# NOVEL INFLUENZA VIRUS
# Type A / H1N1

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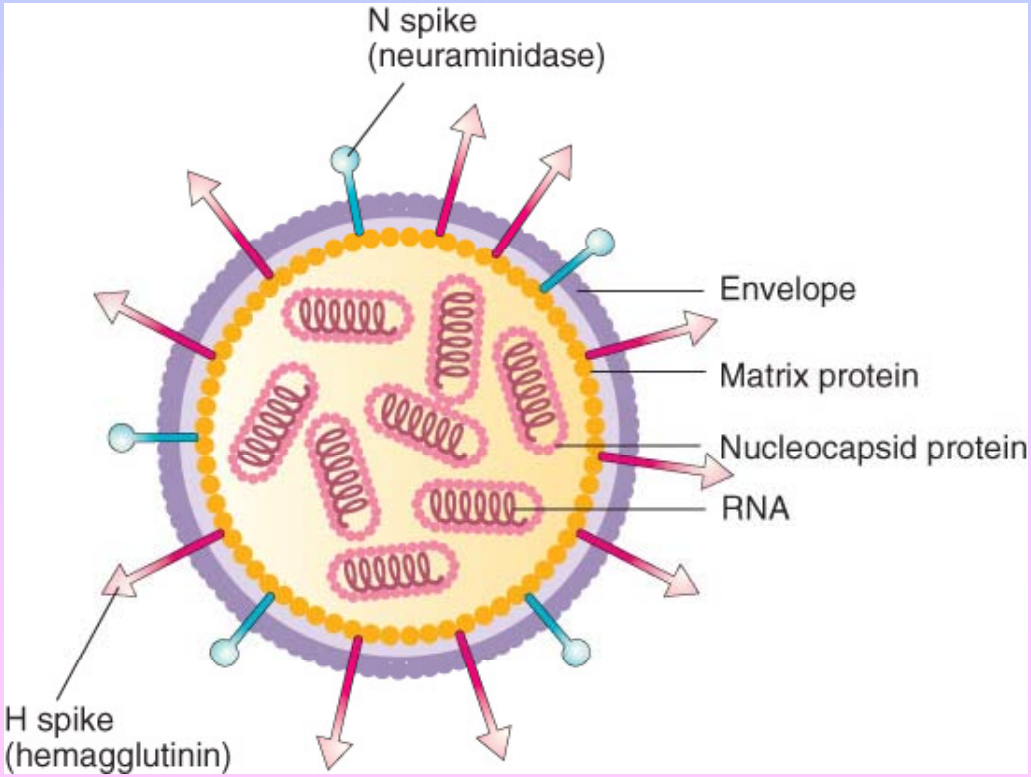
# Influenza

