Clinical Case Management of H1N1 infection in Hospital

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University of Medicine (1) Yangon
H1N1 infection

Influenza virus

- hemagglutinin
- head region
- stem region
- neuraminidase
Clinical Features

- Most people with pandemic (H1N1) 2009 virus infection have had self-limiting uncomplicated illness.
- Only 1-10% needs hospitalization.
- Mortality: 2-9% of hospitalized patients

ILI and SARI Surveillance Guideline (Myanmar) July 2017
Case definitions

ILI (Influenza Like Illness)
Any acute respiratory infection with:
- measured fever of 38°C or above
- and cough
- with onset of fever within 10 days

SARI (Severe Acute Resp Inf)
Any acute respiratory infection with:
- measured fever of 38°C or above
- and cough
- with onset of fever within 10 days
- and requires hospitalization
Case description

Uncomplicated Influenza

- Patients may present with some or all of fever, cough, sore throat, rhinorrhea, headache, muscle pain, and malaise, but **no shortness of breath and no dyspnoea**.

Complicated or severe influenza

- Presenting **clinical** (e.g. shortness of breath/dyspnoea, tachypnea, hypoxia) ± **radiological signs of LRTI** (e.g. pneumonia), **CNS involvement** (e.g. encephalopathy, encephalitis), severe dehydration, or presenting secondary complications, such as renal failure, **multiorgan failure, septic shock**, rhabdomyolysis and myocarditis.
- **Exacerbation of underlying chronic disease**, including asthma, COPD, chronic hepatic or renal failure, diabetes, or other cardiovascular conditions.
- Any other condition or clinical **presentation requiring hospital admission** for clinical management.
- Any of the **signs of disease progression**
Risk factors for severe disease

- Infants and young children, in particular <2 years
- Pregnant women
- Persons of any age with chronic pulmonary disease (e.g. asthma, COPD)
- Persons of any age with chronic cardiac disease (e.g. congestive cardiac failure)
- Persons with metabolic disorders (e.g. diabetes)
- Persons with chronic renal disease, chronic hepatic disease, certain neurological conditions (including neuromuscular, neurocognitive, and seizure disorders), hemoglobinopathies, or immunosuppression, whether due to primary immunosuppressive conditions, such as HIV infection, or secondary conditions, such as immunosuppressive medication or malignancy
- Children receiving chronic aspirin therapy
- Persons aged 65 years and older
Categorization of Patients

**Category A**
Mild fever plus cough/sore throat with or without body ache, headache, diarrhea and vomiting

**Category B**

i. Category A **Plus** high grade fever and severe sore throat

ii. Category – Any mild ILI in people with comorbidities like
   - Pregnant women
   - Lung/heart/liver/kidney/neurological disease/blood disorder/diabetes/cancer/HIV-AIDS
   - On long term steroids or those with immunosuppression due to drugs, radiation or HIV, etc
Categorization of Patients

**Category C**
Cat A plus any 3 or more of the following:
- Breathlessness
- Chest pain
- Drowsiness
- Fall in blood pressure (<90/60 mmHg)
- Cyanosis
- Tachypnea (RR >30/min)
- Decreased oxygen saturation (SPO2 <90 on air)
- CXR – patchy opacities
<table>
<thead>
<tr>
<th>Category</th>
<th>Test</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat A*</td>
<td>No testing</td>
<td>No admission&lt;br&gt;Observe at home&lt;br&gt;Symptomatic treatment&lt;br&gt;(Paracetamol+ Vitamin C+ adequate fluid)</td>
</tr>
<tr>
<td>Cat B(i)*</td>
<td>No testing</td>
<td>No admission&lt;br&gt;Observe at home&lt;br&gt;Treatment as above + Antibiotics</td>
</tr>
<tr>
<td>Cat B(ii)**</td>
<td>RDT</td>
<td>Admit and treatment is guided by comorbidity conditions</td>
</tr>
<tr>
<td>Cat C</td>
<td>RDT and Nasopharyngeal Swab for H1N1 Test</td>
<td>Admit and follow the H1N1 flow</td>
</tr>
</tbody>
</table>

*Cat A and Cat B (i) patients should be handled by screening team led by EMO
** Cat B (ii) patients should be seen by MO team leader
H1N1 Flow

YGH management guideline for H1N1 (pdm) infection
Who doesn’t need to be hospitalized?

When influenza viruses are known to be circulating in a community, patients presenting with features of **uncomplicated influenza** can be diagnosed on clinical and epidemiological grounds. All patients should be instructed to return for follow-up, should they develop any **signs or symptoms of progressive disease or fail to improve within 72 hours of the onset of symptoms**.

