

Impact of Maternal Influenza Vaccination on Infant Antibody Levels Post-Immunization

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Background

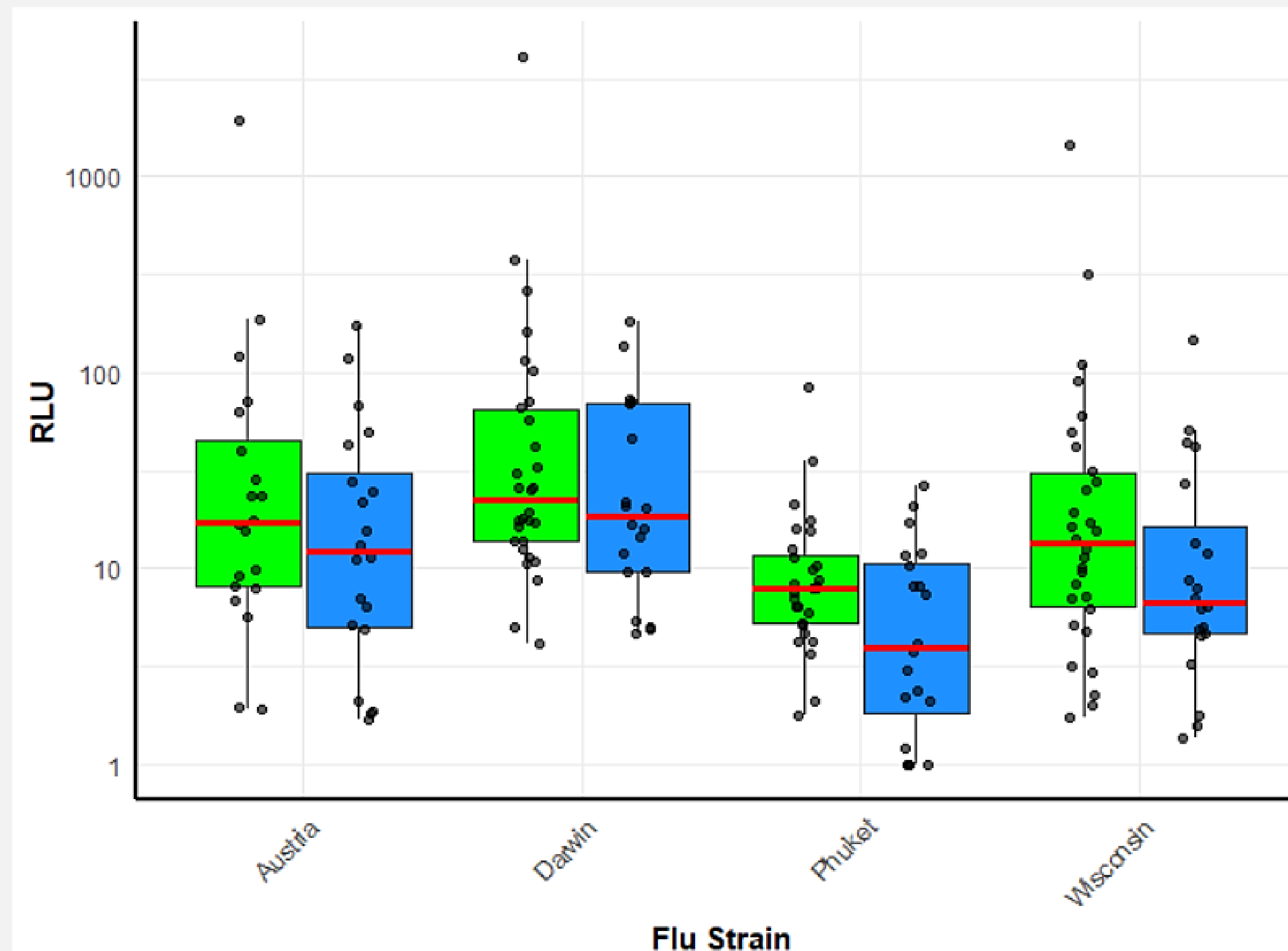
- Influenza (flu) virus infection can lead to high rates of infant hospitalization
- Vaccination strategies for infants are critical to reduce influenza-related disease burden
- Maternal immunization during pregnancy is a key public health strategy to protect both mothers and their infants from severe influenza-related illness
- Maternal antibody interference (MAI) is when maternal antibodies passed from the placenta to the infant impair the infant's ability to generate vaccine responses
- This phenomena has been described for pertussis vaccination, but the impact of maternal vaccination on the development of infant flu antibody responses is not fully understood

Study Objective

- Evaluate for maternal antibody interference for infant influenza vaccination
- Quantify flu-specific antibody responses in infants receiving their 6-month influenza vaccines in infants exposed to maternal influenza vaccination at ≥ 20 weeks' gestation (late maternal vaccine group) versus those with no maternal vaccination or vaccination at < 20 weeks' gestation (no/early maternal vaccine group)

Methods

Results



No/Early Maternal Vaccine
Late Maternal Vaccine

Figure 1: Infant influenza antibody levels (RLU) for four different influenza strains, comparing no/early maternal vaccination with late maternal vaccination.