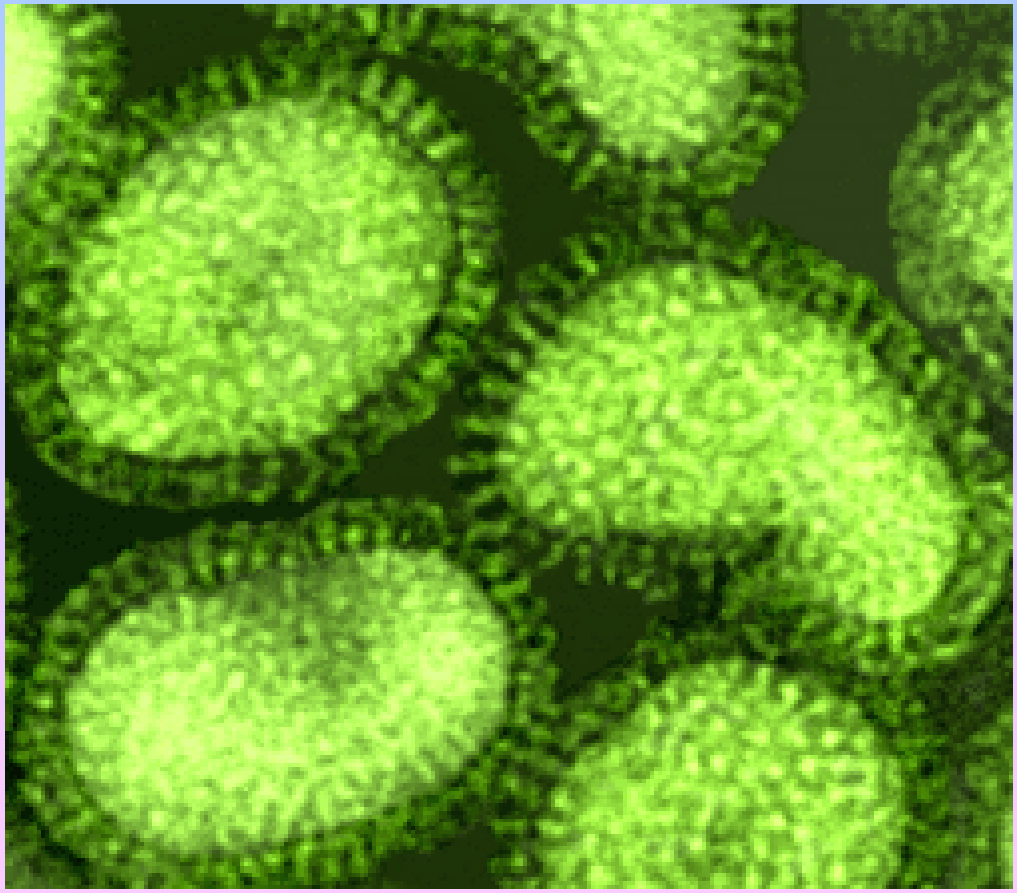
- Single stranded segmented enveloped negative sense RNA viruses of Orthomyxoviridae
- Envelope has 2 types of glycoprotein antigens – Hemagglutinin (H 1-16) and Neuraminidase (N 1-9) – used for subtyping
- **Current virus is H1N1**
- Influenza viruses can be A, B and C
- Most infections caused by Influenza A
- 8 segments of RNA- allows exchange of RNA between different strains when they coinfect the same host cells.
- There are different influenza viruses infecting different species e.g. Human, Avian
- **Current strain re-assortment of 4 viruses**

- Hemagglutin (H) helps the virion attach and penetrate host cells

- Neuraminidase (N) helps release virions from the host cell after replication and assembly



# Influenza virus



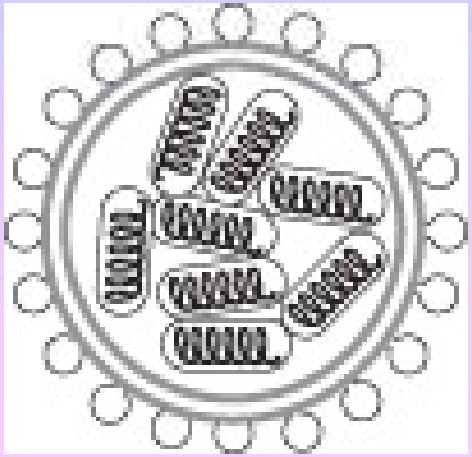
Electron Microscopic Appearance

# Function and structure of H & N

- Hemagglutinin(H 1- 16) needed for attachment to ciliated epithelium in respiratory tract.
- Neuraminidase ( N1-9)– destroys the cellular receptor for hemagglutinin thereby facilitating release of virus from the cell
- The strains are named by the type of influenza virus/ the place they are isolated from/year of isolation and (the H and N type)