**WHO guideline for pharmacological management of pandemic influenza A (H1N1) 2009**

Guidelines for H1N1 pdm 2009 Prevention and Control, MOH, Myanmar (2017)
Who should be hospitalized?

Guidelines for H1N1 pdm 2009 Prevention and Control, MOH, Myanmar (2017)
Case

• A 22 year old young lady was admitted to NYGH at 1:15 pm on 13.7.17.

• c/o - High fever for five days

  - Productive cough for five days
Patient’s condition on admission:

- GC- dyspneic, Temp- 100°F
- BP- 100/60 mmHg, PR- 120/min
- SpO2- 86% on air and 92% on O2
- RR- 34/min
- Bilateral crepitations on both lung fields (L > R)
Initial Tests

- ECG – Sinus tachycardia, HR – 120/min
- Random blood sugar – 106 mg%
- Urea, Creatinine and Electrolytes – Normal
- Liver function test:
  - Serum bilirubin – Normal
  - AST, ALT – raised for two times upper limit of normal
- Sputum for AFB – Negative
- Sputum C&S – Pending
## Serial Blood Tests

<table>
<thead>
<tr>
<th>Date</th>
<th>Hb</th>
<th>WBC</th>
<th>Platelet</th>
<th>ESR (mm/1&lt;sup&gt;st&lt;/sup&gt; hr)</th>
<th>CRP (mg/L)</th>
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<tbody>
<tr>
<td>10.7.17</td>
<td>11.8</td>
<td>5</td>
<td>156</td>
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<tr>
<td>13.7.15</td>
<td>11.4</td>
<td>4.7</td>
<td>132</td>
<td>5</td>
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<tr>
<td>16.7.15</td>
<td>10.8</td>
<td>7.1</td>
<td>180</td>
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<tr>
<td>21.7.17</td>
<td>11.5</td>
<td>17</td>
<td>415</td>
<td></td>
<td>75</td>
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<tr>
<td>26.7.17</td>
<td>10.3</td>
<td>9.5</td>
<td>700</td>
<td>80</td>
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## Serial ABG results

<table>
<thead>
<tr>
<th>Date</th>
<th>13.7.17</th>
<th>15.7.17</th>
<th>21.7.17</th>
<th>24.7.17</th>
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<tbody>
<tr>
<td>pH</td>
<td>7.41</td>
<td>7.39</td>
<td>7.45</td>
<td>7.45</td>
</tr>
<tr>
<td>pH</td>
<td>7.41</td>
<td>7.39</td>
<td>7.45</td>
<td>7.45</td>
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<tr>
<td>pCO₂ (mmHg)</td>
<td>38.9</td>
<td>49.4</td>
<td>36.6</td>
<td>42.2</td>
</tr>
<tr>
<td>pCO₂ (mmHg)</td>
<td>38.9</td>
<td>49.4</td>
<td>36.6</td>
<td>42.2</td>
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<tr>
<td>pO₂ (mmHg)</td>
<td>57.4</td>
<td>60.9</td>
<td>75.9</td>
<td>70.7</td>
</tr>
<tr>
<td>pO₂ (mmHg)</td>
<td>57.4</td>
<td>60.9</td>
<td>75.9</td>
<td>70.7</td>
</tr>
<tr>
<td>HCO₃ (mmol/L)</td>
<td>24.3</td>
<td>29.5</td>
<td>25</td>
<td>28.5</td>
</tr>
<tr>
<td>HCO₃ (mmol/L)</td>
<td>24.3</td>
<td>29.5</td>
<td>25</td>
<td>28.5</td>
</tr>
<tr>
<td>K (mmol/L)</td>
<td>3.24</td>
<td>3.75</td>
<td>3.63</td>
<td>3.85</td>
</tr>
<tr>
<td>K (mmol/L)</td>
<td>3.24</td>
<td>3.75</td>
<td>3.63</td>
<td>3.85</td>
</tr>
</tbody>
</table>

Reference values: pH – 7.2 - 7.5, pCO₂ – 30-50 mmHg, pO₂ – 70-700 mmHg
<table>
<thead>
<tr>
<th>Date</th>
<th>Procalcitonin level (Reference- &lt;0.05 ng/ml)</th>
<th>Significance</th>
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<tbody>
<tr>
<td>15.7.17</td>
<td>0.204</td>
<td>Systemic infection (Sepsis) is not likely. Local bacterial infection is possible.</td>
</tr>
<tr>
<td>21.7.17</td>
<td>0.06</td>
<td>Systemic infection (Sepsis) is not likely. Local bacterial infection is possible.</td>
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</tbody>
</table>
CXR (PA) 13.7.17

- Severe chest infection
  (Left lower lobe consolidation)
CT (Chest) 13.7.17

- Left lower lobe consolidation with diffuse pulmonary alveolar infiltrates (ARDS should be considered.)
Diagnosis

• Severe Pneumonia with Type 1 Respiratory failure
Immediate Management

• Patient was kept in ICU after consultation with Anaesthetist.

