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The Effect of Timing of Tetanus-diphtheria and Pertussis Vaccine Administration in Pregnancy on The Avidity of Pertussis Antibodies

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Disclosure Statement

- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

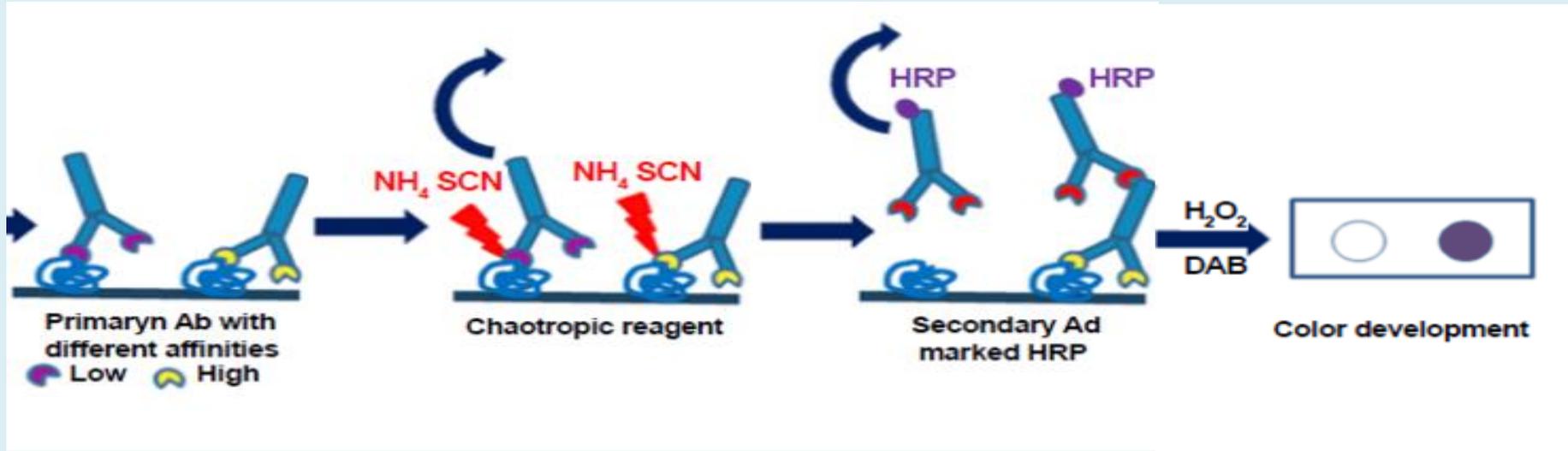
Background

- Vaccination against pertussis in pregnancy is recommended
- When to vaccinate ?



- Vaccine failure in infants of vaccinated mothers
- No anti-pertussis antibody protective cut-off

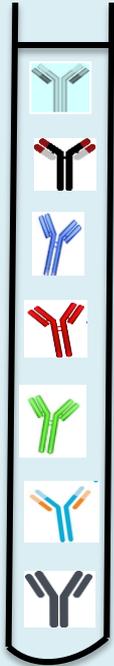
Ab avidity- ELISA-based elution assay



- **Relative avidity index:**
 - Antibody levels with vs. without addition of bond-breaking agent
 - Expressed in %

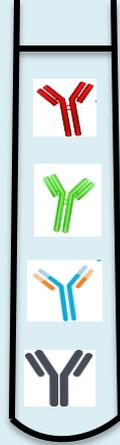
Antibody avidity

120 IU/mL



Single bond-breaking
agent concentration

60 IU/mL



Relative avidity index
 $=60/120=50\%$

Following vaccination:

- Abs with different avidities
- Gradient of bond-breaking agent concentrations

Aim

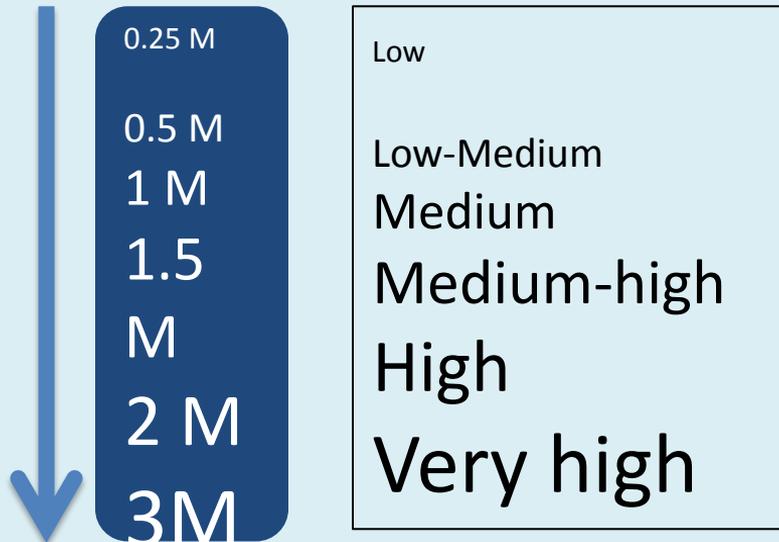
- To determine the effect of timing of vaccination with Tetanus-diphtheria and acellular pertussis (Tdap) in pregnancy on the avidity of cord anti-pertussis toxin (PT) immunoglobulin G (IgG).