  Nomenclature: **A/ Texas/ 77(H3N2)**

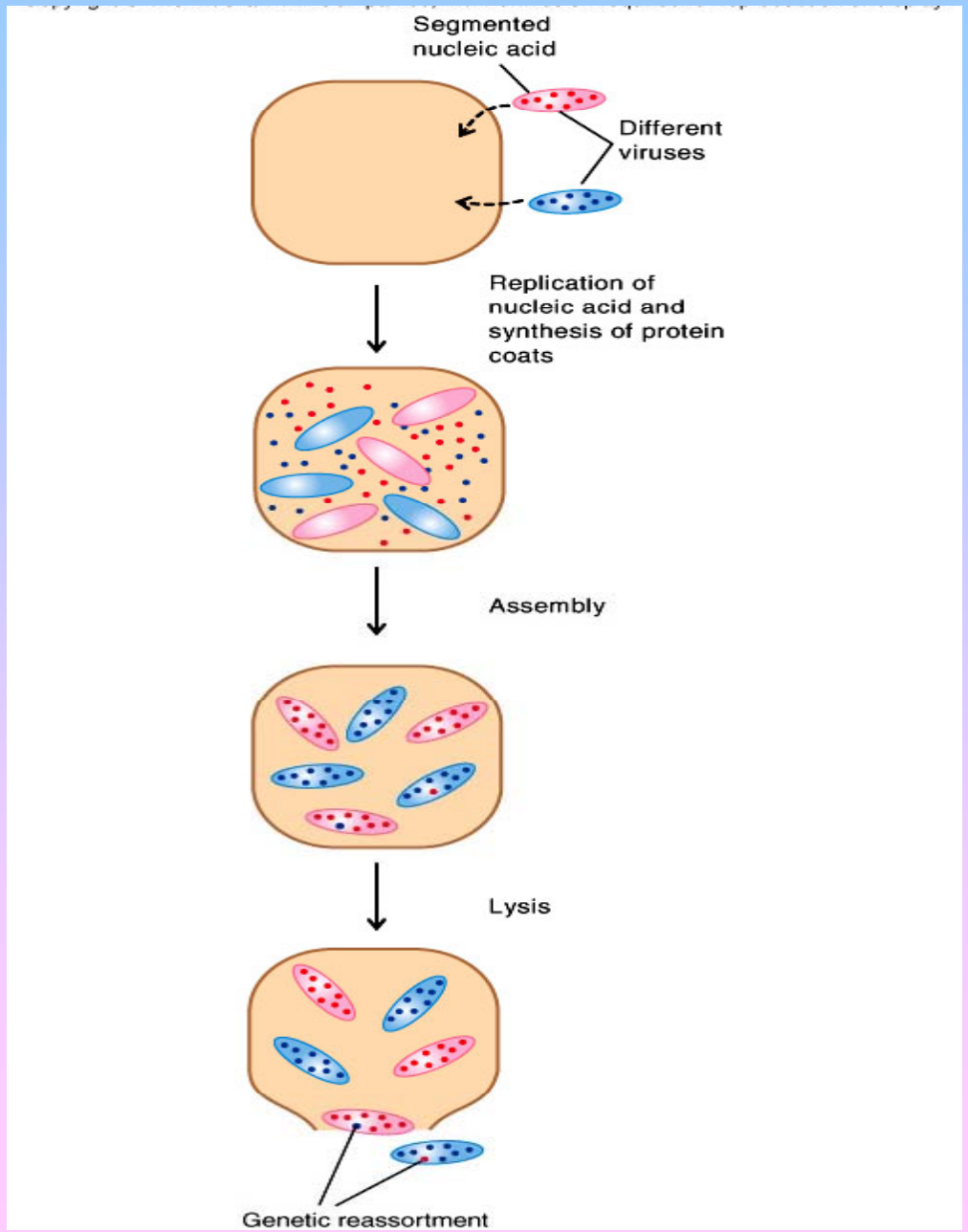
– Complications such as pneumonia or secondary infections occur in:
  - Infants
  - Elderly
  - Immunocompromised people



A new flu strain evolves every year, requiring development of a new vaccine !

