Status in Odisha

• According to the Govt. of Odisha H&FW Department, death toll has risen to 13 in the state, as of 18\textsuperscript{th} August.
• The total number of patients in the state has crossed 200 mark.
• In 2009, when H1N1 was first discovered in humans, experts regarded it as pandemic.
• Since then, the virus has been known as a regular human flu virus. At present, it continues to spread during the flu season like other strains of flu.
• Apart from Orissa, other states such as Gujarat, Maharashtra, Karnataka, Rajasthan and Telangana also reported H1N1. Therefore, the health experts here are pointing out that the floating population or migrant workers could be the sources of H1N1.
• Swine Flu may be amosnomer.
The Virus

Single stranded RNA Virus (Orthomixovirus)
**Influenza**

**What is it**

- A contagious viral respiratory infection
- Typically, although not always, causes fever (100-102°F for several days),
- Severe aches and pains, exhaustion, coughing, sore throat, congestion and a runny nose.
- Much more intense than cold
- Sudden onset of symptoms

**What it is not**

- A cold – Cold symptoms are similar, such as:
  - Congestion, runny nose and cough,
  - But rarely include fever (very mild, if so),
  - Aches and pains;
  - Almost never exhaustion
Spread of Virus

- Transmitted primarily by droplets or respiratory secretions of infected persons. Also, spread through air-borne transmission.
- An annual global attack rate estimated at 5 – 10% in adults and 20 – 30% in children.
- Secondary bacterial pneumonia is a frequent complication of influenza infection, particularly in elderly people and individuals with certain chronic diseases, resulting in a significant level of morbidity and mortality. An influenza pandemic is a rare but recurrent event.
Droplet from Cough

- It can travel from 3 to 6 feet distance. Larger droplets are $\geq 5$ micron and smaller are $\leq 5$ micron. In a study, it was found out that smaller droplets contain large number of virus.
Spread of Virus

- Direct Contact: oral and nasal secretion
- Indirect Contact: Door knobs, door handles, beds, chairs, Washroom surfaces, Cups, dishes, Medical instruments
- Large Droplet Contact: (droplets produced by breathing, talking, sneezing, coughing) include various cells types (e.g. epithelial cells and cells of the immune system), physiological electrolytes contained in mucous and saliva (e.g. Na+, K+, Cl-), as well as the viruses. Typically travels 1-2 meter.
- Air-borne transmission: droplet nuclei (residue from evaporated droplets) or dust particles containing microorganisms can remain suspended in air for long periods of time.
- Aerosol generation procedures: Ventilation (BiPAP and CPAP), endotracheal intubation, airway suction, tracheostomy, chest physiotherapy, nebulizer treatment and bronchoscopy
Survival of Virus H1N1

The Pandemic H1N1 influenza virus can survive on different items for different periods.

- Hard and nonporous surfaces: 24-48 Hours.
- On plastic & stainless steel: it is recoverable up to 24 hours and can be transferred to hands up to 24 hours.
- On cloth, paper and tissue: the virus is recoverable for 8-12 hours and transferable to hands up to 15 minutes.

The virus can survive at humidity of 35-40% and a temperature of 280C (820 F).
Incubation and Infective Period

• The typical incubation period for influenza is 1—4 days (average: 2 days).
• Most healthy adults may be able to infect others beginning 1 day before symptoms develop and up to 5 to 7 days after becoming sick.
• Some people, especially young children and people with weakened immune systems, might be able to infect others for an even longer time.
The Virus

- **Human:** Influenza (Flu)
- **Birds:** Avian Flu
- **Pigs:** Swine Flu
- **Horse:** Horse Flu etc.

**Types of Influenza Virus**

- **Type A** (warm-blooded animals (birds and mammals) can affect human)
- **Type B** (Predominantly Human)
- **Type C** (Predominantly Human) Milder
- **Type D** (cattle; not known to infect human)
• Type A, B, C are classified according to the core proteins.
• Can be further classified according to the surface proteins
  1. HA (18 types) (Hemagglutinin) and
  2. NA (11 types) (Neuraminidase)
Virus Spread & Immunity

H2N2

H3N2

H3N?

