Pregnancy and pandemic influenza A (H1N1) 2009: Information for programme managers and clinicians

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About this document

Pregnant women, especially those with co-morbidities, are at increased risk for complications from all forms of influenza virus infection – seasonal, zoonotic, and pandemic. Influenza in pregnancy is associated with an increased risk of adverse pregnancy outcomes, such as spontaneous abortion, preterm birth, and fetal distress.

Based on available information, the World Health Organization (WHO) has identified the groups that are at increased risk for complications and severe disease from pandemic influenza A (H1N1) 2009 virus infection as including pregnant women and infants and young children <2 years of age.

Pregnant women appear to be approximately 4-5 times more likely to develop severe disease, when compared to non-pregnant individuals in the general population, and this risk is highest in the third trimester. Infants and young children (particularly those <2 years of age and those with underlying chronic medical conditions) have the highest rate of influenza-associated hospitalization. Available data demonstrate that hospitalization rates for children aged <5 years were consistently reported to be at least 2-3 times that of other age groups.[1]

This document provides guidance for the protection and care of women during pregnancy, childbirth and the postpartum period, and of their newborn infants, from influenza virus infection at home, in public places, in the workplace, and in health-care facilities. It aims to make available in one concise document all guidance on pandemic influenza A (H1N1) 2009 virus infection relevant to this programmatic area.

In this document, the first part provides general guidance for pregnant women and their newborn babies during the pandemic. The second part offers considerations for pregnant women working in the health-care services. The last part discusses the care of women, during pregnancy and post partum, and their newborn babies, including those with HIV, who have suspected or confirmed pandemic (H1N1) 2009 virus infection.

Unless specified otherwise, this guidance is drawn from existing WHO documents published on the WHO web site.[2]

This document will be updated as new information becomes available or by the end of 2010, whichever the earlier.

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[1] Transmission dynamics and impact of pandemic influenza A (H1N1) 2009 virus. World Health Organization, *Weekly Epidemiological Record*, 84:46, 481-484, 13 November 2009. Available at: http://www.who.int/wer/2009/wer8446.pdf. Accessed on 29 March 2010.

[2] Pandemic (H1N1) 2009 guidance documents. World Health Organization. Available at: http://www.who.int/csr/resources/publications/swineflu/en/index.html. Accessed on 29 March 2010.

Introduction

Maternity services are among the essential services that need to be ensured during the pandemic. The greatest challenge for organized childbirth services will be at the peak of pandemic virus circulation in a country, when staff members also may be ill and the complication rates among pregnant women or those undergoing childbirth will be highest.

During a pandemic, there are women who are not yet aware that they are pregnant. Therefore, it is important that all women of reproductive age receive information about preventive measures against pandemic influenza. Ideally, prior to the arrival of pandemic influenza, health programme managers should discuss preventive measures with groups in the community and engage them in sharing this information and supporting community members, especially pregnant women, in applying these measures.

Signs and symptoms of pandemic (H1N1) 2009 virus infection

The spectrum of disease caused by pandemic (H1N1) 2009 virus is broad and ranges from non-febrile, mild upper respiratory tract infection to severe or fatal pneumonia.

To date, most cases appear to have uncomplicated, self-limiting typical influenza-like illness. Symptoms include sudden onset fever (typically >38°C), cough, sore throat, malaise, muscle/joint pain, and headache. Gastrointestinal symptoms (nausea, vomiting, and/or diarrhoea) may also exist.

Special considerations for pregnant women and newborns:

- Compared to non-pregnant individuals in the general population, pregnant women are more likely to develop influenza-associated complications, severe disease, and death, especially if they have co-morbidities.[3,4,5,6,7]
- Influenza in pregnancy is associated with increased risk of adverse pregnancy outcomes such as spontaneous abortion, preterm birth, and fetal distress.[3,4,8]
- The risk of complications in newborn infants increases, if their nutritional status is poor and fluid intake is low because of prolonged vomiting, diarrhoea, or inability to feed.
- Newborn infants less frequently present with typical influenza signs, such as cough and fever.[9] Influenza or its complications in newborn infants may