- **How?**

- **Genetic re-assortment**
  - When two segmented RNA viruses infect the same cell, the segments may be interchanged.
  - Results in stable changes in genome


Segmented
nucleic acid
Different
viruses
Replication of
nucleic acid and
synthesis of protein
coats
Assembly
Lysis
Genetic reassortment

# LABORATORY

# DIAGNOSIS

# Guidelines for Sample Collection and Handling of Human Clinical Samples for Laboratory Diagnosis

- **Samples to be Collected**

- <u>From Ambulatory patient</u>
- Throat Swab ***and***
- Nasal / Naso pharyngeal Swab
- Blood for serological  tests (if advised by RRT)

- <u>From an intubated patient</u>
- Lower respiratory aspirate
- Blood for serological tests

# When to Collect Respiratory Specimens?

- As soon as possible after symptoms begin
- Before antiviral medications are administered
- Even if symptoms began more than one week ago

# Personal Protective Equipment

- Before initiating collection of sample a full complement of PPE should be worn**.** This includes :

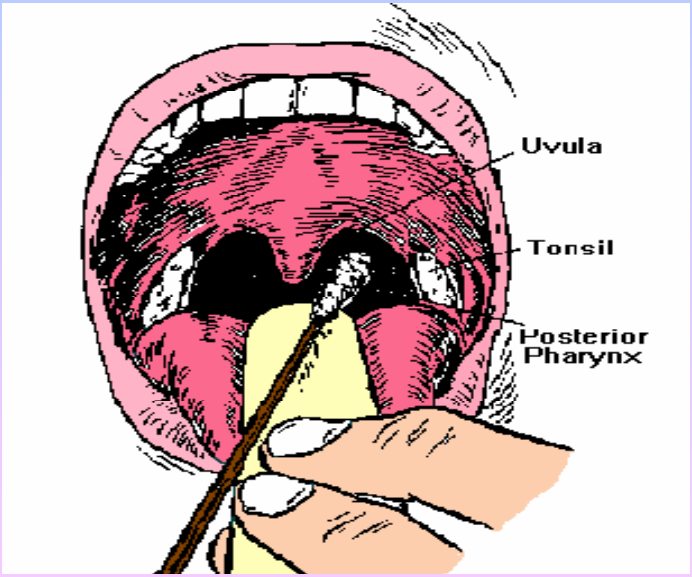
  - Masks (N-95)
  - Gloves
  - Protective eye wear (goggles)
  - Hair covers
  - Boot or shoe covers
  - Protective clothing (gown or apron)

# Methods of Collection

**Throat swab**

- Easy to do
- Highest yield in detecting H1N1 influenza in suspected cases
- Have the patient open his/her mouth wide open.
- The patient should try to resist gagging and closing the mouth while the swab touches the back of the throat near the tonsils.