H2N2

H3N?
Antigenic Drift & Shift

Mutation
Antigenic drift

Small Mutations

Antigenic shift
New Strain
Antigenic Shift

Diagram showing the process of antigenic shift with examples of bird flu virus and human flu virus infecting a swine cell, leading to the creation of a hybrid flu virus.
Antigenic Shift

Genetic Evolution of H7N9 Virus in China, 2013

Domestic Ducks  H7N3 virus

Wild Birds  H7N9 virus

Domestic Poultry  Multiple H9N2 viruses

Multiple Reassortment Events

Setting: Habitats shared by wild and domestic birds and/or live bird/poultry markets

The eight genes of the H7N9 virus are closely related to avian influenza viruses found in domestic ducks, wild birds and domestic poultry in Asia. The virus likely emerged from "reassortment," a process in which two or more influenza viruses co-infect a single host and exchange genes. This can result in the creation of a new influenza virus. Experts think multiple reassortment events led to the creation of the H7N9 virus. These events may have occurred in habitats shared by wild and domestic birds and/or in live bird/poultry markets, where different species of birds are bought and sold for food. As the above diagram shows, the H7N9 virus likely obtained its HA (hemagglutinin) gene from domestic ducks, its NA (neuraminidase) gene from wild birds, and its six remaining genes from multiple related H9N2 influenza viruses in domestic poultry.

Centers for Disease Control and Prevention
National Center for Immunization and Respiratory Diseases
## Influenza

### Seasonal
- Happens annually and usually peaks between December and February
- Usually some immunity from previous exposures and influenza vaccination
- Certain people are at high-risk for serious complications (infants, elderly, pregnant women, extreme obesity and persons with certain chronic medical conditions)

### Pandemic
- Emergence of a novel virus to which all are susceptible
- New virus is able to replicate and cause disease in humans
- New virus is transmitted efficiently from human-to-human.
- Community level outbreaks in at least one other country in a different WHO region.
Evolution of Flu Virus: H1N1-2009

Generation of new influenza virus strains by genetic recombination (antigenic shift)
Swine Flu (Influenza)

Evolution of swine influenza viruses

North America

- North American avian
- 'classical swine' H1N1
- 'seasonal' H3N2
- 'seasonal' H1N1

1997-2003

- H1N2
- H1N1
- H3N2
- H3N1

- North American triple reassortants: initially only H3N2, then also H1N1, H1N2, H2N3, H3N1

2009

- 2009 H1N1 pandemic

Europe

- Eurasian avian
- 'seasonal' H3N2
- 'seasonal' H1N1

1979

- European swine influenza viruses: 'avian-like' H1N1 'human-like' H3N2 'human-like' H1N2

1984

- H3N2

1994

- H1N2

This figure presents a general outline of the differing evolution of swine influenza viruses in North America and Europe. It does not take account of Asiatic swine influenza viruses. The different colours used represent different genetic lines of the influenza viruses.
Swine (pig) Flu (Influenza)

Symptoms of Swine influenza:

- Intestinal: Diarrhea
- Respiratory: Coughing
- Physiological: Lethargy, Lack of appetite
- Nasopharynx: Sneezing
- Systemic: Fever, Weight loss, Poor growth
Past Pandemics

- **1918 pandemic**: Associated with Influenza A (H1N1).
- **1957**: “Asian Flu”: Influenza A (H2N2); 1-2 million deaths worldwide.
- **1968**: “Hong Kong Flu”: Associated with Influenza A (H3N2) and 700,000 deaths were reported worldwide.
- **2004-2009**: Outbreak of H5N1 was reported in 2003 and has affected poultry in 50 countries and caused human infections in 15 countries with 262 deaths.
- **2009**: Novel Influenza A (H1N1) Virus of swine origin and contained a unique combination of gene segments that has not been identified in the past. The molecular analysis of the novel H1N1 virus has re-assorted segments from American swine, Eurasian swine, Avian and Human virus. It has not been previously detected in pigs or humans.
Symptoms

- Fever,
- Cough, Sore throat,
- Malaise, and headache; Exhaustion
- Vomiting and diarrhoea.
- Breathlessness/Cyanosis
- Altered mental status, and extreme irritability

Complications

- Pneumonia (primary viral or secondary bactererial)
- Encephalopathy/Encephalitis
Risk Groups

- Children younger than 5 years old;
- Adults 65 years of age and older
- Chronic pulmonary condition (including asthma),
- Cardiovascular (except hypertension), renal, hepatic, hematological (including sickle cell disease), neurologic, neuromuscular, or metabolic disorders (including diabetes mellitus);
- Immuno-suppression, including that caused by medications or by HIV;
- Pregnant women;
- Residents of nursing homes/Hospitals
- Obesity.
A suspected case

• acute febrile respiratory illness (reported or documented fever, and one of the following: cough, sore throat, shortness of breath, difficulty in breathing or chest pains) with onset:

