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Influenza Antibodies, Vaccines, and Breastfeeding

Global Statements about Breastfeeding and H1N1 Influenza A 2009 Virus

November 3, 2009

World Health Organization

Infection prevention and control in health care for confirmed or suspected cases of pandemic (H1N1) 2009 and influenza-like illnesses

www.who.int/csr/resources/publications/SwineInfluenza_infectioncontrol.pdf
http://www.who.int/csr/disease/swineflu/frequently_asked_questions/what/en/index.html

Australia

Government of Western Australia Department of Health –

Guidelines for Obstetric and Neonatal Specialist Services for the Management of Influenza-Like Illness During the Influenza Pandemic Associated with Influenza A (H1N1) 2009 Virus

<http://www.public.health.wa.gov.au/cproot/2391/2/MANAGEMENT%20OF%20OBSTETRIC%20AND%20NEONATAL%20SPECIALIST%20SERVICES%20-%20Version%201%20-%20Final%20-%2024%20July%202009.pdf>

Government of New South Wales Australia Department of Health

Influenza Guidelines for Maternity Services

www.health.nsw.gov.au/policies/gl/2009/pdf/GL2009_015.pdf

Canada

Canadian Medical Association –

Tanaka T, Nakajima, Murashima A, Garcia-Bournissen F, Gideon K & Ito S. 2009. Safety of neuraminidase inhibitors against novel influenza A (H1N1) in pregnant and breastfeeding women.

Health Canada – “Clinical Guidance for Pregnant and Breastfeeding Women with Influenza-Like Illness in the Context of Pandemic H1N1 2009 Virus”

<http://www.phac-aspc.gc.ca/alert-alerte/h1n1/guidance-orientation-07-09-eng.php>

Europe

European Centre for Disease Prevention and Control –

[http://ecdc.europa.eu/en/healthtopics/Pages/Influenza_A\(H1N1\)_Outbreak.aspx](http://ecdc.europa.eu/en/healthtopics/Pages/Influenza_A(H1N1)_Outbreak.aspx)

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United Kingdom Department of Health

Pregnancy, Breastfeeding, and Swine Flu A/H1N1

http://www.dh.gov.uk/en/Healthcare/Children/Maternity/Maternalandinfantnutrition/DH_099965

UK Department of Health and Royal College of Obstetricians and Gynecologists

Pandemic H1N1 2009 Influenza: Clinical Management Guidelines for Pregnancy

http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh_107768.pdf

United States

American Academy of Pediatrics –

<http://aapnews.aappublications.org/cgi/content/full/aapnews.20091012-1v1>

http://www.who.int/csr/disease/swineflu/frequently_asked_questions/what/en/index.html

Academy of Breastfeeding Medicine –

<http://www.bfmed.org/Media/Files/Documents/H1N1%20and%20Breastfeeding%20-%20for%20physicians1.pdf>

Centers for Disease Control and Prevention –

2009 H1N1 Flu (Swine Flu) and Feeding your Baby: What Parents Should Know -

<http://www.cdc.gov/h1n1flu/infantfeeding.htm>

Studies: Impact of Breastfeeding on Infant Immune Response

Carlson A, Thung S & Norwitz E. 2009. H1N1 influenza in pregnancy: what all obstetric care providers ought to know. *Reviews in Obstetrics & Gynecology*; 2(3):193-145.

Breastfeeding strengthens an infant's immune response to influenza. Babies who are not breastfed may be more vulnerable to viral infections.

Hanson L. 2007. Feeding and infant development: breast-feeding and immune function. *Proceedings of the Nutrition Society*, 66:384-396.

Human milk has significant amounts of secretory IgA antibodies directed specifically against the microbial flora of the mother and her environment. This results in broad multifactorial anti-inflammatory defense for the infant.

Hanson, L. 2004. Immunology of Human milk: How Breastfeeding Protects Babies. Amarillo, TX: Pharmasoft Publishing.

See Chapter 6, "Breastfeeding and Protection Against Disease."

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Hanson L. 2003. The transfer of immunity from mother to child. *Ann N Y Acad Sci*; 199-206.
Transfer of immunity occurs through human milk with the presence of Secretory IgA antibodies . Vaccine response is also enhanced.

Hanson, L. 1999. Human milk and host defence: immediate and long-term effects. *Acta Paediatr Suppl*; **88**(430): 42-6.

Human milk may actively stimulate the immune system of the offspring via transfer of anti-idiotypic antibodies and lymphocytes. Breastfeeding provides protection against diarrhea, respiratory tract infections, otitis media, bacteraemia, bacterial meningitis, botulism, urinary tract infections, necrotizing enterocolitis, as well as enhanced protection for years after the termination of breastfeeding against Haemophilus influenza type b infections, otitis media, diarrhea, respiratory infections and wheezing bronchitis. Breastfeeding also has improved vaccine responses.