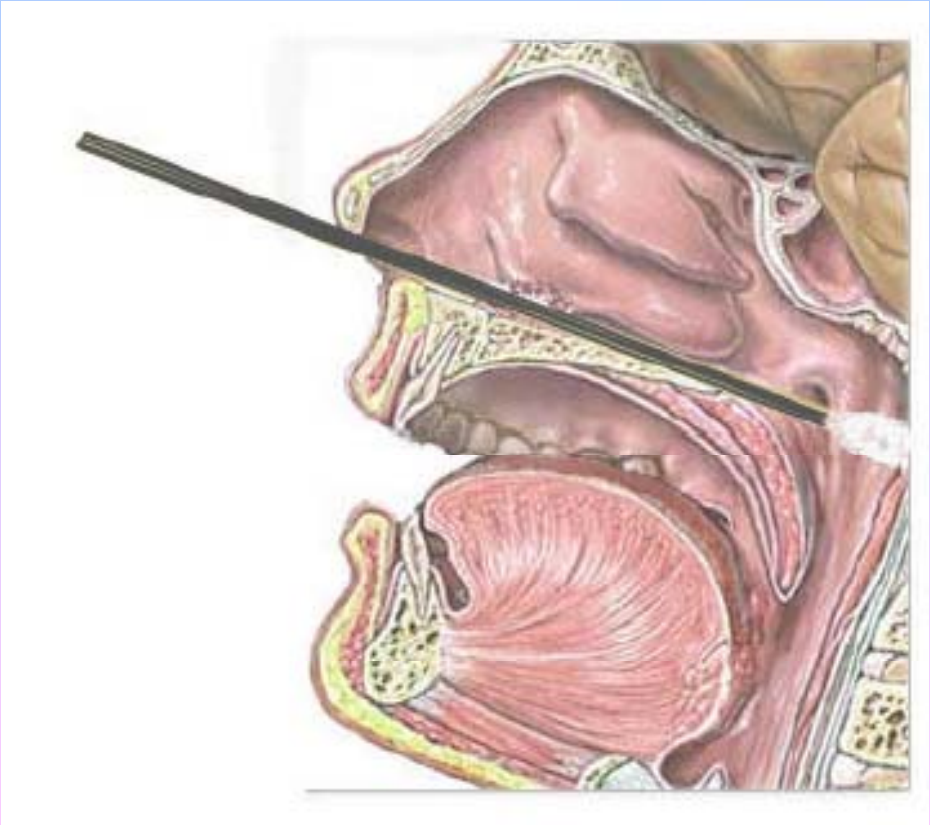
# Throat swab



# Nasal / Nasopharyngeal Swab

- **Nasal / Nasopharyngeal Swab:** Insert dry swab into nostril and back to nasopharynx. Leave in place for a few seconds. Slowly remove swab while slightly rotating it. Use a different swab for the other nostril. Put tip of swab into vial containing VTM, breaking applicator’s stick.

# Nasal / Nasopharyngeal Swab



# Collection of Swabs

- Collect **Nasal swab** from both nostrils if **patient is < 1 year old**
- Collect **nasal swab** from both the nostrils if patient is > 1 year old and **having predominant symptoms of nasal discharge**(running nose)
- Collect **throat swab** (two swabs ) from patients > 1 year old with no nasal discharge.

***Both Nasal and Throat swabs can be collected into the same VTM to increase the viral yield***.

# Labeling

- **Label**

  **Specimen No. :**
  **Patient's Name :**
  **Hospital Name :**
  **Unique ID No. :**

# CLINICAL & EPIDEMIOLOGICAL DATA FOR H1N1 INFLUENZA

- Name of Doctor/Health personal ……
- District ……..… State .....……..……..
- Tel. : ……
- Influenza regional Laboratory …….....……..
- Name of hospital ……..…….
- Patient's Name ……CR/OPD No...……...…...……..……
- Age ……..……Sex ….…….. Tel. No. ……..…….……..
- Address ……..…….
- …… Occupation ……..……..
- Total OPD attendees …..…… Date of onset of illness ……..……

Clinical Signs and symptoms:

- Fever axilla > 38$^{o}$C Yes ☐ No ☐
- Oral > 38.5$^{o}$C Yes ☐ No ☐
- Cough Yes ☐ No ☐
- Sore Throat Yes ☐ No ☐
- Nasal Catarrh Yes ☐ No ☐
- Shortness of breath/ difficulty in breathing Yes ☐ No ☐

# Exposure History:

- Country Visit — Date of visit ☐ Name ☐
- Close contact with a person (within 7 days) who is confirmed case of influenza A (H1N1). — Yes ☐ No ☐
- Travell to community (Within 7 days) where one or more confirmed cases of Influenza A (H1N1) have been reported. — Yes ☐ No ☐
- Resides in a community where there are one or more confirmed influenza cases. — Yes ☐ No ☐

**Sample Collection:**

- Data of sample collection
  ……
  ……
- **Sample collected:** throat swab/nasopharyngeal swab/other
  ……
- No. of samples collected
  ……
  ……
- **Treatment History:**
- Treatment taken Yes ☐ No ☐

  If yes what & when
  ……
  ……..……
- **Investigations Done** Yes ☐ No ☐

  Chest X-Ray findings
  ……

# Storing Specimens

- Store specimens at 4 °C before and during transportation within 48 hours
- Store specimens at -70 °C beyond 48 hours
- Do not store in standard freezer – keep on ice or in refrigerator
- Avoid freeze-thaw cycles
- Better to keep on ice for a week than to have repeat freeze and thaw