1. within 7 days of close contact with a person who is a probable or confirmed case of the new influenza virus infection, or

2. within 7 days of travel to a community internationally where there has been one or more confirmed Pandemic influenza, or

3. resides in a community where there are one or more confirmed new influenza cases.
A Probable case

• An individual with an influenza test that is positive for influenza A (Novel), but is un-subtypable by reagents used to detect seasonal influenza virus infection;

OR

• An individual with a clinically compatible illness or who died of an unexplained acute respiratory illness, considered to be epidemiologically linked to a probable or confirmed case.
A Confirmed case

- An individual with laboratory confirmed new influenza A (Novel) virus infection by one or more of the following:

  - Real-time RT-PCR,
  - Viral culture
  - Four-fold rise in new influenza A (Novel) virus-specific neutralizing antibodies.
Treatment/Chemoprophylaxis

• Treatment with oseltamivir or zanamivir is recommended for all people with suspected or confirmed influenza who require hospitalization.

• Should be initiated as soon as possible after the onset of symptoms. Benefits are maximal when treatment is started within 48 hours of illness.

• Recommended duration of treatment is five days. However, hospitalized patients with severe infection might require longer treatment.
Broad Guidelines For Schools And Educational Institutions

• Avoid any large gathering of students. If, unavoidable, at least 2 meter distance be maintained.

• All class teachers should begin their class with active screening of each student.

• Students, teachers and other employees working in schools/educational institutions are advised to stay at home, if they develop flu like symptoms. They should consult the medical doctor and take treatment as advised including home isolation and drugs for treatment.

• They should continue to stay at home for at least 7 days, if they are advised by the doctor to take Oseltamivir treatment and they should observe home isolation. If, symptoms deteriorate, it should be reported to health authorities, immediately.
Broad Guidelines For Schools And Educational Institutions

- School authorities should not insist on production of medical certificate from such absentees.
- All are advised to wash their hands frequently with soap and water.
- Should observe strict cough/sneeze etiquette i.e. using tissue while sneezing and coughing. The tissue paper so used should be kept in a separate plastic bag, so that it can be disposed of safely.
- Regular cleaning of the area with cleaner they ordinarily use so that all the droplets and shredding from any unnoticed mildly infected students/employees are taken care of.
Cover your Cough

Stop the spread of germs that can make you and others sick!

Cover your mouth and nose with a tissue when you cough or sneeze. Put your used tissue in the waste basket.

You may be asked to put on a facemask to protect others.

If you don't have a tissue, cough or sneeze into your upper sleeve or elbow, not your hands.

Wash hands often with soap and warm water for 20 seconds. If soap and water are not available, use an alcohol-based hand rub.
Broad Guidelines For Schools And Educational Institutions

- Closure of schools has not been recommended by Centre for Disease Control, Atlanta, USA.
- School authority should monitor the health status of students as well as the other ancillary staff in the hostel on regular basis.
- Authorized local medical authority should be called for examination of suspected cases in the hostel.
- School should discourage excursion of the students to the affected countries.
- All the schools should display and circulate “DO’S AND DON’TS” for the infection and frequently asked questions (FAQ) to the students.
To establish the diagnosis of pandemic influenza A

- an upper respiratory sample (nasopharyngeal swab, nasal swab, throat swab, combined oropharyngeal/nasopharyngeal swab, or nasal aspirate) should be collected.
- In intubated patients, an endotracheal aspirate should also be obtained.
- Specimens should be placed in viral transport media and placed on ice (4°C) or refrigerated immediately for transportation to the laboratory.
- Once the samples arrive in the laboratory, they should be stored either in a refrigerator at 4°C or in a -70°C freezer.
- If a -70°C freezer is not available, they should be kept refrigerated, preferably for <1 week.
Guidance for Hospital Treatment

• Standard Precautions to be followed at all patient care areas: hand hygiene, Gloves and use of personal protective equipment (PPE) to avoid direct contact with patient’s blood, body fluids, secretions and non-intact skin, prevention of needle stick/sharp injury and cleaning and disinfection of the environment and equipment.

• Droplet precautions to be followed when caring for patients with influenza A (masks, respirators and eye shield) in isolation facilities.

• Airborne and Contact Precautions should complement Standard Precautions while managing case of Pandemic influenza in critical care facilities.

• Hospitals should follow the hospital waste management protocols as per the hospital waste management rules.