- No significant differences found in infant antibody levels**
- Infants of mothers who did not receive the vaccine late in pregnancy had slightly higher antibody levels.**

Conclusion

- Across all 4 influenza hemagglutinin antibodies analyzed, no statistically significant differences were found in post-vaccination antibody levels between infants whose mothers received influenza vaccination at ≥ 20 weeks' gestation and those whose mothers did not or received it earlier
- We do not see significant effects of maternal antibody interference; larger studies with infant clinical infection rates are needed to better assess potential effects
- Based on the current data, maternal influenza vaccination during pregnancy remains strongly supported to prevent severe influenza infection in pregnant individuals
- Maternal antibodies play a critical role in providing passive immunity to infants under 6 months of age, when they are most vulnerable to severe influenza illness

References

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Table 1: Median Infant IgG antibody levels in no/early vs late maternal vaccine groups

IgG Flu Antibody	No/Early Maternal Vaccine (N=30)	Late Maternal vaccine (N=20)	P-value
Flu B/Austria/2021	26.06 (11.91, 99.01)	14.23 (4.78, 44.43)	0.07
Flu A/Darwin/2021	22.32 (13.87, 64.56)	18.44 (9.69, 70.13)	0.41
Flu A/Wisconsin/2019	13.07 (5.42, 30.34)	10.41 (4.65, 42.05)	0.70
Flu B/Phuket/2013	7.73 (4.38, 11.91)	3.93 (1.16, 10.72)	0.17



Table 2: Baseline Demographics of infants

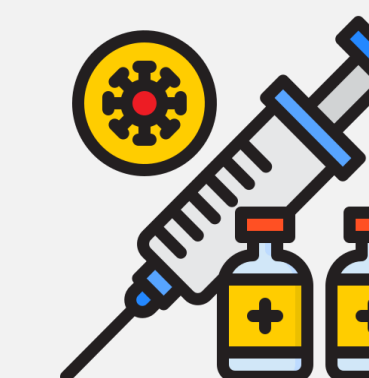


Table 3: Days post vaccination



Background

- Maternal antibody interference (MAI) occurs when antibodies passed from mother to infant (via placenta or breast milk) reduce the infant's ability to mount their own immune response to a vaccine or infection.
- Maternal IgG crosses the placenta during pregnancy and circulates in the newborn. These antibodies can neutralize vaccine antigens before the infant's immune system responds. This leads to lower antibody production or shorter immunity duration after vaccination.
- Strongest in the first months of life when maternal antibody levels are highest but wanes as antibodies decline.
- Well-documented in measles and pertussis vaccines.
- Maternal immunization must balance immediate newborn protection with potential dampening of later vaccine responses.
- Not yet studied for influenza.

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Fast Facts

Pregnant or Have an Infant 3-12 Months Old

Willing to Collect Small Blood Samples from Baby

Compensation Provided

Conducting Remote

Methods

- Observational cohort study conducted from December 2022 to March 2025, enrolling infants across the U.S. using BuildClinical
- Capillary blood samples collected remotely using Tasso+ home blood collection devices.
- Vaccine and infection histories obtained via participant report. Informed consent obtained from parents/guardians.
- Serum IgG antibody levels specific to influenza strain hemagglutinin proteins (Flu A/Darwin/2021, Flu B/Austria/2021, Flu B/Phuket/2013, Flu A/Wisconsin/2019) quantified using MSD V-PLEX Respiratory Panel 4 (IgG) Kit.
- Data reported as median relative light units (RLU) with interquartile range (IQR). Comparisons performed using Wilcoxon rank-sum test.

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Table 2: Baseline Demographics of Infants

	No/Early Maternal Vaccine Group (n=26)	Late Maternal Vaccine Group (n=18)
Sex at Birth		
Male	50% (13)	50% (9)
Female	50% (13)	50% (9)
Race		
White	80.8% (21)	88.9% (16)
Black or African American	0% (0)	0% (0)
Asian	7.7% (2)	11.1% (2)
Other	11.5% (3)	0% (0)
Ethnicity		
Hispanic or Latino	15.4% (4)	16.7% (3)
Not Hispanic or Latino	84.6% (22)	83.3% (15)
Gestational Age at Maternal Vaccine (in weeks)	17.08 (14.75, 17.57)	25.22 (23.14,28.75)

Table 3: Days from Last Flu vaccine dose to sample

	No/Early Maternal Vaccine Group (n=30)	Late Maternal Vaccine Group (n=20)
Days from Last Flu Vaccine Dose to Sample	49.5 (33.5, 73.5)	45 (33, 66.5)