# Transportation of specimens

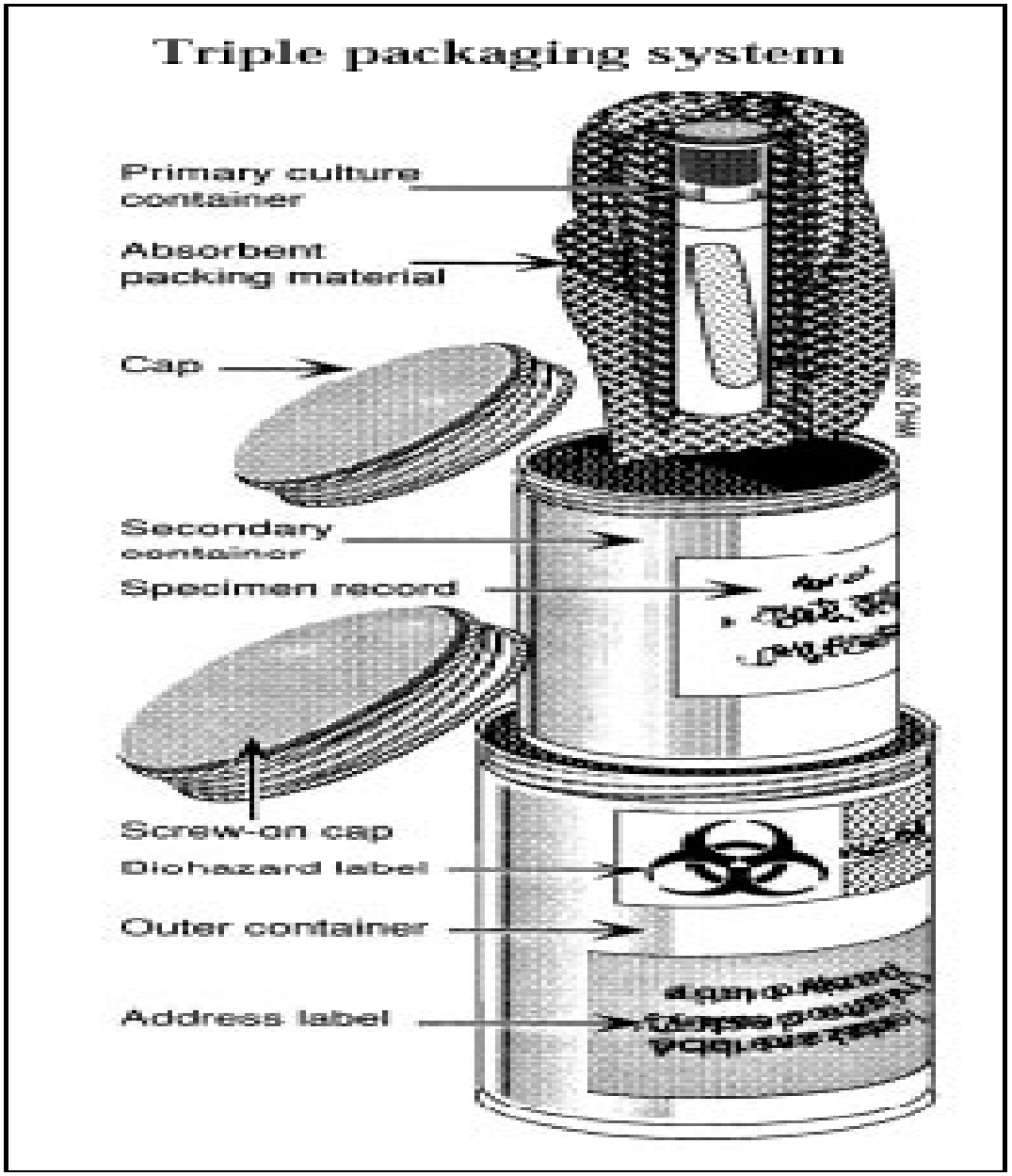
- Specimens in VTM for viral isolation/RT PCR should be kept at 4$^{o}$C.
- Transported to the laboratory promptly within 2 days.
- They should be frozen at -70$^{o}$C until they are transported.
- Sera may be stored at 4$^{o}$C for one week thereafter should be frozen at -20$^{o}$C.