• Dead body should be handled using full cover of PPE.
Guidance for Hospital Treatment

• Hospitals to have advanced life support ambulance with designated paramedic and driver.
• The ambulance staff should follow standard precautions while handling the patient and airborne precautions, if, aerosol generating procedures are done.
• Triple layer surgical masks should be available and worn during transport.
• During transport, optimize the vehicle’s ventilation to increase the volume of air exchange (e.g. opening the windows). When possible, use vehicles that have separate driver and patient compartments.
• Disinfect the ambulance after shifting patient.
• Notify the receiving facility as soon as possible.
Disposal of used masks

Used mask should be considered as potentially infected medical waste:

• In the hospital setting it should be disposed off in the identified infectious waste disposal bag/container.

• In community settings where medical waste management protocol cannot be practiced, it may be disposed off either by burning or deep burial.

• During home care, patients and contacts using triple layer mask should first disinfect used mask with ordinary bleach solution or sodium hypochlorite solution and/or quaternary ammonium household disinfectant and then dispose off either by burning or deep burial.
Face Masks

Triple Layer Mask
Prevents larger particle

N 95 Mask
Filters 0.3 micron particle size
95% filtering
Categorization & Treatment

Category- A

Mild fever plus cough / sore throat with or without body ache, headache, diarrhoea and vomiting.

- Do not require Oseltamivir and symptomatic treatment
- Monitored for their progress and reassessed at 24 to 48 hours by the doctor.
- No testing of the patient for H1N1 is required.
- Confine themselves at home and avoid mixing up with public and high risk members in the family.
Categorization & Treatment

**Category-B**

(i) In addition to symptoms of Category-A, if the patient has high grade fever and severe sore throat, he/she may require home isolation and Oseltamivir; **OR**

(ii) shall be treated with Oseltamivir, if, one or more of the following high risk conditions exist

- Children less than 5 years old;
- Pregnant women;
- Persons aged 65 years or older;
- Patients with lung diseases, heart disease, liver disease, kidney disease, blood disorders, diabetes, neurological disorders, cancer and HIV/AIDS;
- Patients on long term cortisone therapy
Category & Treatment

**Category-C**

Category-A and B patients with one or more of the following:

- Breathlessness, chest pain, drowsiness, fall in blood pressure, sputum mixed with blood, bluish discolouration of nails
- Irritability among small children, refusal to accept feed
- Worsening of underlying chronic conditions

Require testing, immediate hospitalization and treatment including Oseltamivir
Home Care Treatment

- Check with their health care provider about any special care they might need and Whether to take antiviral medications
- Keep away from others as much as possible
- Do not go to work or school while ill. Stay home for at least 24 hours after fever subsides, except to seek medical care or for other necessities. (Fever should subside without the use of a fever-reducing medicine).
- Get plenty of rest.
- Drink clear fluids (such as water, broth, sports drinks, electrolyte beverages for infants) to prevent dehydration.
- Cover coughs and sneezes. Clean hands with soap and water or an alcohol-based hand rub.
- Wear a facemask – if available and tolerable – when sharing common spaces with other household members. This is especially important if other household members are at high risk for complications from influenza.
- Be watchful for emergency warning signs that might indicate need to seek medical attention.
Vaccination

The seasonal flu vaccine is not expected to protect against pandemic Influenza

However, seasonal vaccines mostly contains the viral particle of last pandemic

- It has been recommended that certain groups of the population receive the 2009 H1N1 vaccine.
- It includes pregnant women, people who live with or care for children younger than 6 months of age, healthcare and emergency medical services personnel, persons between the ages of 6 months and 24 years old, and people ages of 25 through 64 years of age who are at higher risk for 2009 H1N1 because of chronic health disorders or compromised immune systems.
Types of Vaccines

Vaccines for the seasonal flu, specific for a year are developed as per the recommendation of the WHO

• Egg-based flu vaccine
• Cell-based flu vaccine
• Recombinant flu vaccine

It can be

• An inactivated (killed) preparation that is injected
• An live attenuated influenza vaccine; normally delivered nasally
• Trivalent or Quadrivalent

Inactivated vaccines can be

• Whole virus vaccines
• Split virus vaccines
• Subunit vaccines
Inactivated vaccines

- **Whole Virus**: a suspension of whole virus particles inactivated by a suitable method.
- **Split Virus**: a suspension treated such that the virus particles have been partially or completely disrupted by physicochemical means.
- **Sub-unit**: a suspension treated so that the preparation consists predominantly of haemagglutinin and neuraminidase antigens.
- **Vaccine with adjuvant**: a suspension of whole virus particles, split or subunit components formulated with an adjuvant.
**Recommended Vaccine Virus for 2017-18**

Recommended composition of influenza virus vaccines for use in the 2017-2018 northern hemisphere influenza season

**Trivalent**

- an A/Michigan/45/2015(H1N1)pdm09-like virus
- an A/Hong Kong/4801/2014 (H3N2)-like virus and
- a B/Brisbane/60/2008 like virus.

