Pandemic Influenza A H1N1

Clinical management Protocol
and
Infection Control Guidelines

Directorate General of Health Services
Ministry of Health and Family Welfare
Government of India

Pandemic Influenza A H1N1
(Earlier called Swine Flu)

Clinical Management Protocol

1. Introduction

Influenza like Illness caused by Influenza A [H1N1], a re-assorted influenza virus, was reported from Mexico on 18th March, 2009 and rapidly spread to neighboring United States and Canada. Subsequently the disease spread to all the continents. World Health Organization [WHO] has raised the level of Influenza pandemic alert from phase 5 to 6 on 11.06.09**.** As per WHO, we are now at the start of 2009 Influenza pandemic. As per WHO assessment the overall severity of Influenza pandemic is moderate implying that most people recover from infection without the need for hospitalization or the medical care. As on 13th August 2009 World Health Organization has reported 1,82,166 laboratory confirmed cases of influenza A/H1N1 and 1799 deaths from 178 countries.

India reported its first case on 13th May, 2008. Most of the cases reported subsequently were travel related cases among those traveling to India from affected countries. As on 20th August, 12,604 persons have been tested so far out of which 2401 are positive for Influenza A H1N1 [Swine]. Substantial number of cases now being reported from Maharashtra (Mumbai and Pune), Karnataka (Bangalore) and Tamil Nadu (Chennai) are indigenous cases. Thirty six laboratory confirmed cases have died. Majority of those who died had some underlying diseases and have reported late to the identified health care facility.

2. Epidemiology

2.1 The agent

Genetic sequencing shows a new sub type of influenza A (H1N1) virus with segments from four influenza viruses: North American Swine, North American Avian, Human Influenza and Eurasian Swine.

2.2 Host factors

The majority of these cases have occurred in otherwise healthy young adults.

2.3 Transmission

The transmission is by droplet infection and fomites.

2.4 Incubation period

1-7 days.

2.5 Communicability

From 1 day before to 7 days after the onset of symptoms. If illness persist for more than 7 days, chances of communicability may persist till resolution of illness. Children may spread the virus for a longer period.

There is substantial gap in the epidemiology of the novel virus which got re-assorted from swine influenza.

3. Clinical features

Important clinical features of swine influenza include fever, and upper respiratory symptoms such as cough, running nose and sore throat. Head ache, body ache, fatigue diarrhea and vomiting have also been observed.

There is insufficient information to date about clinical complications of the current pandemic influenza A (H1N1) virus infection. Clinicians should expect complications to be similar to seasonal influenza: sinusitis, otitis media, croup, pneumonia, bronchiolitis, status asthamaticus, myocarditis, pericarditis, myositis, rhabdomyolysis, encephalitis, seizures, toxic shock syndrome and secondary bacterial pneumonia with or without sepsis. Individuals at extremes of age and with preexisting medical conditions are at higher risk of complications and exacerbation of the underlying conditions.

The standard case definition is at Annexure-I

4. Investigations

Routine investigations required for evaluation and management of a patient with symptoms as described above will be required. These may include haematological, biochemical, radiological and microbiological tests as necessary.

Confirmation of Pandemic influenza A(H1N1) infection is through:

- Real time RT PCR or
- Isolation of the virus in culture or
- Four-fold rise in virus specific neutralizing antibodies.

For confirmation of diagnosis, clinical specimens such as nasopharyngeal swab, throat swab, nasal swab, wash or aspirate, and tracheal aspirate (for intubated patients) are to be obtained. The sample should be collected by a trained physician / microbiologist preferably before administration of the anti-viral drug. Keep specimens at 4°C in viral transport media until transported for testing. The samples should be transported to designated laboratories with in 24 hours. If they cannot be transported then it needs to b stored at -70°C. Paired blood samples at an interval of 14 days for serological testing should also be collected.

5. Treatment

The guiding principles are:

- ❋ Early implementation of infection control precautions to minimize nosocomical / household spread of disease
- ❋ Prompt treatment to prevent severe illness & death.
- ❋ Early identification and follow up of persons at risk.