# Tests Done

- RT-PCR
- Viral culture
- Four fold rise in antibody titre
- **Our Center**
- National Institute of Virology,(NIV) 20-A, Dr. Ambedkar Road, Pune-411001 [Tel.No. 020-26124386]
- Swab & VTM to be collected from Dept. of Microbiology

# Important things to remember

- Inform the laboratory before moving the samples.
- All samples should be transported after proper packaging using the standard triple packaging system (WHO) and it should accompany with the clinical details as per proforma.
- While transportation cold chain should be maintained


Triple packaging system
Primary culture container
Absorbent packing material
Cap
Secondary container
Specimen record
Screw-on cap
Biohazard label
Outer container
Address label

# General Biosafety Measures

- **Clinical samples should be collected by hospital staff and not by the laboratory staff.**
- All clinical samples have to be collected wearing complete complement of PPE.
- While taking samples always use N95 mask.
- Use Latex disposable gloves.
- Wear laboratory coat/disposable apron.
- Always cover your hair with head cover.
- Use protective eye wear (goggles)/face shields
- The clinical samples should be processed only in designated laboratory having the appropriate containment facilities.

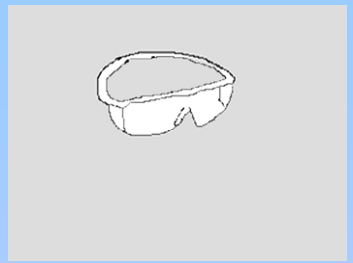
# General Biosafety Measures

- Minimizes the formation of aerosols and droplets.
- Adequate & conveniently located biohazard containers
- Work surfaces must be decontaminated after any spill
- 5% bleach solution is appropriate
- Wash hands often – especially after handling infectious materials and , before leaving the working areas
- Personal protective equipment must be removed before leaving the laboratory/ward.

# PPE

PPE reduces the risk of infection if used correctly consist Of

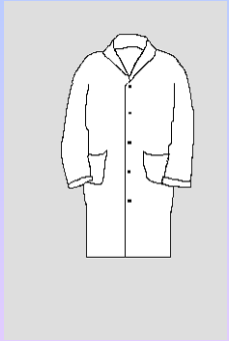
- Gloves (nonsterile),
- Mask (high-efficiency mask) / Three layered surgical mask,
- Long-sleeved cuffed gown,
- Protective eyewear (goggles/visors/face shields),
- Cap (may be used in high risk situations where there may be increased aerosols),
- Plastic apron if splashing of blood, body fluids, excretions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



Goggles

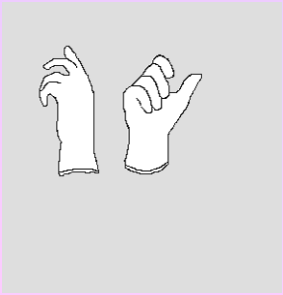
N-95 Mask

OR

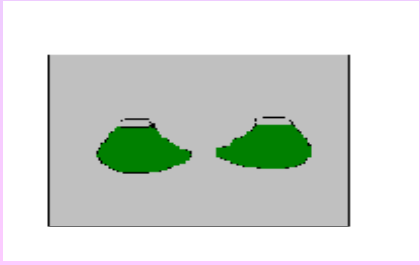


Gown (Must for lab work)

Triple Layer Mask



Gloves



Shoe Covers

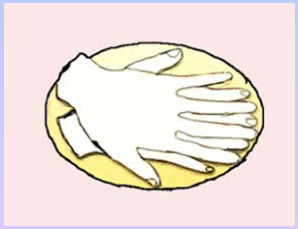
# Hand Hygiene is important!

- 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.