**Quadrivalent vaccines** containing two influenza B viruses contain the

- above three viruses and a B/Phuket/3073/2013-like virus
Illness Resembling Influenza

1. Influenza-like illness (ILI) is defined (according to WHO criteria) as:
   - Sudden onset of a fever over 38°C, AND
   - Cough or sore throat, AND
   - An absence of other diagnoses.

2. Severe Acute Respiratory Infections (SARI): For persons ≥ 5 years the definition for SARI is adapted from the WHO protocol on rapid response:
   - Sudden onset of fever over 38°C, AND
   - Cough or sore throat, AND
   - Shortness of breath or difficulty in breathing, AND
   - Requiring hospital admission
Vaccination Contraindicated

• If you have any severe, life-threatening allergies.
  Most, but not all, types of flu vaccine contain a small amount of egg protein.

• If you ever had Guillain-Barré Syndrome (also called GBS).

• If you are not feeling well.
  It is usually okay to get flu vaccine when you have a mild illness, but you might be asked to come back when you feel better.
Risks of Minor Vaccine Reactions

- soreness, redness, or swelling where the shot was given
- hoarseness
- sore, red or itchy eyes
- cough
- fever
- aches
- headache
- itching
- fatigue
Risks of Serious Vaccine Reaction

- There may be a small increased risk of Guillain-Barré Syndrome (GBS) after inactivated flu vaccine. This risk has been estimated at 1 or 2 additional cases per million people vaccinated. This is much lower than the risk of severe complications from flu, which can be prevented by flu vaccine.

- Young children who get the flu shot along with pneumococcal vaccine (PCV13) and/or DTaP vaccine at the same time might be slightly more likely to have a seizure caused by fever.
Information related to Odisha

- The Regional Medical Research Centre (RMRC), Bhubaneswar has been recommended for testing of throat swabs for H1N1 free of cost.

- Joint director public health Bikash Patnaik is I/C of control of Swine Flu
Popular Brands in India

- **Agripal** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Chiron Panacea (Panacea Biotec Ltd)
- **Fiuarix** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Glaxo Smithkline Pharmaceuticals Ltd.
- **Influgen** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Lupin Laboratories Ltd.
- **Influvac** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Solvay Pharma India Pvt Ltd
- **Nasovac** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Serum Institute of India Ltd.
- **Vaxigrip** Influenza Vaccine (A&B), H1N1 Vaccine (Swine Flu) Sanofi Pasteur
Dosages

- **Children:** 6 months through 35 months of age - The first time last season with only one dose, should receive two 0.25 mL doses: one on day 1 followed by another approximately 4 weeks later.
- **36 months through 8 years of age** - The first time last season with only one dose, should receive two 0.5 mL doses: one on day 1 followed by another approximately 4 weeks later.
- **9 years of age and older** should receive a single 0.5 mL intramuscular dose.1
- **Adults** - It should be administered as a single 0.5 mL intramuscular injection.
SWINE FLU
H1 N1

Protect yourself and your family members from Swine Flu!

— Be aware of the symptoms: —
• Fever and cough; sore throat; runny or stuffy nose; difficulty in breathing; other symptoms may include body aches, headache, fatigue, chills, diarrhoea, vomiting, blood in sputum.

Follow the DOs and DONTs

DOs
• Cover your mouth and nose with a handkerchief or tissue paper when you cough or sneeze.
• Wash your hands often with soap and water.
• Avoid touching your eyes, nose or mouth.
• Avoid crowded places; Stay more than an arm’s length from persons afflicted with flu.
• Stay away from public places if you have fever, coughing and sneezing.
• Drink plenty of water and eat nutritious food.
• Sleep well.

DONTs
• Shake hands or use other contact greetings.
• Spit in public.
• Take medicines without consulting the physician.

Medicines are available at various Hospitals and Chemists. Details on www.mohfw.nic.in

In case you need more information, call: 011-23921401; Outbreak Monitoring Cell, National Centre for Disease Control, Delhi

Ministry of Health and Family Welfare
Government of India
THANK YOU