5.1 Infrastructure / manpower / material support

- Isolation facilities: if dedicated isolation room is not available then patients can be cohorted in a well ventilated isolation ward with beds kept one metre apart.
- Manpower: Dedicated doctors, nurses and paramedical workers.
- Equipment: Portable X Ray machine, ventilators, large oxygen cylinders, pulse oxymeter
- Supplies: Adequate quantities of PPE, disinfectants and medications (Oseltamivir, antibiotics and other medicines)

5.2 Standard Operating Procedures

- Reinforce standard infection control precautions i.e. all those entering the room must use high efficiency masks, gowns, goggles, gloves, cap and shoe cover.
- Restrict number of visitors and provide them with PPE.
- Provide antiviral prophylaxis to health care personnel managing the case and ask them to monitor their own health twice a day.
- Dispose waste properly by placing it in sealed impermeable bags labeled as Bio- Hazard.

5.3 Oseltamivir Medication

- Oseltamivir is the recommended drug both for prophylaxis and treatment.
- In the current phase, if a person conforms to the case definition of suspect case, then he would be provided Oseltamivir.

- <u>Dose for treatment is as follows</u>:
  - By Weight:
  - For weight <15kg 30 mg BD for 5 days
  - 15-23kg 45 mg BD for 5 days
  - 24-<40kg 60 mg BD for 5 days
  - >40kg 75 mg BD for 5 days
  - For infants:
  - < 3 months 12 mg BD for 5 days

- 3-5 months 20 mg BD for 5 days
- 6-11 months 25 mg BD for 5 days

- It is also available as syrup (12mg per ml)
- If needed dose & duration can be modified as per clinical condition.

Adverse reactions:

Oseltamivir is generally well tolerated, gastrointestinal side effects (transient nausea, vomiting) may increase with increasing doses, particularly above 300 mg/day. Occasionally it may cause bronchitis, insomnia and vertigo. Less commonly angina, pseudo membranous colitis and peritonsillar abscess have also been reported. There have been rare reports of anaphylaxis and skin rashes. In children, most frequently reported side effect is vomiting. Infrequently, abdominal pain, epistaxis, bronchitis, otitis media, dermatitis and conjunctivitis have also been observed. There is no recommendation for dose reduction in patients with hepatic disease. Though rare reporting of fatal neuro-psychiatiric illness in children and adolescents have been linked to oseltamivir, there is no scientific evidence for a causal relationship.

5.4 Supportive therapy

- IV Fluids.
- Parentral nutrition.
- Oxygen therapy/ ventilatory support.
- Antibiotics for secondary infection.
- Vasopressors for shock.
- Paracetamol or ibuprofen is prescribed for fever, myalgia and headache. Patient is advised to drink plenty of fluids. Smokers should avoid smoking. For sore throat, short course of topical decongestants, saline nasal drops, throat lozenges and steam inhalation may be beneficial.
- Salicylate / aspirin is strictly contra-indicated in any influenza patient due to its potential to cause Reye's syndrome.
- The suspected cases would be constantly monitored for clinical / radiological evidence of lower respiratory tract infection and for hypoxia (respiratory rate, oxygen saturation, level of consciousness).

- Patients with signs of tachypnea, dyspnea, respiratory distress and oxygen saturation less than 90 per cent should be supplemented with oxygen therapy. Types of oxygen devices depend on the severity of hypoxic conditions which can be started from oxygen cannula, simple mask, partial re-breathing mask (mask with reservoir bag) and non re-breathing mask. In children, oxygen hood or head boxes can be used.
- Patients with severe pneumonia and acute respiratory failure ($SpO_2 < 90\%$ and $PaO_2 < 60$ mmHg with oxygen therapy) must be supported with mechanical ventilation. Invasive mechanical ventilation is

preferred choice. Non invasive ventilation is an option when mechanical ventilation is not available. To reduce spread of infectious aerosols, use of HEPA filters on expiratory ports of the ventilator circuit / high flow oxygen masks is recommended.

