

ADVISORY ON PREPARING PRIMARY CARE FACILITIES FOR FLU PANDEMIC

Managing Influenza-like Cases in an Outbreak of Highly Contagious and Virulent Influenza (Issued on 13 May 2006)

COLLEGE PANDEMIC INFLUENZA PREPAREDNESS WORKGROUP 2006

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INTRODUCTION

Safety of the family physician and his staff as well as the ability to continue to provide services to the patient in the event of an epidemic of life threatening influenza infection require a carefully thought out and tested infection control strategy. Family physicians are encouraged to prepare their offices, their staff and themselves for the eventuality of a severe influenza outbreak. Such preparations should aim at generic measures that can cope with an outbreak of any severe infectious disease. Also, such measures should be sustainable on a long-term basis and able to be stepped up whenever the threat arises. Hence simplicity and cost-effectiveness are important.

Lessons from SARS, previous influenza epidemics and other outbreaks where physicians were at high risk provide insights to develop effective policies and coping strategies in the event of an outbreak of highly contagious and virulent influenza.

A College pandemic influenza preparedness workgroup has identified 11 areas to work on: (1) PPE and antivirals; (2) communication, communication system and channels; (3) safety issues; (4) confidence building; (5) building local defence; (6) organising work; (7) decanting work; (8) educating preparedness; (9) including the GP as essential service provider; (10) building infection control reserves; and (11) ethics and legal issues.

SFP2006; 32(3): 47-55

PANDEMIC OUTBREAK ALERT LEVELS AND OUTBREAK CONTROL TASKS

A summary of the DORSCON-FLU Alert levels as described in the MOH Singapore's Influenza Pandemic Readiness and Response Plan Dec 05 Draft is shown in Table 1. The full-text document can be downloaded from the MOH website. See Reference 3. See also Annex C.

PREPARING THE CLINIC

Family physicians are encouraged to take a fresh look at their office settings from the standpoint of infection control. A systematic way to do this is to apply the framework of outcome, process, and structure (Table 2). Re-design and modifications in all areas may be necessary.

Table 1. The outbreak control tasks of healthcare workers in the pandemic influenza outbreak

Pandemic Alert Period

- o Green (Level 1): WHO Phase 3 – Isolated animal-human spread cases; Threat of H-H spread low – **Step up vigilance and preparedness to meet the potential threat** (We are now in WHO Phase 3)
- o Yellow: WHO Phase 4 – Inefficient H-H spread – **Prevent further import of cases. Ring fence & isolate cases to prevent spread. Provide treatment of all cases. Antiviral prophylaxis to contacts and exposed health workers**
- o Orange: WHO Phase 5 – better adapted at H-H spread – **Contain spread and suppress spread of transmission, while preserving essential services and resources**

Pandemic Period

- o Red: WHO Phase 6 – Efficient H-H spread. High risk of acquiring disease from the community once pandemic spreads to Singapore – **Regain control of the situation**
- o Black: WHO Phase 6 – High rates of severe disease and deaths – **Ensure that medical and public health measures take precedence over social and economic considerations.**

Source: MOH. Singapore pandemic influenza readiness and response plan, Dec 2005

OUTCOME GOALS

Achieving the outcome goals in Table 2 will result in confidence building of the public and staff that the clinic is as safe as it can be despite the pandemic. This will in turn increase the likelihood of the ability of the clinic to be able to continue to provide a service.

PROCESS GOALS

Standard operating procedures need to be formulated in the following processes of work:

(1) Receiving patients without being infected

Preparedness to receive patients without being infected is the core of safety measures for doctor, staff and patients. Such quality assurance will build confidence in the health care delivery system. Service continuity can then be assured. This requires the formulation of clinic procedures with regards to:

- κ The triage of febrile cases and how they can be seen without infecting non-febrile patients. Information such as those outlined below should be obtained from DORSCON Yellow onwards for basic triaging:
 - o Presenting symptoms
 - o Recent travel history

Table 2. The framework of structure, process, and outcome in pandemic preparedness

OUTCOME GOALS	Areas identified by College to focus on (brackets were the order they were brought up in a focus group meeting)
<ol style="list-style-type: none"> 1. Minimize the risk of infection of staff members in the course of their work 2. Minimize the risk of infection of patients when they visit the clinic. 3. Minimize the risk of infection of others when the staff and patients of clinics are in the community. 4. Provide the best possible treatment for patients who are infected. 	<ul style="list-style-type: none"> o Safety issues (3) o Confidence building (4) o Including the GP as essential service provider (9)
PROCESS GOALS	
<ol style="list-style-type: none"> 1. Receiving patients without being infected 2. Administrative processes to control infection 3. Caring for patients who have influenza-like illness 4. Protecting yourself and your staff 5. Disposal of the patient suspected of having pandemic flu 	<ul style="list-style-type: none"> o Educating preparedness (8)
STRUCTURE GOALS	
<ol style="list-style-type: none"> 1. Providing information to your patients 2. Isolation facilities at your clinic 3. Disinfection and PPE store readiness 4. Medication stock readiness 5. Evacuation plan and readiness 6. Other goals to be addressed (organizing work, decanting work, building local defence, building infection control reserves, resolving ethical and legal issues) 	<ul style="list-style-type: none"> o Communication, communication system and channels (2) o PPE and antivirals (1) o Building infection control reserves (10) o Local defence (5) o Organising work (6) o Decanting work (7) o Ethics and legal issues (11)