• IV Ceftriaxone

• IV Azithromycin
Second day of admission..

↑ Respiratory distress

ABG- Type 1 Respiratory failure

CPAP (NIPPV) was given and consulted with chest physician.
Second day of admission..

• IV Ceftriaxone was changed to IV Tazobactam + Piperacillin.
• IV Azithromycin for three days
• IV Levofloxacin was added after IV Azithromycin.
Sputum C&S (16.7.17)

- Streptococcus sanguis –
- Sensitive to CS1, Doxycycline, Linezolid, Gentamicin
- IV CS1 was added according to C&S result.
CXR recheck after 1 week...

CXR (PA) 13.7.17

CXR (AP) 20.7.17

No improvement
Throat Swab (21.7.17) RT-PCR

<table>
<thead>
<tr>
<th>No.</th>
<th>Lab. No.</th>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Date Received</th>
<th>Date Tested</th>
<th>Type of test</th>
<th>Result</th>
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<tbody>
<tr>
<td>1</td>
<td>1010-17</td>
<td></td>
<td>22</td>
<td>F</td>
<td>18.7.2017</td>
<td>21.7.2017</td>
<td>Real time-PCR by using M primer, B primer, H3, H1N1, H17 &amp; Swine Primer</td>
<td>A/H1N1 Pdm (+)</td>
</tr>
</tbody>
</table>

A H1N1 Pdm- Positive
Viral serology

- HBsAg, HCV Ab, HIV Ab
- Measles Ig M Ab
- Rubella IgM Ab
- JE Ig M Ab
- Zika Ig M Ab
- Chikungunya Ig M Ab
- Herpes simplex IgM Ab
- Dengue serology

Negative
Types of specimen that can be collected for PCR test of ILI

Nasopharyngeal swab (also for culture)
All samples should be accompanied by the relevant surveillance forms (CIF) duly filled up by the concerned medical officer or designated health staff.
Any throat swab collected in VTM should be immediately stored and transported to NHL within two days in cold chain by respective health staff designated by respective health department.
Laboratory Tests

- Rapid diagnostic (antigen) testing
- RT-PCR (highest sensitivity)
- Viral culture
- Immunofluorescence assays and serology
Emergencies preparedness, response

Clinical management of human infection with pandemic (H1N1) 2009: revised guidance

Diagnostic testing to confirm the pandemic virus should be prioritized for patients at higher risk for severe illness.

However, clinicians who should not delay treatment of a patient with symptoms of an influenza-like illness to wait for laboratory confirmation of H1N1 virus infection.

WHO revised guidance: Clinical Management of Human infection with Pandemic H1N1 2009
Antiviral Treatment Recommendations

- Patients who have severe or progressive illness should be treated with antiviral medication as soon as possible.
- People with mild symptoms but who are at higher risk for severe illness (e.g. pregnant women, infants and young children, and those with chronic lung problems) should start antiviral treatment as soon as possible.
- Antiviral treatment is not necessary for people have uncomplicated, or mild, illness and are not in a high risk group for severe illness.

Mothers who are breastfeeding can continue breastfeeding while ill and receiving antiviral treatment.

WHO revised guidance: Clinical Management of Human infection with Pandemic H1N1 2009
Role of Antiviral Therapy

Responding to pandemic (H1N1) 2009 influenza: the role of oseltamivir or zanamivir. Both medications were well tolerated, and earlier administration seemed to be associated with a reduced duration of fever [median duration of fever of 1.5 days (range 1–4 days) with oseltamivir and 1 day (range 1–5 days) with zanamivir when antiviral treatment began on the day of fever onset, compared with a median of 3 days (range 2–5 days) when either drug was initiated the day after fever onset]. Most patients were discharged shortly after antiviral administration and all recovered within 24 h. In a multivariable analysis of outcomes, the only variable that was significantly associated with a positive outcome was the receipt of antiviral drugs within 2 days of illness onset.
Role of Antiviral Therapy

The standard treatment regimens for adults and children are expected to be effective against the pandemic (H1N1) 2009 virus, but clinical evidence for this is still to be collected. It is possible that increasing the dosage could help to control viral shedding, particularly as anecdotal reports suggest this is prolonged in patients with pandemic (H1N1) 2009 disease.