- Maintain airway, breathing and circulation (ABC);
- Maintain hydration, electrolyte balance and nutrition.
- If the laboratory reports are negative, the patient would be discharged after giving full course of oseltamivir. Even if the test results are negative, all cases with strong epidemiological criteria need to be followed up.
- Immunomodulating drugs has not been found to be beneficial in treatment of ARDS or sepsis associated multi organ failure. High dose corticosteroids in particular have no evidence of benefit and there is potential for harm. Low dose corticosteroids (Hydrocortisone 200-400 mg/ day) may be useful in persisting septic shock (SBP < 90).
- Suspected case not having pneumonia do not require antibiotic therapy. Antibacterial agents should be administered, if required, as per locally accepted clinical practice guidelines. Patient on mechanical ventilation should be administered antibiotics prophylactically to prevent hospital associated infections.

5.5 Discharge Policy

It has been observed that some of the patients even though asymptomatic, continue to test positive for influenza A H1N1. A treated and recovered patient, even though testing positive, has very little possibility of infecting others. In view of the above, the following recommendations are made:

- Patients who responded to treatment after two to three days and become totally asymptomatic should be discharged after 5 days of treatment. There is no need for a repeat test.

- Patients who continue to have symptoms of fever, sore throat etc. even on the 5th day should continue treatment for 5 more days. If the patient become asymptomatic during the course of treatment there is no need to test further.

- For patients who continue to be symptomatic even after 10 days of treatment or those cases with respiratory distress and in whom secondary infection is taken care of, and if patient continue to shed virus, then resistance of the patients to anti viral would be tested. The dose of anti viral may be adjusted on case to case basis.

The family of patients discharged earlier should be educated on personal hygiene and infection control measures at home; children should not attend school during this period.

5.6 Chemoprophylaxis

(i) Chemoprophylaxis for health care workers at high risk.

- The treating physicians and other paramedical personnel at the isolation facility would be put on chemoprophylaxis.

(ii) Chemoprophylaxis for contacts

- Chemoprophylaxis is advised for those contacts with high risk (with under lying systemic diseases; extremes of age[< 5 years and 65> years]
- In phase-5, if the clusters are reported for the first time, and given that those exposed are known and can be traced easily, then family, social and community contacts should be given Chemoprophylaxis.

(iii) Mass Chemoprophylaxis:

- The strategy of containment by geographic approach by giving oseltamivir to every individual in a prescribed geographic limit of 5 km from the epicenter(The village/city where the cluster is reported) would be applied:
  - If the virus is lethal and causing severe morbidity and high mortality
  - Though affecting humans, is not efficiently transmitting in our population
  - If the cluster is limited by natural geographic boundaries.

  This strategic decision would be taken by the RRT in consultation with State Health Department/MOHFW, Government of India.

- All close contacts of suspected, probable and confirmed cases. Close contacts include household /social contacts, family members, workplace or school contacts, fellow travelers etc.
- All health care personnel coming in contact with suspected, probable or confirmed cases
- Oseltamivir is the drug of choice.
- Prophylaxis should be provided till 10 days after last exposure (maximum period of 6 weeks)
  - By Weight:

- For weight <15kg 30 mg OD
- 15-23kg 45 mg OD
- 24-<40kg 60 mg OD
- >40kg 75 mg OD

  - For infants:

  - < 3 months not recommended unless situation judged critical due to limited data on use in this age group
  - 3-5 months 20 mg OD
  - 6-11 months 25 mg OD

5.7 Non-Pharmaceutical Interventions

- Close Contacts of suspected, probable and confirmed cases should be advised to remain at home (voluntary home quarantine) for at least 7 days after the last contact with the case. Monitoring of fever should be done for at least 7 days. Prompt testing and hospitalization must be done when symptoms are reported.
- All suspected cases, clusters of ILI/SARI cases need to be notified to the State Health Authorities and the Ministry of Health & Family Welfare, Govt. of India (Director, EMR and NICD)

6. Laboratory Tests

- The samples are to be tested in BSL-3 or BSL 2+ laboratory with BSL-3 precautions. The apex laboratories are:

(i) National Institute of Communicable Diseases, 22, Sham Nath Marg, Delhi [Tel. Nos. Influenza Monitoring Cell: 011-23921401; Director: 011-23913148]

(ii) National Institute of Virology, 20-A, Dr. Ambedkar Road, Pune-411001 [Tel.No. 020-26124386]

There is a network of 16 other laboratories that can test for Influenza A H1N1. This network is being expanded to include private laboratories. The updated list is available on the web site of Ministry of Health and Family Welfare (www.mohfw.nic.in).

