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Routine vaccinations during pregnancy:

an update

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Submitted: 3 May 2019; **Editor's response:** 30 May 2019; **final acceptance:** 11 June 2019.

70: 142–143.

DOI: https://doi.org/10.3399/bjgp20X708089

WHY WAS THIS UPDATE DEVELOPED?

Antenatal vaccination is usually delivered in primary care, yet a recent survey highlighted that many UK GPs are not confident discussing vaccination with pregnant women, and would value concise guidelines.[1]

HOW DOES ANTENATAL VACCINATION WORK?

Antenatal vaccination boosts maternal antibody levels and therefore the amount of antibody transferred to the fetus.

RATIONALE AND EFFECTIVENESS OF ANTENATAL VACCINATION

Pertussis (whooping cough)

Recommendation: between 16–32 weeks of gestation. The UK antenatal pertussis vaccination programme was introduced following the 2012 pertussis outbreak, when >9000 individuals were infected and 14 infants died.[2] Although numbers of cases have since reduced, rates of pertussis remain significantly higher than prior to 2012. A similar trend has been observed globally, and at least 14 countries have implemented similar recommendations.[2]

Pertussis disproportionately affects young infants, who have the highest rates of disease, and are at highest risk of severe disease and death. Most cases occur in early childhood before completion of primary immunisation, and therefore antenatal vaccination provides effective protection during this 'window-period' of vulnerability.

Pertussis vaccination is <90% effective at protecting infants up to 2 months of age, and is 95% effective at preventing infant death from pertussis.[2] The only deaths among infants born to vaccinated women have been in cases where the mother was vaccinated <10 days before delivery (leaving insufficient time for effective antibody transfer). Pertussis is currently only available as a combination vaccine (Boostrix®-IPV [GlaxoSmithKline UK] in the UK) that also protects against tetanus, diphtheria, and polio, which are safe to be given in pregnancy.[3]

Influenza

Recommendation: any gestation during influenza season (usually October–March/April). Pregnant women are at increased risk of severe disease from influenza, particularly during the third trimester. Influenza caused approximately 10% of UK deaths occurring in pregnant (or recently pregnant) women during 2009–2012.[4] Furthermore, influenza can have severe consequences for the fetus and young infants, including pre-term birth, respiratory illness, and death.[5]

Large trials have demonstrated approximately 50% reduction in cases of laboratory-confirmed influenza among vaccinated pregnant women and their infants (up to 6 months of age),[5] as well as a 50% reduction in infant hospitalisations due to influenza.[6] Antenatal influenza vaccination has been recommended since 2009 in the UK, and is recommended by the World Health Organization.[5]

WHAT IS THE EVIDENCE OF SAFETY?

Mild, self-limiting vaccine-related side effects are common

Reactions at the vaccination site (such as pain and erythema) are common, and usually last 1–2 days. Mild fever, headaches, malaise, and myalgia occur less commonly.[3,7]

Severe allergic reactions are extremely rare

Allergic reactions can occur to vaccine components; however, serious reactions are extremely rare. A study of >25 million vaccine doses in adults and children demonstrated an anaphylaxis rate of 1.31 per million,[8] and no evidence suggests the rate is higher during pregnancy. The life-threatening nature of anaphylaxis, however, necessitates that providers have resources in place for its immediate management.

No evidence of adverse pregnancy outcomes

Randomised controlled trials and observational studies, involving hundreds

Box 1. Further resources

Healthcare professionals

Public Health England (PHE) guidance: https://www.gov.uk/guidance/pertussis-whooping-cough-immunisation-for-pregnant-women-resources-and-training#training-resource-on-pertussis-vaccination-in-pregnancy-for-health-professionals and https://www.gov.uk/government/publications/influenza-vaccination-in-pregnancy-advice-for-healthcare-professionals

Health Education England immunisation eLearning: https://www.e-lfh.org.uk/programmes/immunisation/

Oxford Vaccine Knowledge Project (information on vaccines): vk.ovg.ox.ac.uk

Pregnant women

PHE leaflets: https://www.gov.uk/government/publications/resources-to-support-whooping-cough-vaccination *and* https://www.gov.uk/government/publications/flu-vaccination-leaflet-for-pregnant-women

The MatImms mobile app (provides information and personalised vaccine schedules): https://play.google.com/store/apps/details?id=uk.ac.imperial.vip_matimms&hl=es_CL

Box 2. Other FAQs from pregnant women

I was vaccinated during my last pregnancy. Should I get vaccinated again?	Yes, influenza and pertussis vaccination is recommended in each pregnancy to ensure optimal protection
Is there a chance that I, or my baby, could get flu or whooping cough from the vaccine?	No, both are non-live vaccines and therefore cannot cause even mild forms of the infections
I'm perfectly healthy. Why do I need the flu vaccine?	Pregnant women are at increased risk of severe disease, and infection can have serious consequences for their unborn baby. The infant will also have increased protection against influenza during the first months of life
Can I have both vaccines on the same day?	Yes, it's safe to have both on the same day
The Boostrix-IPV manufacturer leaflet says there is no information on its use in pregnancy?	This statement is present because vaccine clinical trials were not performed in pregnancy by the manufacturer prior to licensing. It is now recommended by the Department of Health because good evidence shows vaccination is safe and effective.
Isn't it all to make money for drug companies?	The studies confirming the safety/efficacy of vaccination have not been carried out by the manufacturers

Funding

Christine E Jones is funded by the IMmunising PRegnant women and INfants neTwork (IMPRINT) funded by the GCRF Networks in Vaccines Research and Development which was co-funded by the MRC and BBSRC. Additional support for the study was provided by a grant from the British Paediatric Allergy Immunity and Infection Group (BPAIIG). BPAIIG had no role in the study design, data collection, data analysis/interpretation, report writing, or the decision to submit the manuscript for publication

Provenance

Freely submitted; externally peer reviewed.

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of thousands of mother–infant pairs, demonstrate no increased risk of maternal complications (including maternal death, hypertensive disorders, and caesarean section rates) or adverse fetal outcomes (including fetal death, malformations, growth restriction, or premature birth) associated with antenatal vaccination, compared with background rates.[3,7]

No evidence of adverse infant neurodevelopmental outcomes

Public concern has arisen over longer-term outcomes of vaccination, particularly with regards to autism. No evidence demonstrates any association with autism, including a recent study of 82 000 infants whose mothers received pertussis vaccination.[9]

No evidence of risk associated with vaccine adjuvants

Vaccine adjuvants, such as alum (aluminium), improve the immune response to vaccines.

- Alum is present at very low concentration in Boostrix-IPV (the pertussis-containing vaccine), the amount absorbed is extremely low, and no evidence shows adverse effects on cognitive development.[10] Natural exposure to aluminium also occurs regularly.[10]
- Thimerosal/thiomersal (an ethylmercury-based preservative) is no longer used in UK vaccines; however, no evidence of harm was demonstrated with its use.
- Formaldehyde may be present in influenza vaccines (trace amounts). Pork gelatine is not present in the vaccines recommended during pregnancy in the UK.

FURTHER RESOURCES

Box 1 shows further resources for healthcare professionals and pregnant women. Box 2 lists additional information.

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