The effectiveness of oseltamivir in treating pandemic (H1N1) 2009 in some patient sub-populations known to be at higher risk of severe disease, such as young children and those with co-existing illnesses, has yet to be established. This is being addressed through a series of four studies; the first of these, which started in 2007, is not yet a standard.

Responding to pandemic (H1N1) 2009 influenza: the role of oseltamivir, J Antimicrob Chemother 2010; 65 Suppl 2: ii35–40
Back to the case....

- The patient was admitted after five days of signs and symptoms.

- So, antiviral therapy doesn’t appear to be affective anymore.
Role of Antibiotics and Steroids

Secondary Bacterial Pneumonia

- Initial empiric antimicrobial therapy of suspected pandemic (H1N1) 2009-associated pneumonia/pneumonitis should include both oseltamivir and community-acquired pneumonia antibiotic therapy.
- In the absence of clinical and/or microbiological indication of bacterial infection, discontinuation of antibiotics may be considered in patients with laboratory confirmed pandemic (H1N1) viral pneumonia/pneumonitis as prolonged or redundant antimicrobial therapy poses a risk of antimicrobial resistance.

Adjunctive pharmacologic therapy

High dose systemic corticosteroids and other adjunctive therapies for viral pneumonitis are not recommended for use outside of the context of clinical trials.

WHO guideline for pharmacological management of pandemic influenza A (H1N1) 2009
Back to the case..
Sputum C&S (23.7.17)

- Klebsiella pneumoniae-
- Sensitive to Ertapenem, Imipenem, Meropenem, Amikacin
- IV Imipenem and PO Linezolid were added.
Final diagnosis

• Severe influenza infection (H1N1 pdm) with Type 1 respiratory failure complicated by secondary bacterial pneumonia
Temperature Monitoring Chart

Temp Normal since 26.7.17
## Patient’s Progress

<table>
<thead>
<tr>
<th>Mode of O2 therapy</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPAP</td>
<td>13.7.17</td>
<td>24.7.17</td>
</tr>
<tr>
<td>O2 Facemask</td>
<td>24.7.17</td>
<td>25.7.17</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>25.7.17</td>
<td>Till now</td>
</tr>
</tbody>
</table>

**Current Condition**
- Fever subsided and respiratory distress reduced.
- ABG results came back to normal.
- But patient still needs O₂ therapy to maintain SpO2 > 96%.
What about the prevention???

PREVENTION IS BETTER THAN CURE
Mode of Transmission

• Spread from infectious people to susceptible people through large virus-containing droplets and aerosols that are produced by coughing, sneezing or talking

• Less commonly, spread via contaminated fomites or by direct touching
Incubation Period

• Approximately 2-3 days, but could range up to 7 days

• Patient is infectious from one day before to seven days after the onset of signs and symptoms.
THE SPREAD OF FLU IS UP TO YOU

FLU DOESN'T SPREAD ITSELF, PEOPLE SPREAD IT

COVER your face when you cough or sneeze
Duration of Isolation Precautions

The duration of isolation precautions for hospitalized patients with influenza symptoms should be continued for 7 days after onset of illness or 24 hours after the resolution of fever and respiratory symptoms, whichever is longer, while a patient is in a health-care facility. For prolonged illness with complications (i.e. pneumonia), control measures should be used during the duration of acute illness (i.e. until the patient has improved clinically). Special attention is needed in caring for immunosuppressed patients who may shed virus for a longer time period and are also at increased risk for development of antiviral-resistant virus4.

WHO guideline for pharmacological management of pandemic influenza A (H1N1) 2009
Infection Control Measures

Surgical Mask နှင့် Gloves တို့ကို အသုံးပြုပါ။

Disposable Gowns နှင့် N95 Respirators ကို အသုံးပြုပါ။

PPE - Personal Protective Equipment
Original Contribution
November 4, 2009
Surgical Mask vs N95 Respirator for Preventing Influenza Among Health Care Workers A Randomized Trial

Mark Loeb, MD, MSc; Nancy Dafoe, RN; James Mahony, PhD; et al

Results
Between September 23, 2008, and December 8, 2008, 478 nurses were assessed for eligibility and 446 nurses were enrolled and randomly assigned the intervention; 225 were allocated to receive surgical masks and 221 to N95 respirators. Influenza infection occurred in 50 nurses (23.6%) in the surgical mask group and in 48 (22.9%) in the N95 respirator group (absolute risk difference, −0.73%; 95% CI, −8.8% to 7.3%; \( P = .86 \)), the lower confidence limit being inside the noninferiority limit of −9%.