Guidelines on Infection control Measures

Infection control measures would be targeted according to the risk profile as follows:

1. Health facility managing the human cases of Influenza A H1N1

1.1 During Pre Hospital Care

- Standard precautions are to be followed while transporting patient to a health-care facility. The patient should also wear a three layer surgical mask.
- Aerosol generating procedures should be avoided during transportation as far as possible.
- The personnel in the patient's cabin of the ambulance should wear full complement of PPE including N95 masks, the driver should wear three layered surgical mask.
- Once the patient is admitted to the hospital, the interior and exterior of the ambulance and reusable patient care equipment needs to be sanitized using sodium hypochlorite / quaternary ammonium compounds.
- Recommended procedures for disposal of waste (including PPE used by personnel) generated in the ambulance while transporting the patient should be followed.

1.2 During Hospital Care

- The patient should be admitted directly to the isolation facility and continue to wear a three layer surgical mask.
- The identified medical, nursing and paramedical personnel attending the suspect/ probable / confirmed case should wear full complement of PPE . If splashing with blood or other body fluids is anticipated, a water proof apron should be worn over the PPE.
- Aerosol-generating procedures such as endotracheal intubation, nebulized medication administration, induction and aspiration of sputum or other respiratory secretions, airway suction, chest physiotherapy and positive pressure ventilation should be performed by the treating physician/ nurse wearing full complement of PPE with N95 respirator on.
- Sample collection and packing should be done under full cover of PPE with N-95 respirator .
- Perform hand hygiene before and after patient contact and following contact with contaminated items, whether or not gloves are worn.
- Until further evidence is available, infection control precautions should continue in an adult patient for 7 days after resolution of symptoms and 14 days after resolution of symptoms for children younger than 12 years because of longer period of viral shedding

expected in children. If the patient insists on returning home, after resolution of fever, it may be considered, provided the patient and household members follow recommended infection control measures and the cases could be monitored by the health workers in the community.

- The virus can survive in the environment for variable periods of time (hours to days). Cleaning followed by disinfection should be done for contaminated surfaces and equipments.
- The virus is inactivated by a number of disinfectants such as 70% ethanol, 5% benzalkonium chloride (Lysol) and 10% sodium hypochlorite. Patient rooms/areas should be cleaned at least daily and finally after discharge of patient. In addition to daily cleaning of floors and other horizontal surfaces, special attention should be given to cleaning and disinfecting frequently touched surfaces. To avoid possible aerosolization of the virus, damp sweeping should be performed. Horizontal surfaces should be dusted by moistening a cloth with a small amount of disinfectant.
- Clean heavily soiled equipment and then apply a disinfectant effective against influenza virus (mentioned above) before removing it from the isolation room/area. If possible, place contaminated patient-care equipment in suitable bags before removing it from the isolation room/area.
- When transporting contaminated patient-care equipment outside the isolation room/area, use gloves followed by hand hygiene. Use standard precautions and follow current recommendations for cleaning and disinfection or sterilization of reusable patient-care equipment.
- All waste generated from influenza patients in isolation room/area should be considered as clinical infectious waste and should be treated and disposed in accordance with national regulations pertaining to such waste. When transporting waste outside the isolation room/area, gloves should be used followed by hand hygiene.

Case Definition

A *suspected case* of Pandemic influenza A (H1N1) virus infection is defined as a person

with acute febrile respiratory illness (fever $\geq 38^{0}$ C) with onset.:

- *within 7 days of close contact with a person who is a confirmed case of pandemic influenza A (H1N1) virus infection, or*
- *within 7 days of travel to community where there are one or more confirmed pandemic influenza A(H1N1) cases, or*
- *resides in a community where there are one or more confirmed pandemic influenza cases.*

A *probable case* of Pandemic influenza A (H1N1) virus infection is defined as a person with an acute febrile respiratory illness who:

- *is positive for influenza A, but unsubtypable for H1 and H3 by influenza RT-PCR or reagents used to detect seasonal influenza virus infection, or*
- *is positive for influenza A by an influenza rapid test or an influenza immunofluorescence assay (IFA) plus meets criteria for a suspected case*
- *individual with a clinically compatible illness who died of an unexplained acute respiratory –illness who is considered to be epidemiologically linked to a probable or confirmed case.*

