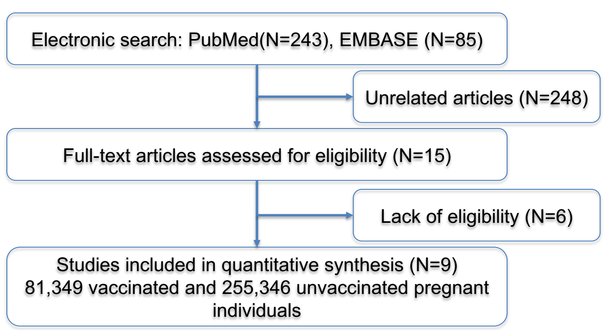
Introduction

- The risk and benefits of coronavirus disease 2019 (COVID-19) vaccination during pregnancy are under investigation. Pooled evidence regarding neonatal and maternal outcomes in relation to COVID-19 vaccination during pregnancy is scarce.

Methods

- PubMed and EMBASE were searched on April 5, 2022, for prospective trials and observational studies comparing the individuals who received at least one COVID-19 vaccination during pregnancy with those who did not and reporting the neonatal outcomes.
- The neonatal and maternal outcomes were synthesized using a random-effects model.
- Vaccination timing (during 1st trimester or 2nd/3rd trimester) and neonatal outcomes were assessed.

Figure 1. Study selection



Results

Figure 2a. NICU admission

Study or Subgroup	log[Odds Ratio]	SE	Vaccinated Total	Unvaccinated Total	Weight	Odds Ratio IV, Random, 95% CI
Blakeway H [27]	0.0488	0.4555	133	399	1.1%	1.05 [0.43, 2.56]
Fell DB [18]	-0.1863	0.0252	22660	74930	57.6%	0.83 [0.79, 0.87]
Magnus MC [19]	-0.0305	0.0555	28506	129015	36.4%	0.97 [0.87, 1.08]
Mayo RP [24]	-0.3857	0.5531	125	369	0.8%	0.68 [0.23, 2.01]
Rottenstreich M [26]	-0.1054	0.2421	712	1063	3.9%	0.90 [0.56, 1.45]
Theiler RN [25]	0.1906	1.0323	140	1862	0.2%	1.21 [0.16, 9.15]
Total (95% CI)			**52276**	**207638**	**100.0%**	**0.88 [0.80, 0.97]**

Heterogeneity: Tau² = 0.00; Chi² = 7.07, df = 5 (P = 0.22); I² = 29%
Test for overall effect: Z = 2.53 (P = 0.01)

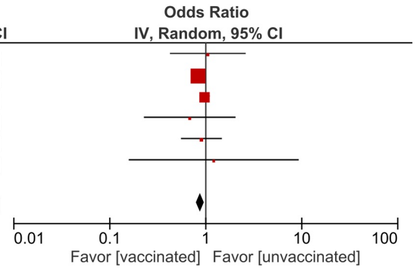


Figure 2b. Intrauterine fetal death

Study or Subgroup	log[Odds Ratio]	SE	Vaccinated Total	Unvaccinated Total	Weight	Odds Ratio IV, Random, 95% CI
Blakeway H [27]	0	1.6423	133	399	0.6%	1.00 [0.04, 25.00]
Dick A [28]	-0.1393	0.2826	2305	3313	20.6%	0.87 [0.50, 1.51]
Magnus MC [19]	-0.4005	0.1493	28506	129015	73.9%	0.67 [0.50, 0.90]
Rottenstreich M [26]	0.4055	0.6375	712	1063	4.1%	1.50 [0.43, 5.23]
Theiler RN [25]	0.0198	1.4455	140	1862	0.8%	1.02 [0.06, 17.34]
Total (95% CI)			**31796**	**135652**	**100.0%**	**0.73 [0.57, 0.94]**

Heterogeneity: Tau² = 0.00; Chi² = 2.08, df = 4 (P = 0.72); I² = 0%
Test for overall effect: Z = 2.40 (P = 0.02)