- o Recent visits to hospital
- o In the advanced pandemic phases, clinics may wish to introduce phone triaging and an appointment system. The phone triaging will allow the clinic to identify
 - o Those that definitely need to go to the flu clinic
 - o Those that are probable flu cases and hence need extra precaution during clinic visit, and
 - o Those that are unlikely to be infectious e.g. coming for DM meds
- o An appointment system will help to limit possible cross infection in the clinics and also help to increase patients' comfort level and confidence in visiting the clinics.
- κ The consultation processes of potentially infected patients and the subsequent transfer of such patients for home observation, hospital admission, and transport arrangements.

(2) Administrative processes to control infection

The timing of activation of pandemic procedures will be when unusual numbers of influenza like cases occur or information as given by the Ministry of Health. The case definitions for diagnosis of pandemic influenza are shown in Annex A.

The development of a communication system is necessary for two-way communication between Ministry and service providers. Keeping in touch with the Ministry of Health and request for information clarification will be necessary for optimal infection control.

Administrative processes to control infection need to be established. These include:

- κ Clinic recordings that will facilitate contact tracing from DORSCON Yellow onwards such as the time of arrival at the clinic of patients and accompanying persons.
- κ Clinic visit policy such as making it compulsory for all patients visiting the clinic to wear a face mask regardless of fever status due to possibility of transmission before onset of fever.
- κ Staff monitoring procedures for fever from DORSCON Yellow onwards with twice daily temperature taking.
- κ Disinfection procedures and PPE training for staff such as regular hand washing, gowning up and taking off of PPE should be taught to the clinic staff.
- κ Evacuation plan for patients who are to be sent to CDC/ TTSH, and
- κ Downtime plan if the clinic has to be shut down for disinfection purposes.

(3) Caring for patients and community

Widespread and continuing dissemination of information and updates will help patients, informal carers as well as family physicians to provide the necessary services for the community:

- κ Clinical Assessment of Patients – diagnostic strategy, examinations, and investigations.
- κ Managing patients – vaccination against seasonal influenza, and pandemic influenza vaccine when available.
- κ Information for patients on self-care – observation, voluntary social isolation, self-diagnosis, and monitoring.
- κ Managing anxiety of patients – the importance of up-to-date information on infection in the community.

- κ Anti-virals – when should these be used, timing, dosage and duration, and when these should NOT be used e.g., use of oseltamivir for prophylaxis of avian influenza.
- κ Panic and anxiety – timely, and clear information will do much to calm the community.
- κ Public education – non-pharmacological control measures of handwashing, respiratory hygiene, voluntary social distancing, and action to take if one needs to travel.
- κ Workplaces – Encourage workplaces to disseminate disease prevention information to their staff, encourage them to practise good personal hygiene, to implement infection control measures at the workplace, and be familiar with the action to take when a staff or visitor is unwell and symptoms of flu is present. Some information is given in the Flu Pandemic Guide. See Reference 1.

(4) Protecting yourself and your staff

Specific standard operating instructions will need to be formulated by each practice. These will cover:

- κ Protecting health care workers – PPE for healthcare workers, Vaccination, and Antiviral prophylaxis
 - At preparatory stage (DORSCON Green 1), all healthcare workers should be vaccinated against seasonal flu.
 - Mask fitting should be carried out so as to be able to order the right mask size for clinic staff.
 - The GP clinic is a high risk area. PPE and mask are needed definitely from DORSCON Orange onward.
- κ Protecting your family – Voluntary social isolation may be necessary if there are risks of pandemic influenza infection in the course of work.
- κ Preventive measures at home – Family members also need to be educated on non-pharmacological measures of infection control.
- κ Vaccination – This will depend on the Ministry of Health's policy for the staff.

(5) Transfer of the patient suspected of having pandemic flu

The decision of the MOH Pandemic Flu Taskforce is that from DORSCON Green to Orange, any patient suspected of having the pandemic flu will be sent to CDC/TTSH for assessment and treatment.

In DORSCON Red, all GP clinics and Polyclinics will see flu patients in addition to their usual patient load. Also, during DORSCON Red, all public sector hospitals would be seeing and managing flu patients. So, unlike the earlier levels, there is no need to just refer all cases to TTSH for evaluation.

STRUCTURE GOALS

These are the infrastructure upon which the processes of care and outcome goals are achieved. They include:

(1) Providing information to your patients

- Information about opening and closing hours should be provided. In a crisis situation, operating hours may

change from the routine.