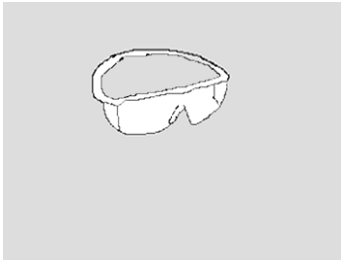
A *confirmed case* of pandemic influenza A (H1N1) virus infection is defined as a person with an acute febrile respiratory illness with laboratory confirmed pandemic influenza A (H1N1) virus infection at WHO approved laboratories by one or more of the following tests:

- *Real Time PCR*
- *viral culture*
- *Four-fold rise in pandemic influenza A (H1N1) virus specific neutralizing antibodies.*

Standard Operating Procedures on Use of PPE

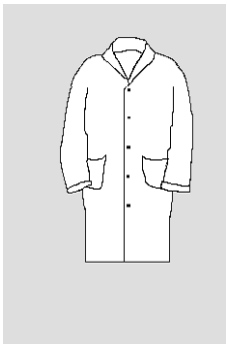
Personal Protection Equipments

PPE reduces the risk of infection if used correctly. It includes:
• Gloves (nonsterile),
• Mask (high-efficiency mask) / Three layered surgical mask,
• Long-sleeved cuffed gown,
• Protective eyewear (goggles/visors/face shields),
• Cap (may be used in high risk situations where there may be increased aerosols),
• Plastic apron if splashing of blood, body fluids, excretions and secretions is anticipated.



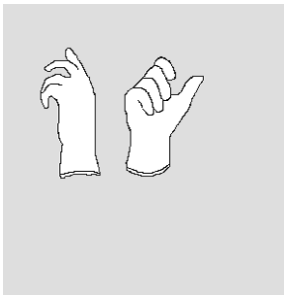
Goggles

N-95 Mask

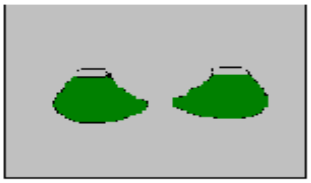


Gown(must for lab work)

Triple layer Mask



Gloves



Shoe covers

The PPE should be used in situations were regular work practice requires unavoidable, relatively closed contact with the suspected human case / poultry.

Correct procedure for applying PPE in the following order:

1. Follow thorough hand wash
2. Wear the coverall.
3. Wear the goggles/ shoe cover/and head cover in that order.
4. Wear face mask
5. Wear gloves

The masks should be changed after every six to eight hours.

Remove PPE in the following order:

• Remove gown (place in rubbish bin).
• Remove gloves (peel from hand and discard into rubbish bin).
• Use alcohol-based hand-rub or wash hands with soap and water.
• Remove cap and face shield (place cap in bin and if reusable place face shield in container for decontamination).
• Remove mask - **by grasping elastic behind ears – do not touch front of mask**
• Use alcohol-based hand-rub or wash hands with soap and water.
• Leave the room.
• Once outside room use alcohol hand-rub again or wash hands with soap and water.

Used PPE should be handled as waste as per waste management protocol

Guidelines/ operating procedures for infection control practices

1. Infection control measures at Individual level

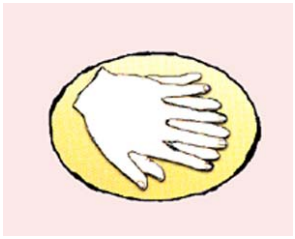
1.1 Hand Hygiene

Hand hygiene is the single most important measure to reduce the risk of transmitting infectious organism from one person to other.

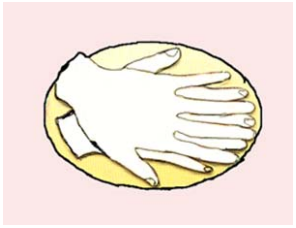
Hands should be washed frequently with soap and water / alcohol based hand rubs/ antiseptic hand wash and thoroughly dried preferably using disposable tissue/ paper/ towel.