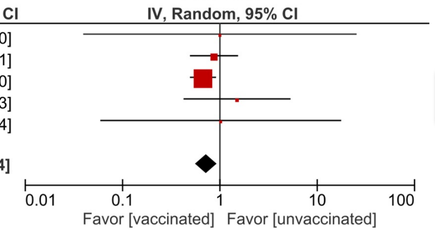


Figure 2c. Maternal SARS-CoV-2 infection

Study or Subgroup	log[Odds Ratio]	SE	Vaccinated Total	Unvaccinated Total	Weight	Odds Ratio IV, Random, 95% CI
Blakeway H [27]	0.0583	0.7566	140	1188	10.5%	1.06 [0.24, 4.67]
Fell DB [18]	-0.1508	0.0433	22660	74930	19.4%	0.86 [0.79, 0.94]
Goldshtein I [15]	-1.8326	0.0329	16697	7591	19.4%	0.16 [0.15, 0.17]
Lipkind HS [17]	-0.2357	0.0691	10064	36015	19.3%	0.79 [0.69, 0.90]
Magnus MC [19]	-0.5108	0.0262	28506	129015	19.5%	0.60 [0.57, 0.63]
Theiler RN [25]	-2.2073	0.6629	140	1862	11.8%	0.11 [0.03, 0.40]
Total (95% CI)			**78207**	**250601**	**100.0%**	**0.46 [0.22, 0.93]**

Heterogeneity: Tau² = 0.67; Chi² = 1402.64, df = 5 (P < 0.00001); I² = 100%
Test for overall effect: Z = 2.16 (P = 0.03)

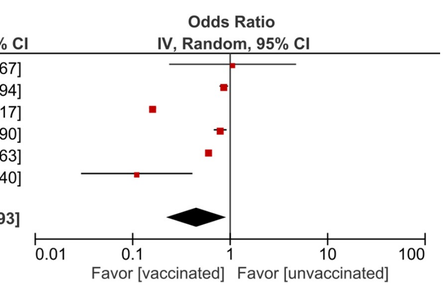
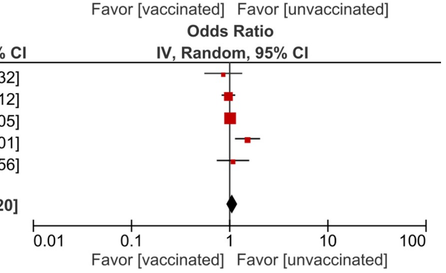


Figure 2d. Cesarean delivery

Study or Subgroup	log[Odds Ratio]	SE	Vaccinated Total	Unvaccinated Total	Weight	Odds Ratio IV, Random, 95% CI
Blakeway H [27]	-0.1508	0.2189	133	399	7.3%	0.86 [0.56, 1.32]
Dick A [28]	-0.0305	0.0734	2305	3313	27.8%	0.97 [0.84, 1.12]
Fell DB [18]	0.01	0.0206	22660	74930	41.2%	1.01 [0.97, 1.05]
Rottenstreich M [26]	0.4187	0.1423	712	1063	14.1%	1.52 [1.15, 2.01]
Theiler RN [25]	0.077	0.186	140	1862	9.5%	1.08 [0.75, 1.56]
Total (95% CI)			**25950**	**81567**	**100.0%**	**1.05 [0.93, 1.20]**

Heterogeneity: Tau² = 0.01; Chi² = 9.17, df = 4 (P = 0.06); I² = 56%
Test for overall effect: Z = 0.78 (P = 0.43)



Results

Outcome	Vaccinated	Unvaccinated	OR (95% CI)
Preterm birth (1st vs no vaccination)	236/3,343	8,534/171,927	1.81 (0.94-3.46)
Preterm birth (2nd/3rd vs no vaccination)	2,233/54,128	8,534/171,927	0.80 (0.69-0.92)
SGA (1st vs no vaccination)	258/3,249	13,876/165,741	1.09 (0.95-1.27)
SGA (2nd/3rd vs no vaccination)	3,799/52,000	13,876/165,741	0.94 (0.88-1.00)

Table 1. Vaccination timing and neonatal outcomes

Discussion

- COVID-19 vaccination during pregnancy was not associated with adverse neonatal and maternal outcomes.
- COVID-19 vaccination during pregnancy was associated with lower risks of NICU admission and intrauterine fetal death.
- The safety and efficacy of COVID-19 vaccination during pregnancy should be recognized widely to address vaccine hesitancy and to promote children's health.

References

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