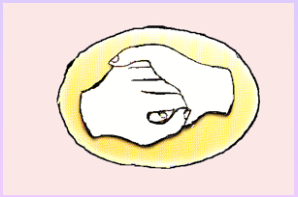
# Steps of hand washing

Step 1: wash palm & fingers

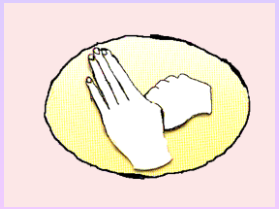
step 2 : wash back of hands



Step 3 :wash fingers & knuckles

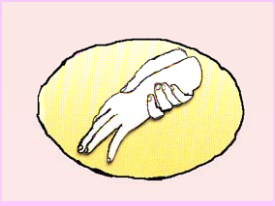


step 4 : wash thumbs



Step 5 ; wash fingertips

step 6 : wash wrists



# Respiratory Hygiene/Cough Etiquette

- 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

# Use of masks

- N95 used for HCWs  coming in prolong contact
- Three layered surgical mask is recommended for all cases and immediate family and social contacts.

# 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 (including N95 mask). 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.

# Biosafety Measures

- Hand hygiene before & after patient contact
- Also ,following contact with contaminated items, whether or not gloves are worn.
- Infection control precautions should continue in an adult patient for 7 days after resolution of symptoms, 14 days after resolution of symptoms for children younger than 12 years because of longer period of viral shedding expected in children.
- 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

- Virus is inactivated by

  70% ethanol , 5% benzalkonium chloride (Lysol),

  10% sodium hypochlorite.
- Patient rooms/areas should be cleaned at least daily and finally after discharge of patient.
- 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.

# Biomedical waste

- 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.

## Contact Numbers of Nodal Officers identified by the State / UT Administration

- **Pune** :Office of the Joint Director (Health Services), Central Building , Pune020-26124299,9404225846 [24X7]

  Dr. Desai-09822429266

# For people who are sick:

- Stay home and limit contacts with others as much as possible.
- Rest and take plenty of liquids.
- Cover your mouth and nose when you cough or sneeze.
- Seek medical advice if needed.

# 15 New Screening Centres in Pune

1. Erandwane Hospital, Padale Palace, **Karve road**
2. Late Anandibai Narhar Gadgil Hospital, near **Mhatre bridge**
3. Late Balaji Rakhmaji Gayakwad Hospital, Timber market, **Ganj peth**
4. Late Kalawati Mavale Hospital, Near Modi Ganpati, **Narayan peth**
5. Late Mamasaheb Badade Hospital, **Nanapeth**
6. Hutatma Babu Genu Hospital, **Raviwar peth**, Laxmi Road
7. Siddharth Hospital, Opposite Vishrantwadi Police chowki, **Alandi Road**
8. Late Shivshankar Pote Hospital, **Satara Road**

9. Late Junglerao Kondiba Amrale Hospital Near Mahapalika Bhavan, **Shivajinagar**
10. Late Baburao Genba Shevale Hospital, Aundh road, **Khadaki**
11. Late Damodar Raoji Galande Patil Hospital, Kalyaninagar, **Yeravada**
12. Dr. Kotnis Hospital, near mandai, **Shukrawar peth**
13. Late Bapusaheb Genuji Kavade Patil Hospital, Near Demko Colony, **Koregaon Park**
14. Late Rohidas Kirad Hospital, Burudi pul, **Ganesh peth**
15. Late Jayabai Nanasaheb Sutar Nursing Home, Near Gujarat colony, **Kothrud**

# New Screening Centres in PCMC

1. Yashwantrao Chavan Memorial Hospital, Sant **Tukaramnagar, Pimpri**
2. Jijamata Hospital, **Pimpri**
3. Municipal Hospital, **Bhosari**
4. Municipal Hospital, **Akurdi**
5. Municipal Hospital, **Sangvi**
6. Municipal Hospital, **Thergaon**
7. Municipal Hospital, **Yamunanagar, Nigdi**
8. Talera Hospital, **Chinchwad**

# Do’s and Don'ts for the community

**DO:**

- Wash your hands.
- Avoid crowded places.
- Stay more than an arm’s length from persons affected with flu.
- Drink plenty of water and eat nutritious food.

DO NOT:

- Shake hands or hug in greeting.
- Spit in public.
- Take medicines without consulting a physician.