

UPDATES ON Tdap VACCINATION DURING PREGNANCY

Pertussis is a transmissible respiratory infection which kills about 300,000 infants worldwide every year—most under two months of age¹. The rise in pertussis cases may be attributed to low immunization coverage, as reported by Lim and colleagues in 2016 where they found out that Malaysia immunization coverage was only at 86.4%, a low number than the target set at 95%.

Year	Pertussis Cases
2012 in US	48,277 cases (2269 infants)
2013 in M'sia	222
2015 in M'sia	939

In a local study by Chuah et al., it was found that infants aged **less than 3 months old were more susceptible to critical pertussis compared to those in older age group**³. This study is consistent with findings from United States where 1000 babies were hospitalized each year due to whooping cough. In each time, between 5 to 15 babies died from whooping cough as these deaths were in babies who were too young to get their own whooping cough vaccine. Evidence suggests that the immunity against diphtheria wears off with time, and since infants do not begin their own vaccine series against pertussis until approximately 2 months of age; this leaves a significant risk for newborns who may contract pertussis infections from family members and caregivers. Hence, in view of this data, in September 2017, [The American College of Obstetricians and Gynecologists \(ACOG\)](#) issued an Expert Work Group encouraging healthcare professionals to routinely assess their pregnant patient's vaccination status and ensure that **ALL pregnant women should receive a tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine during each pregnancy, as early as in the 27th to 36th weeks of gestation window as possible.**

Why Administer Tdap Vaccination During Pregnancy?

1. Severity of Pertussis to BOTH Mother & Infant

Pertussis cause serious morbidity & mortality in infants, especially within the first 6 months of life³. About 61% hospitalized infants with pertussis experience apnea, 23% develop pneumonia & 1% will die. Most of the death are infants who are too young to be protected by the DtaP vaccine. Complications among pregnant women are usually less serious compared to infants, especially among those who have gotten the vaccine. However, syncope (6%) and rib fractures (4%) have been reported due to the persistent cough itself³.

2. Maternal Vaccination Confers Protection To Unborn Child

Transplacental transfer of maternal pertussis antibodies of the IgG isotype crosses from mother to infant during pregnancy contributes to the newborn's passive immunity in early life **before** they are able to receive the primary DTaP series at 2 months of age. To avoid this unprotected gap (from birth to infant's first dose of DtaP), as well as to maximize the passive antibody transfer to the infant, ACOG & CDC recommends to administer Tdap during the third trimester of pregnancy (**27 through 36 weeks of gestation**). Since the level of pertussis antibodies decreases over time, administration of Tdap is recommended during every pregnancy in order to transfer the greatest number of protective antibodies to each infant.

In order to transfer the maximum amount of maternal antibodies to the fetus, the highest concentration of antibodies in the maternal blood should be prevalent during the second and third trimester. While the United States and Great-Britain recommends vaccination between 26 to 36 gestational weeks, Switzerland on the other hand recommends the vaccine to be given as early as second trimester (13-26 gestational weeks). This is in line with a recent observational study conducted by Eberhardt et al that showed immunisation during the second trimester (13–26 gestational weeks) elicited higher antibody titres in the newborn compared with later vaccination at third trimester (27-36 gestational week); a finding that was also observed with preterm birth. This recommendation may be considered in special situations (eg pregnancies with increased risk of pre-term delivery or pertussis outbreak) to allow for longer placental exposure to higher antibody levels and maximization of antibody transfer.

Peak maternal anti-pertussis antibody levels are achieved approximately four weeks following vaccination, hence while it is preferable that immunization is administered in sufficient time before birth (i.e. 4 weeks), it should still be considered **until the end of pregnancy**, as it potentially provide partial protection.

Safety of Tdap During Pregnancy

Several prospective and observational studies have shown that Tdap is safe and well tolerated in pregnant women⁵. The Tdap vaccine is adjuvanted with aluminium phosphate (0.39 mg/dose for Boostrix[®] and 1.5 mg/dose for Adacel[®]), considerably low since the natural adult dietary ingestion of aluminium is estimated to be 7-9 mg per day. Furthermore, there is no evidence that the aluminium in the vaccine puts the developing fetus at risk. Several studies have shown the efficacy of maternal vaccination. -based studies from the United Kingdom have estimated a vaccine efficacy of 91 to 95% to prevent infant death. Recently, a retrospective cohort study from California showed that immunisation during pregnancy decreased the likelihood of contracting pertussis up to 2 to 3 months after birth, compared with a postpartum vaccination.



In conclusion, **Tdap should be offered in every pregnancy. This is ideally administered between 27 and 32 weeks of gestation but evidence also supports providing maternal Tdap over a wider range of gestational ages from 13 weeks up to the time of delivery in view of programmatic and unique patient considerations.**

References :

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4. Clinical-Guidance-and-Publications/Committee-Opinions/Immunization-Infectious-Disease-and-Public-Health-Preparedness-Expert-Work-Group/Maternal-Immunization, June 2018
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DIFFERENCES BETWEEN DTaP , Tdap and Td



	DTaP	Tdap	Td
Vaccine Type	Diphtheria Tetanus (acellular) Pertussis	Tetanus diphtheria (acellular) pertussis	Tetanus diphtheria
Administration 	4 doses : ✓ at 2, 3 & 5 months ✓ 18 month (booster)	1 dose ✓ 15 years (booster). Given once only. ✓ Pregnant & never had a dose before : between 27th-36th weeks for each pregnancy ✓ If did not get a dose during pregnancy : Right after delivery	✓ 1 –3 doses ✓ every 10 years (booster) ✓ Pregnant women who have previously received Tdap and need tetanus or diphtheria vaccine while pregnant should get Td.
Licensed Age to Receive Vaccine	2 months to 6 years old.	4 years to 64 years [Adacel] 4 to > 65 years old [Boostrix]	7 years and older
Example of Brands Available in Malaysia	DTaP + IPV/HIB : Pentaxim by Sanofi Pasteur, Infanrix IPV-HIB by GSK DtaP + IPV/HIB/HepB : Hexaxim by Sanofi Pasteur, Infanrix Hexa by GSK	✓ Adacel by Sanofi Pasteur ✓ Sanofi Pasteur Boostrix by GSK 	NOT AVAILABLE in Malaysia

*IPV : inactivated polio , HIB : Haemophilus influenzae , HepB : Hepatitis B

Look Closely at the letters :

- ⇒ Upper case 'T' : same amount of tetanus in DTaP, Tdap and Td
- ⇒ Upper case 'D' and 'P' : more diphtheria and pertussis in DTaP than in Tdap & Td; lower case means there is less.

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