Methods

- Cord of Tdap-vaccinated women during 28-36⁺⁶ WG¹

Abs with different avidities

NH₄SCN Conc Ag-Ab strength



Total absolute avidity levels

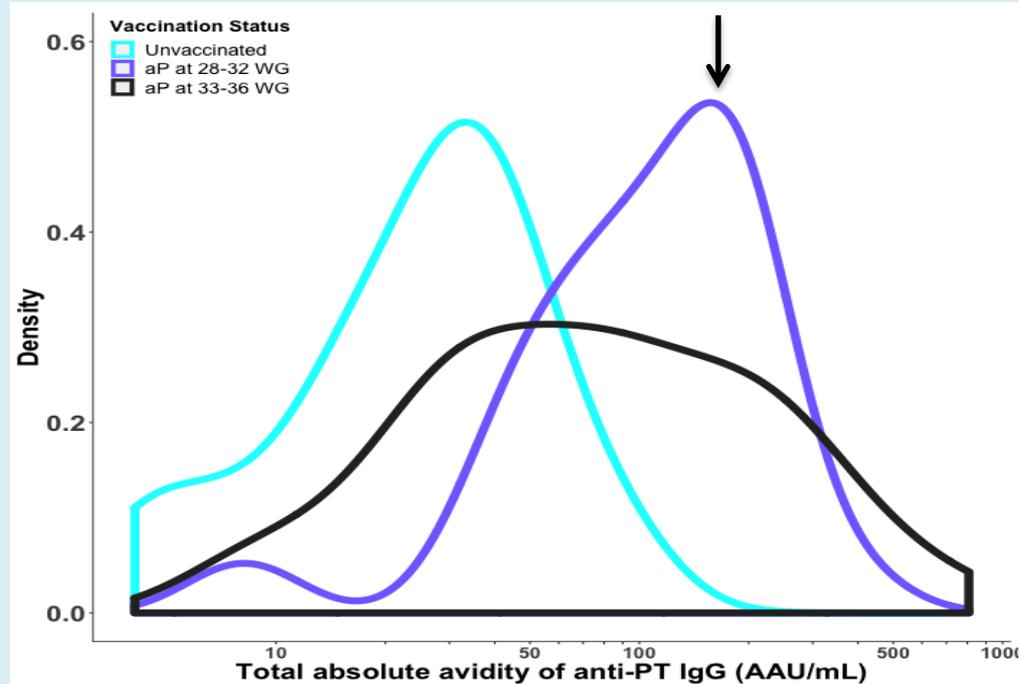
Sum of weighted levels of Abs with different avidities

Higher weight to high avidity antibodies

Anti-PT IgG levels by timing of vaccination

	Vaccinated during 28-32 WG (n=43)	Vaccinated during 33-36 WG (n=47)	P
Fractional absolute levels (IU/mL), GMC (95% CI)			
Low	2.0 (1.1-3.9)	2.0 (1.1-3.6)	0.759
Low-medium	11.2 (8.5-14.7)	6.9 (4.7-10.2)	0.054
Medium	11.6 (8.8-15.2)	6.7 (5.2-8.6)	0.007
Medium-high	11.4 (8.2-15.8)	7.5 (5.2-10.7)	0.090
High	10.1 (7.4-13.8)	5.7 (3.6-8.9)	0.035
Very high	11.2 (8.1-15.3)	7.7 (4.7-12.5)	0.268
Total absolute avidity levels (AAU/mL), GMC (95% CI)	100.0 (78.3-127.8)	73.1 (53.3-100.3)	0.119