[3] ANZIC Group, Critical illness due to 2009 A/H1N1 influenza in pregnant and postpartum women: population based cohort study. BMJ 2010;340:c1279.
[4] Creanga AA, Johnson TF, Graitcer SB, et al. Severity of 2009 Pandemic Influenza A (H1N1) Virus Infection in Pregnant Women. Obstet Gynecol 2010;115:717-26.
[5] Jamieson DJ, Honein MA, Rasmussen SA, Williams JL, Swerdlow DL, Biggerstaff MS, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. Lancet 2009;374(9688):451-8.
[6] Louie JK, Acosta M, Jamieson DJ, Honein MA. Severe 2009 H1N1 influenza in pregnant and postpartum women in California. N Engl J Med 2010;362(1):27-35.
[7] Siston AM, Rasmussen SA, Honein MA, et al. Pandemic 2009 influenza A(H1N1) virus illness among pregnant women in the United States. JAMA 2010;303:1517-25.
[8] Hewagama S, Walker SP, Stuart RL, et al. 2009 H1N1 influenza A and pregnancy outcomes in Victoria, Australia. Clin Infect Dis 2010;50:686-90.

manifest as apnoea, low grade fever, fast breathing, cyanosis, excessive sleeping, lethargy, feeding poorly, and dehydration. Illnesses caused by influenza virus infection in newborn infants are difficult to distinguish, based on signs alone, from illnesses caused by other respiratory pathogens, e.g. respiratory syncytial virus. Delay in identifying the cause of respiratory illness in newborn infants can lead to additional complications, and therefore, differential diagnosis should include influenza virus infection where its circulation in the community is known.

General guidance for pregnant women, mothers, and their newborns during the pandemic

Protection against infection

The main route for transmission of pandemic (H1N1) 2009 influenza virus seems to be similar to seasonal influenza; that is, via droplets that are expelled by speaking, sneezing, or coughing. People can avoid infection by taking the following measures:

- avoid close contact with people who exhibit symptoms of influenza-like illness (if possible, try to maintain a distance of at least 1 metre);
- avoid touching mouth and nose;
- wash hands thoroughly with soap and water or clean them with an alcohol-based hand sanitizer on a regular basis (especially if touching the mouth and nose or surfaces that are potentially contaminated);
- if possible, reduce the time spent in crowded settings during epidemics in the community; and
- improve airflow in living spaces by opening windows.

It is advisable to practise additional good health habits, including getting adequate sleep, eating nutritious food, and staying physically active.

Special considerations for pregnant women and new mothers and their babies

- Pregnant women, new mothers, and newborn infants should avoid crowded public places whenever possible.
- Pregnant women and new mothers should avoid providing care for those with confirmed, probable, or suspected influenza infection, except for their own newborns.
- Anyone with respiratory symptoms should not provide care for a pregnant woman or a mother and newborn baby.
- Mothers should be encouraged to begin breastfeeding within one hour of giving birth and to breastfeed frequently and exclusively including a period of

[9] Poehling KA, et. al. New Vaccine Surveillance Network: The underrecognized burden of influenza in young children. N Engl J Med. 2006 Jul 6;355(1):31-40. Available at: http://content.nejm.org/cgi/content/short/355/1/31. Accessed on 29 March 2010.

pandemic (H1N1) 2009 circulation. Infants who are not breastfed are more vulnerable to infectious diseases, including severe respiratory tract infection.

- Inform parents and caretakers about how to protect infants from virus infections that cause respiratory illnesses, including pandemic (H1N1) 2009, by:
  - Washing hands frequently with soap and water and cleaning soiled surfaces to keep the environment free from virus contamination, especially since infants have a tendency to place their hands in their mouths.
  - Adhering to **respiratory etiquette**—that is, covering their mouth and nose, when coughing or sneezing. If a tissue is used, it should be discarded in a bin with a lid and then hands should be washed.[10]
  - Keeping newborn infants close to their mothers. In general, this closeness promotes infant survival from various threats.

Specific measures

- Antivirals for prophylaxis are generally not recommended. This includes pregnant women and newborn infants exposed to pandemic (H1N1) 2009 virus.[11]
- When pandemic (H1N1) 2009 vaccines become available in a country, pregnant women should be immunized as a priority group given their increased risk of complications and death.[12,13]
- From May 2010 the new seasonal influenza vaccines (e.g. those prepared for the 2010 southern hemisphere influenza season) will include protection against pandemic (H1N1) 2009 and can be given to pregnant women. Older seasonal vaccines not containing a pandemic 2009 strain will not protect against the pandemic (H1N1) 2009 virus[14].
- Pandemic (H1N1) 2009 and seasonal influenza vaccines are not recommended for infants below 6 months of age.