Conclusion
Among nurses in Ontario tertiary care hospitals, use of a surgical mask compared with an N95 respirator resulted in noninferior rates of laboratory-confirmed influenza.
Hand Washing helps a lot.

1. before touching a patient,
2. before clean/aseptic procedures,
3. after body fluid exposure/risk,
4. after touching a patient, and
5. after touching patient surroundings.

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

1. Wet hands with water;
2. Apply enough soap to cover all hand surfaces;
3. Rub hands palm to palm;
4. Right palm over left dorsum with interlaced fingers and vice versa;
5. Palm to palm with fingers interlaced;
6. Backs of fingers to opposing palms with fingers interlocked;
7. Rotational rubbing of left thumb clasped in right palm and vice versa;
8. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;
9. Rinse hands with water;
10. Dry hands thoroughly with a single use towel;
11. Use towel to turn off faucet;

Your hands are now safe.
Prevention in community

**Observe Good Personal Hygiene**
- Cover your mouth and nose with tissue paper when coughing or sneezing. Dispose the used tissue paper in the rubbish bin properly.

**Cough!!**

- Do not cough or sneeze without covering your mouth and nose with tissue paper.
- Dispose of used tissue paper properly.

**Avoid H1N1**
- Avoid hugging, kissing and shaking hands when greeting.
- Cover your nose and mouth with a disposable tissue when coughing and sneezing.
- Regularly wash hands with soap and water.
- Dispose of used tissues properly immediately after use.
- If you have flu-like symptoms, seek medical advice immediately.
- If you have flu-like symptoms, keep a distance of at least 1 meter from other people.
- If you have flu-like symptoms, stay home from work, school or crowded places.
Contact Persons

Is Quarantine needed???

• To report back if there are symptoms of influenza

• Chemoprophylaxis in not generally recommended.

*YGH management guideline for H1N1 (pdm) infection*
The study was conducted on HCP posted in “Swine Flu Intensive Care Unit” from October 2009 to March 2010. Data on infection control measures, chemoprophylactic use of oseltamivir, flu-like illness, ADRs to oseltamivir, and contact history in family and neighborhood were collected by face-to-face interview conducted by investigator using a set of prespecified items in a questionnaire.

Chemoprophylaxis with oseltamivir is not recommended for HCP working in areas of high aerosol generation like ICU if infection control measures are adopted as there is no significant difference in the incidence of flu-like illness in HCP with and without intake of oseltamivir. This protects HCP from various adverse effects of the drugs, like nausea, gastritis, and headache.
The estimated number of influenza-associated illnesses prevented by flu vaccination during the 2014-2015 season:

1.9 million greater than the population of the city of Philadelphia

DATA: Morbidity and Mortality Weekly Report (MMWR), October 4–November 28, 2015: Vol. 64, No. 48
Effectiveness of Flu vaccination

- Flu vaccination can reduce the risk of flu-associated hospitalization, including among children and older adults.
  - A 2014 study* showed that flu vaccine reduced children’s risk of flu-related pediatric intensive care unit (PICU) admission by 74% during flu seasons from 2010-2012.
  - Another study published in the summer of 2016 showed that people 50 years and older who got a flu vaccine reduced their risk of getting hospitalized from flu by 57%.
- Flu vaccination is an important preventive tool for people with chronic health conditions.
  - Vaccination was associated with lower rates of some cardiac events among people with heart disease, especially among those who had had a cardiac event in the past year.
  - Flu vaccination also has been shown to be associated with reduced hospitalizations among people with diabetes (79%) and chronic lung disease (52%).
- Vaccination helps protect women during and after pregnancy. Getting vaccinated can also protect a baby after birth from flu. (Mom passes antibodies onto the developing baby during her pregnancy.)
Recommended composition of influenza virus vaccines for use in the 2016-2017 northern hemisphere influenza season

It is recommended that trivalent vaccines for use in the 2016-2017 northern hemisphere influenza season contain the following:

– an A/California/7/2009 (H1N1)pdm09-like virus;
– an A/Hong Kong/4801/2014 (H3N2)-like virus;
– a B/Brisbane/60/2008-like virus.