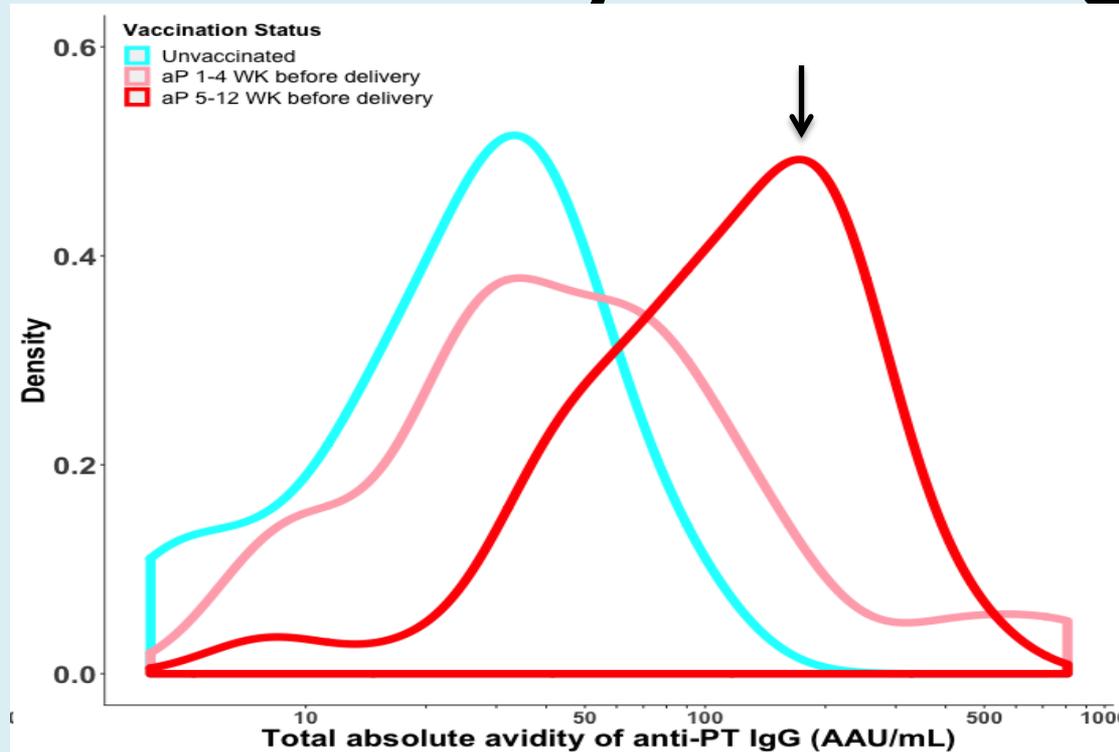
Vaccination 28-32 WG= higher total absolute avidity of anti-PT IgG



Anti-PT IgG levels by timing between vaccination and delivery

	1-4 weeks (n=25)	5-12 weeks (n=64)	P
Fractional absolute levels (IU/mL), GMC (95% CI)			
Low	1.6 (0.8-3.4)	2.2 (1.3-3.6)	0.950
Low-medium	5.6 (3.5-9.0)	10.2 (7.7-13.5)	0.030
Medium	5.0 (3.6-7.0)	10.7 (8.6-13.3)	<0.001
Medium-high	5.1 (2.9-9.1)	11.5 (8.9-14.6)	0.005
High	3.3 (1.7-6.4)	10.3(7.9-13.4)	<0.001
Very high	4.3 (2.2-8.5)	12.6 (9.4-16.9)	0.002
Total absolute avidity levels (AAU/mL), GMC (95% CI)	47.8 (30.9-73.9)	105.9 (86.3-130.0)	<0.001

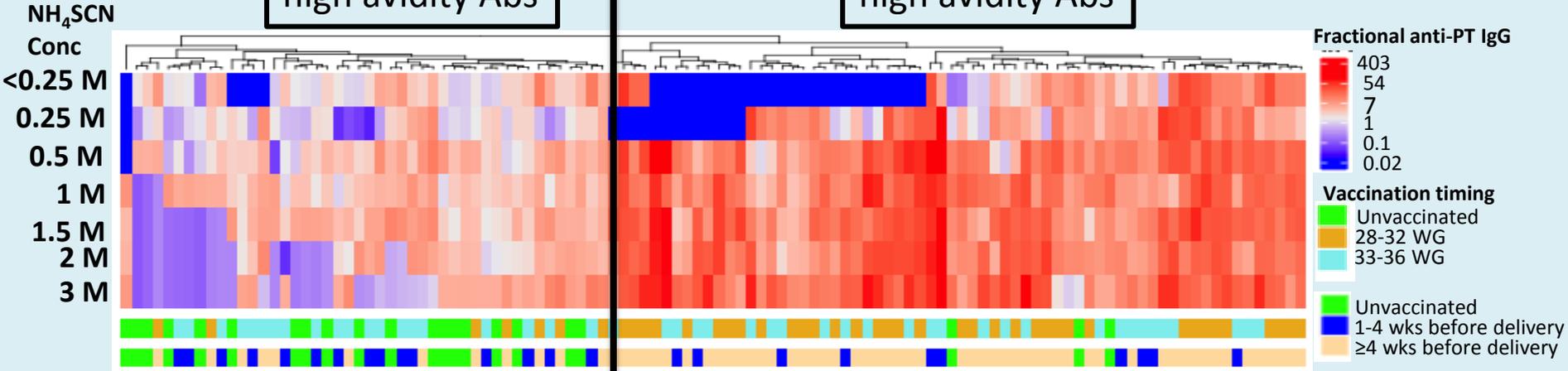
Vaccination 5-12 weeks before delivery = higher total absolute avidity of anti-PT IgG



Vaccination 28-32 WG/5-12 weeks before delivery = avidity profile of high fractional absolute anti-PT IgG

Low levels of high avidity Abs

High levels of high avidity Abs



86 % of Unvaccinated

84 % of vaccinated 28-32 WG

81% of vaccinated ≥4 wks before delivery

Conclusion

- Vaccination against pertussis during 28-32 vs 33-36 WG = higher levels of high-avidity antibodies
 - Potential greater protection to the neonate
- When in pregnancy ?



- Clinical significance of high avidity antibodies needs further investigation

Acknowledgment



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