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[10] Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care: WHO interim guidelines. World Health Organization, June 2007. Available at: http://www.who.int/csr/resources/publications/swineflu/WHO_CD_EPR_2007_6/en/index.html. Accessed on 29 March 2010.

[11] WHO Guidelines for Pharmacological Management of Pandemic (H1N1) 2009 Influenza and other Influenza Viruses. World Health Organization, February 2010. Available at: http://www.who.int/csr/resources/publications/swineflu/h1n1_use_antivirals_20090820/en/index.html. Accessed on 29 March 2010.

[12] Safety of pandemic vaccines. Pandemic (H1N1) 2009 briefing note 6. World Health Organization, 6 August 2009. Available at: http://www.who.int/csr/disease/swineflu/notes/h1n1_safety_vaccines_20090805/en/index.html. Accessed on 29 March 2010.

[13] WHO recommendations on pandemic (H1N1) 2009 vaccines. Pandemic (H1N1) 2009 briefing note 2. World Health Organization, 13 July 2009. Available at: http://www.who.int/csr/disease/swineflu/notes/h1n1_vaccine_20090713/en/index.html. Accessed on 29 March 2010.

[14] Serum cross-reactive antibody response to a novel Influenza A (H1N1) virus after vaccination with seasonal influenza vaccine. US Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, 22 May 2009; 58(19):521-552. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5819a1.htm. Accessed on 29 March 2010.

- Only inactivated influenza vaccine is suitable for pregnant women and children less than 24 months of age. Live attenuated influenza vaccine should not be used in this population.
- Vaccination is also recommended for all health care workers.[13]

Health care during and following pregnancy and childbirth in the pandemic

All pregnant women and their babies should be protected against influenza virus infection.

Provide standard health care during and following pregnancy and childbirth as recommended in national guidelines. In the context of pandemic (H1N1) 2009, additional considerations include the following:

Antenatal care

- When pandemic (H1N1) influenza transmission is occurring in the community, consider reducing antenatal clinic visits to the minimum required[15] and advise women with low-risk pregnancies to postpone clinic visits during early pregnancy for a few weeks.
- Advise pregnant women to avoid crowded places, whenever possible, during community outbreaks. This includes avoiding long waits in crowded clinic waiting areas or using public transportation when coming for health services and for any other travel.
- Organize care for asymptomatic pregnant women in separate areas from those for ill women and apply triage criteria, i.e. check quickly for symptoms of influenza, including fever and respiratory symptoms. If a woman has these symptoms, she should be separated from those without symptoms. Mechanisms should be in place (e.g. posters, signs) which would facilitate women with symptoms to self-separate upon arrival at the health facility and to not wait in an area with asymptomatic pregnant women.
- Provide adequate information on the prevention of influenza and steps to take in case of symptoms that suggest influenza infection.
- Help pregnant women to develop their birth and emergency preparedness plans and inform them about any relevant reorganization of health services in a pandemic situation.
- When attending pregnant women, use all preventive measures to avoid transmission of infection. Vaccination is recommended for all healthcare workers.

Childbirth and postnatal care for the mother

- On admission, check for any symptoms and signs suggesting influenza infection.

[15] Pregnancy, childbirth, postpartum and newborn care. A guide for essential practice. World Health Organization, United Nations Population Fund, UNICEF, and the World Bank. Geneva, Switzerland, 2009. Available at: http://www.who.int/making_pregnancy_safer/documents/924159084x/en/index.html. Accessed on 29 March 2010.

- Apply infection control measures and ensure that during and following childbirth, pregnant women and their newborn infants are not exposed to symptomatic individuals with acute respiratory illness. Have separate areas for labour and delivery for women with pandemic (H1N1) 2009 virus infection (see section on "Infection control and prevention" below).
- Allow birth companions, but screen them for infection (i.e. take their history, measure body temperature, and look for signs of influenza infection). If infection is a possibility, arrange for an alternative, healthy birth companion. Emphasize to the companion the importance of preventive measures during the mother's and newborn's stay.
- Develop discharge criteria; reduce the length of stay in the postnatal ward to the minimum required by maternal and newborn conditions, and inform community services of any change.
- Provide women and their families with adequate information on prevention of infection with pandemic (H1N1) 2009 virus and the steps to take if symptoms suggestive of virus infection develop after discharge.