- After contact with respiratory secretions or such contaminated surfaces.
- Any activity that involves hand to face contact such as eating/ normal grooming / smoking etc.

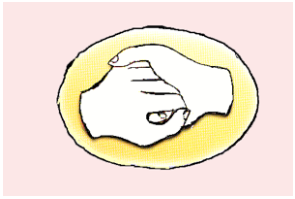
Steps of hand washing



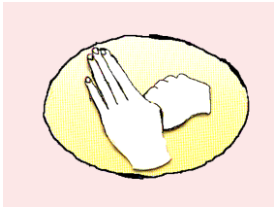
Step 1.
Wash palms and fingers.



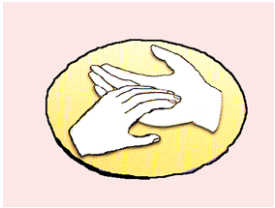
Step 2.
Wash back of hands.



Step 3.
Wash fingers and knuckles.



Step 4.
Wash thumbs.



Step 5.
Wash fingertips.

Step 6.
Wash wrists.

1.2 Respiratory Hygiene/Cough Etiquette

The following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms influenza like illness.

- Cover the nose/mouth with a handkerchief/ tissue paper when coughing or sneezing;
- Use tissues to contain respiratory secretions and dispose of them in the nearest waste receptacle after use;
- Perform hand hygiene (e.g., hand washing with non-antimicrobial soap and water, alcohol-based hand rub, or antiseptic hand wash) after having contact with respiratory secretions and contaminated objects/materials

1.3 Staying away

- Stay arms length away from those showing symptoms of influenza like illness.

1.4 Use of mask

Three layered surgical mask is recommended for medical personnel working in screening areas and in isolation facilities. Medical personnel working in isolation ward or critical care facility performing aerosol generating procedures such as suction, endotracheal intubation etc.

2. Infection control measures at health facility

2.1 Droplet Precautions:

Advise healthcare personnel to observe Droplet Precautions (i.e., wearing a surgical or procedure masks for close contact), in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection, particularly if fever is present. These

precautions should be maintained until it is determined that the cause of symptoms is not an infectious agent that requires Droplet Precautions.

2.2 Visual Alerts

Post visual alerts (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physician offices, outpatient, clinics) instructing patients and persons who accompany them (e.g., family, friends) to inform healthcare personnel of symptoms of a respiratory infection when they first register or care and to **practice Respiratory Hygiene/Cough Etiquette.**

2.3 Use of PPE

- The medical, nurses and paramedics attending the suspect/ probable / confirmed case should wear full complement of PPE
- Use N-95 masks during aerosol-generating procedures.
- Perform hand hygiene before and after patient contact and following contact with contaminated items, whether or not gloves are worn.
- Sample collection and packing should be done under full cover of PPE.

2.4 Decontaminating contaminated surfaces, fomites and equipments

Cleaning followed by disinfection should be done for contaminated surfaces and equipments.

- use phenolic disinfectants, quaternary ammonia compounds , alcohol or sodium hypochlorite. Patient rooms/areas should be cleaned at least daily and terminally after discharge. In addition to daily cleaning of floors and other horizontal surfaces, special attention should be given to cleaning and disinfecting frequently touched surfaces.
- To avoid possible aerosolization of AI virus, damp sweeping should be performed.
- Clean heavily soiled equipment and then apply a disinfectant effective against influenza virus before removing it from the isolation room/area.
- When transporting contaminated patient-care equipment outside the isolation room/area, use gloves followed by hand hygiene. Use standard precautions and follow current recommendations for cleaning and disinfection or sterilization of reusable patient-care equipment.

2.5 Guidelines for waste disposal

- All the waste has to be treated as infectious waste and decontaminated as per standard procedures
- Articles like swabs/gauges etc are to be discarded in the Yellow coloured autoclavable biosafety bags after use, the bags are to be autoclaved followed by incineration of the contents of the bag.

- Waste like used gloves, face masks and disposable syringes etc are to be discarded in Blue/White autoclavable biosafety bags which should be autocalaved/microwaved before disposal
- All hospitals and laboratory personnel should follow the standard guidelines (Biomedical waste management and handling rules, 1998) for waste management.