Hanson L. 1998. Breastfeeding provides passive and likely long-lasting active immunity. *Annals of Allergy, Asthma and Immunology*; 81(6):523-437.

Human milk protects against infections such as both acute and prolonged diarrhea, respiratory tract infections, otitis media, urinary tract infection, H. influenza infections, and other illnesses. In addition, infants may respond better to both infections and vaccines.

Hanson, L & Soderstrom T. 1981. Human milk: Defense against infection. *Prog Clin Biol Res*; 61: 147-59.

The neonate is deficient in the main antibody (secretory IgA) that protects mucosal membranes. While developing this immune system, the breast-fed baby is provided with 0.25-0.5 grams per day of secretory IgA antibodies via the milk. These antibodies, which function in concert with other defense factors in milk such as lactoferrin, are directed against a number of micro-organisms that threaten the neonate. Recent studies suggest that it may also be possible by vaccination of the mother to increase the immunity provided the breast-fed infant via the milk secretory IgA antibodies.

Papst HF, Spady DW. 1990. Effect of Breast Feeding on Antibody Response to Conjugate Vaccine. *Lancet*, Aug 4; 336(8710):2609

Breastfeeding enhances immune response with significantly higher antibody levels.

Van-Coric, M. 1990. Antibody Responses to Parental & Oral Vaccines Where Impaired by Conventional and Low-Protein Formulas as Compared to Breast Feeding". *Acta Paediatr Scand*; 79:1137-42.

Breastfed infants have significantly higher antibody levels than two groups of formula-fed infants. Babies who were breastfed had better serum and secretory responses to perioral and parenteral vaccines than babies who were formula fed.

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Studies: Impact of Maternal Influenza Vaccination on Infants

Deubzer HE, Obaro SK, Newman VO, Adegbola RA, Greenwood BM & Henderson DC. 2004. Colostrum obtained from women vaccinated with pneumococcal vaccine during pregnancy inhibits epithelial adhesion of *Streptococcus pneumoniae*. *Journal of Infectious Diseases*; 190:1758-61.

Maternal vaccination with the pneumococcal polysaccharide vaccine during pregnancy boosts the capacity of colostrum to inhibit the bacteria from attaching to epithelial cells.

Englund JA, Mbawauike IN, Hammill H, et al. 1993. Maternal immunization with influenza or tetanus toxoid vaccine for passive antibody protection in young infants. *Journal of Infectious Disease*; 168:647-656.

Vaccinating a pregnant mother produces anti-influenza antibodies that are transferred to the fetus. The antibodies are present at birth in both cord and infant sera.

Goldman R & Koren G. 2002. Influenza vaccination during pregnancy. *Canadian Family Physician*; 48:1768-9.

The risk of both maternal and fetal morbidity and mortality from influenza seems to be greater than the theoretical risk of adverse effects on pregnancy outcome posed by the inactivated, or "killed" influenza virus vaccine. The vaccine appears to be safe when given during any trimester.

Linder N, Ohel G. 1994. In utero vaccination. *Clin Perinatol*; 21:663-74.

The influenza vaccine given to a pregnant woman provides protection to the infant until the infant is able to become self-immunized.

Munoz FM. 2003. Influenza virus infection in infancy and early childhood. *Paediatric Respiratory Reviews*; 4, 99-104.

Offering influenza vaccine to pregnant women who will deliver during the influenza season can reduce the frequency and severity of influenza disease in infants less than 6 months of age.

Rasmussen S, Jamieson D, MacFarlane K, Cragan J, Williams J & Henderson Z. 2009. Pandemic influenza and pregnant women: summary of a meeting of experts. *American Journal of Public Health*; 99(S2):s248-s254.

Pregnant women are at a higher risk of mortality, morbidity, and pregnancy loss due to complications of influenza. Influenza can also cross the placenta, producing adverse outcomes in the fetus. Despite the risks, pregnant women tend to be less likely to get the influenza vaccine.

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Sumaya CV & Gibbs RS. 1979. Immunization of pregnant women with influenza A/New Jersey/76influenza vaccination program: effects on maternal health and pregnancy outcome. *J Infect Dis*; 140:141-146.

Because antibodies to influenza cross the placenta, vaccinating the pregnant woman can provide protection to infants.

Wutzler P, Schmidt-Ott R, Hoyer H & Sauerbrei A. 2009. Prevalence of influenza A and B antibodies in pregnant women and their offspring. *Journal of Clinical Virology*; 46:161-164.

Influenza vaccination among pregnant women can improve the protection of both the mother and her baby against influenza.

Zaman K, Roy E, Arifeen S, Rahman M, Raqib R, Wilson E, Omer S, Shahid N, Breiman R & Steinhoff M. 2008. Effectiveness of maternal influenza immunization in mothers and infants. *New England Journal of Medicine*; 359(15), 1555-1564.

Giving pregnant women the inactivated or “killed” influenza vaccine reduced influenza illness by 63% in their infants up to 6 months of age.

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