Newborn care and breastfeeding

- Do not separate the baby from the mother. Institute rooming-in.
- Ensure adherence to WHO recommendations on protecting, promoting, and supporting breastfeeding,[16] which includes initiating breastfeeding within the first hour of life to establish exclusive breastfeeding.
- Minimize contact between health-care workers and the mother-baby dyad and minimize the time spent in hospital by mother and baby as much as possible.
- Implement screening procedures and limit the number of visitors to maternities and newborn care units.

Considerations for pregnant women in the workplace

- Pregnant women working in professions that involve interaction with large numbers of people or groups or where they may come into contact with infected persons should follow the same guidelines as all other persons and should carefully follow recommended infection prevention and control measures (see section on "Infection control and prevention" below).
- Pregnant women working in high-risk professions involving direct contact with people with suspected, probable or confirmed influenza (e.g. nurses or doctors caring for hospitalized patients) should be familiar with infection prevention and control measures and advised to strictly adhere to Standard and Droplet Transmission Precautions.[17] It is recommended, where available, that pregnant

[16] For WHO recommendations see Breastfeeding. World Health Organization, 2010. Available at: http://www.who.int/child_adolescent_health/topics/prevention_care/child/nutrition/breastfeeding/en/index.html. Accessed on 29 March 2010.

[17] Infection prevention and control in health care for confirmed or suspected cases of pandemic (H1N1) 2009 and influenza-like illnesses. World Health Organization, 16 December 2009. Available at: http://www.who.int/csr/resources/publications/swineflu/swineinfinfcont/en/index.html. Accessed on 29 March 2010.

women working in health care should be vaccinated. Upon request, and if the situation allows, reassignment may be considered to duties where they are less likely to be in close contact with people who may have pandemic (H1N1) 2009 virus infection.

Pregnant women who have suspected or confirmed pandemic (H1N1) 2009 virus infection

In addition to appropriate care related to pregnancy, childbirth, and the postnatal period, care for pregnant women or mothers with newborn infants who have suspected or confirmed pandemic (H1N1) 2009 virus infection includes interventions for infection prevention and control and clinical management of pandemic (H1N1) 2009 virus infection.[10,11,18]

Infection prevention and control

- Services for pregnant women and new mothers and babies with acute respiratory infection (ARI) should be separated from services for other pregnant women and other hospitalized patients.
- A separate area for childbirth should be maintained for women with influenza.
- Rooms should be adequately ventilated.
- Newborn babies should be roomed-in with mothers even if the mother has pandemic (H1N1) 2009 virus infection. The benefits for the baby of not separating it from its mother in the early newborn period are well documented; keeping the baby with the mother provides protective effects for child survival, in general, and early initiation of breastfeeding allows passive transfer of antibodies that protect the newborn infant from infections, including respiratory infections. This is especially important in developing countries. Currently, there is no evidence that the potential risk of newborn infection with pandemic (H1N1) 2009 outweighs the risk that would result from separating the baby from the mother and from not being breastfed.
- An ill mother should practise cough or sneeze etiquette, perform hand hygiene regularly, and keep her room well-ventilated.
- Health-care workers should follow recommended infection prevention practices, including those for cleaning surfaces, change linens, and handling waste disposal.
- Health-care providers should wear face masks properly whenever they are in contact with infected individuals.
- Additionally, personal protection equipment should be used during childbirth since splashes are common.

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[18] Clinical management of human infection with pandemic (H1N1) 2009: revised guidance. World Health Organization, November 2009. Available at: http://www.who.int/csr/resources/publications/swineflu/clinical_management/en/index.html. Accessed on 29 March 2010.

- Patients with respiratory symptoms, including pregnant women or mothers should be asked to:
  - wear face masks when being transported within health-care facilities;
  - cover their mouth and nose, when coughing or sneezing;
  - practice hand hygiene, washing often with soap; and
  - dispose of infected waste (e.g. soiled tissue) in a bin with a lid.