It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Phuket/3073/2013-like virus.
<table>
<thead>
<tr>
<th>Mfg.</th>
<th>Description</th>
<th>Age Range</th>
<th>Doses / Vial or Box</th>
<th>Preservative Content</th>
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<tbody>
<tr>
<td><strong>Trivalent</strong></td>
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<tr>
<td>CSL</td>
<td>Afluria® 5mL Vial</td>
<td>9 years and above</td>
<td>10 / Vial</td>
<td>Yes</td>
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<tr>
<td>CSL</td>
<td>Afluria® 0.5mL Prefilled</td>
<td>9 years and above</td>
<td>10 / Box</td>
<td>None</td>
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<tr>
<td>Novartis</td>
<td>Fluvirin® 5mL Vial</td>
<td>4 years and above</td>
<td>10 / Vial</td>
<td>Yes</td>
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<tr>
<td>Novartis</td>
<td>Fluvirin® 0.5mL Prefilled Luer Lock Syringe</td>
<td>4 years and above</td>
<td>10 / Vial</td>
<td>No (1 mcg / 0.5mL dose)</td>
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<tr>
<td>Novartis</td>
<td>Flucelvax® 0.5mL Prefilled Syringe</td>
<td>18 years and above</td>
<td>10 / Box</td>
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<td>Protein Sciences</td>
<td>Flublok® 5mL 0.5 mL single dose vial</td>
<td>18 yrs and above</td>
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<tr>
<td>Sanofi</td>
<td>Fluzone® 5mL Vial</td>
<td>6 - 35 months (0.25mL)</td>
<td>10 / Vial</td>
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<td>Sanofi</td>
<td>Fluzone® 0.5mL Prefilled</td>
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<td>Sanofi</td>
<td>Fluzone® High-Dose 0.5mL Prefilled Syringe</td>
<td>65 years and above</td>
<td>10 / Box</td>
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<td><strong>Quadrivalent</strong></td>
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<td>MedImmune</td>
<td>FluMist® Quadrivalent (Influenza Vaccine Live, Intranasal)</td>
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<td>GSK</td>
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<tr>
<td>GSK</td>
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<td>4 yrs and above</td>
<td>10 / Vial</td>
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<tr>
<td>GSK</td>
<td>Fluarix® Quadrivalent 0.5 mL Prefilled Syringe</td>
<td>3 yrs and above</td>
<td>10 / Box</td>
<td>None</td>
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<tr>
<td>Sanofi</td>
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<td>6 - 35 months (0.25mL)</td>
<td>10 / Vial</td>
<td>Yes</td>
</tr>
<tr>
<td>Sanofi</td>
<td>Fluzone® Quadrivalent 0.5mL Prefilled Syringe</td>
<td>3 yrs and above</td>
<td>10 / Box</td>
<td>None</td>
</tr>
<tr>
<td>Sanofi</td>
<td>Fluzone® Intradermal</td>
<td>18-64 years</td>
<td>10 / Box</td>
<td>None</td>
</tr>
<tr>
<td>Sanofi</td>
<td>Fluzone® Quadrivalent 0.25 mL Single Dose Vial</td>
<td>6 - 35 months (0.25mL)</td>
<td>10 / Box</td>
<td>None</td>
</tr>
<tr>
<td>Sanofi</td>
<td>Fluzone® Quadrivalent 0.5 mL Prefilled Syringe (Pediatric)</td>
<td>6 - 35 months</td>
<td>10 / Box</td>
<td>None</td>
</tr>
</tbody>
</table>
References

- WHO guideline for pharmacological management of pandemic influenza A (H1N1) 2009
- Clinical management of human infection with pandemic (H1N1) 2009: revised guidance, WHO
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• Responding to pandemic (H1N1) 2009 influenza: the role of oseltamivir, J Antimicrob Chemother 2010

• WHO Recommended composition of influenza virus vaccines for use in the 2016-2017 northern hemisphere influenza season


• Surgical mask Vs N 95 respirator for preventing influenza among healthcare workers: A Randomized Trial, JAMA 2009
THANK YOU!!

• အခြိန်များကို ကြည့်ရှုရန်
• အခြိန်များကို ရွေးချယ်ရန်
• ကြိုးစားခြင်းများကို ကြည့်ရှုရန်
• အရေးကြီးများကို ရွေးချယ်ရန်

(ရှေးဟောင်းများနှင့် – ကြည့်ရှုခြင်း)