Further infection prevention and control guidance is available from WHO website at http://www.who.int/csr/disease/swineflu/en/index.html

Management of pandemic (H1N1) 2009 virus infection during and following pregnancy, childbirth, and postnatal care

The clinical management of pregnant women infected with pandemic (H1N1) 2009 virus includes management of influenza[18] and care specific to pregnancy, childbirth, and the postnatal period.[15,19]

Management of influenza during pregnancy

The following points are to be considered during pregnancy:

- Pregnant women who meet the current case definition for uncomplicated illness with confirmed or suspected pandemic (H1N1) 2009 virus should be treated early with the antiviral medications oseltamivir or zanamivir. The regimen is the same as the regimen for other adults. Treatment is for five days.
- Treatment with antiviral medications should begin as soon as possible and without waiting for results of diagnostic testing. A negative laboratory test should not stop treatment in a patient with clinical suspicion of influenza.
- Patients who have severe or progressive clinical illness should be treated with oseltamivir. This recommendation applies to all patient groups, including pregnant women. Currently, there are no data supporting administration of oseltamivir in doses higher than 75 mg twice daily for pregnant women.
- Danger signs that can signal progression to more severe disease in pregnant women are the same as in other patients (i.e. shortness of breath either during physical activity or while resting, difficulty in breathing, turning blue, bloody or coloured sputum, chest pain, altered mental state, high fever that persists beyond three days, and low blood pressure).
- Fever (>38° C) in early pregnancy is associated with increased risk of fetal anomalies and, in late pregnancy, with adverse perinatal outcomes. Treat fever associated with pandemic (H1N1) 2009 virus infection in pregnant women or women in labour or breastfeeding with paracetamol (acetaminophen).
- Explain the importance of adequate nutrition and fluid intake to the woman and her family.

[19] Managing complications in pregnancy and childbirth. A guide for midwives and doctors. World Health Organization., 2003. Available at: http://www.who.int/making_pregnancy_safer/documents/9241545879/en/index.html. Accessed on 29 March 2010.

- Prophylactic antibiotics are not recommended.
- Co-infections must be treated early. Ensure that antimicrobials for treating any co-infections are safe for use during pregnancy and lactation.[19]
- If oxygen is required for severe pneumonia, ensure that oxygen saturation (SaO_2) remains above 92-95%.

Management of influenza during and following childbirth

Women with pandemic (H1N1) 2009 virus infection face a higher risk of preterm labour and delivery.

- Balance the advantages of use of tocolysis with potential harm related to tachycardia, hypotension, or other side effects.
- Corticosteroids for promotion of fetal lung maturation in suspected preterm labour or for anticipated preterm labour are safe, when used at the recommended dose for this indication.[19]
- If a woman has an infection with pandemic (H1N1) 2009 virus, there is a higher risk of fetal distress and increased risk of operative delivery.
- Balance the risk of operative vaginal delivery with the risk of caesarean delivery and anaesthesia in a severely ill woman.

Newborn care

- Keep ill babies with their mothers.
- If the mother is ill with influenza, she should follow measures to prevent transmission. These include covering coughs and sneezes when caring for and breastfeeding the baby, as well as performing frequent hand hygiene.
- Mothers should be encouraged to initiate breastfeeding within one hour of giving birth and to breastfeed frequently and exclusively.
- The mother can continue breastfeeding, even if she is ill and on antiviral medicines. She should take additional fluids, especially if she has fever.
- If severe maternal illness prevents the mother from feeding the infant at her breast, she should be helped to express her breast milk and feed it to the infant by cup or cup and spoon.
- Data on treatment of newborn infants with pandemic (H1N1) virus infection are limited. However, newborn infants with severe or deteriorating illness should be treated with antivirals. Give oseltamivir 3 mg/kg/dose once daily for 5 days to newborn infants younger than 14 days. For older infants, give oseltamivir 3 mg/kg/dose twice daily for five days.[11]
- Ensure that newborn infants are not given any medications for prophylaxis or treatment, including paracetamol (acetaminophen) for fever, without medical advice. Acetylsalicylic acid (aspirin) should be avoided because of the risk of Reye's syndrome.