- Relevant health education should be provided; these include proper hand washing techniques, proper coughing etiquettes, and information on the pandemic flu virus. There is Flu Pandemic Guide for the public that is downloadable from the Singapore Government Flu Website (<http://www.flu.gov.sg>).
- Nevertheless many patients still rely on their family physicians and the clinic to provide information. They often seek explanation, confirmation and reassurances from their family physicians. Channels of communication to the patient must be maintained. This should include notices at the clinic, mail, telephone, fax, email and website.
- In the event of a severe epidemic, normal lines of communication may be disrupted or restricted. Such contingencies should be considered in preparations.
- Information on how to provide service continuity will need to be transmitted to patients – appointment systems, triage over the telephone, spacing out patients, separation of acute and chronic cases are possibilities that medical practitioners could consider and keep their patients informed.

(2) Isolation facilities at your clinic

- These will be needed for patients awaiting transport to the hospital.
- If there is area restriction, as most HDB clinics will have, suspected cases can be asked to sit outside the clinic with a surgical mask on. But this has to be cleared with the relevant area owner e.g. HDB.
- If rooms are to be used, full infection control procedures must be taken i.e. patients must wear surgical masks, dustbins should be considered as biological hazards, full PPE protection for anyone entering the rooms, and the rooms should be disinfected after each patient.
- Suspected cases can be directed to the relevant centers for screening e.g. TTSH.

(3) Disinfections and PPE store readiness

The stocks that are required and how they are to be acquired will need to be clarified with the vendors,

- At the current preparatory stage (DORSCON Green 1), it is recommended to keep 1 week's stock of PPE.
- Clinical N95 masks should be acquired instead of industrial grade N95 masks as the clinical mask can last for 24 hours while the industrial mask only last for 4 hours. The use of expired N95 masks may not provide the desired level of protection and should not be attempted.
- Other PPE includes full body gown, gloves and eye goggles. These are necessary when coming in direct contact with suspected cases and when assisting patient transfer.
- Disinfectants - stock up on lemon bleach or use alcohol-based solutions; aerosol sprays are discouraged.

(4) Medication stock readiness

These will include medications for routine care too. There is a need to work out supply lines when the clinic needs to be closed.

(5) Evacuation plan and readiness

A tested evacuation plan is needed. The outbreak of SARS may have stimulated doctors to work out their evacuation plan and readiness. Doctors are encouraged to conduct evacuation plan and readiness exercises amongst their staff.

(6) Other goals to be addressed:**K Organising work**

From the College pandemic influenza preparedness workgroup's input, there is a need to work on work organization amongst the different sectors of care: family physician clinic, Government polyclinic, the hospital, and other health care facilities. The various models that could be introduced will require continuing discussion and clear dissemination of the final decided model so that all healthcare providers are in no confusion.

K Decanting of patients from hospital to family physicians and from polyclinic to family physicians

The right siting of patients should be regarded as part of the pandemic influenza preparedness plan and needs to be gradually done now. This will minimize overloading of patients on any sector and create reserve capacity to deal with the influenza's unprecedented workload in every sector.

K Building local defence

This consists of the neighbourhood doctors working out a mutual support system for various purposes from sharing of information, best practice, coping with downtime and other matters that are relevant to the neighbourhood doctors.

K Building infection control reserves

This is a measure that needs to be addressed by the family physicians that have the responsibility of running their practices. Quality infection control measures are not free and having financial reserves will result in a more robust system to deal with the additional demands on the practice during a pandemic.

K Resolving ethical and legal issues

The Ministry of Health and the medical profession believe that doctors will rally to the service of our nation in times of need such as this. Whilst it can invoke legal measures, the Ministry of Health would rather appeal to the ethos of the medical professional and public co-operation.

Unreasonable behaviour on the part of the patient

will be dealt with by explanation and relevant legal enforcement as a last resort. Examples are: unreasonable demand for antivirals when not indicated, and insistence on service delivery that may be difficult under these circumstances.

CONCLUSIONS

1. Family physicians need to prepare their offices, their staff and themselves for the eventuality of a severe influenza outbreak.
2. Such preparations should be generic to be able to cope with an outbreak of any severe infectious disease.
3. Several structural goals have been identified by the workgroup for further deliberation.
4. Infection control measures should be capable of sustainability on a long-term basis and able to be stepped up whenever the threat arises.

REFERENCES FOR FURTHER READING

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ANNEX A

THE PANDEMIC INFLUENZA IN BRIEF

Introduction. The pandemic influenza refers to an influenza outbreak that affects many countries in the world at around the same time. It is due to a novel influenza virus that human populations are not resistant to. The result is that the viral infection will spread unimpeded across countries. Up to 25-30% of the population may be infected before populations begin to develop immunity in those exposed to infection.

Comparison with seasonal influenza. The key features of a pandemic influenza will be the unusually large numbers who will be affected in a very short time and the severity of those affected (Table 3). The seasonal epidemics cause an average of 14.8 deaths per 100,000 or 600 deaths in Singapore each year (USA-19.6, Hong Kong-16.4). If the new subtype is highly pathogenic, mortality rate will be higher than this.

Table A. Distinguishing characteristics between seasonal influenza and pandemic influenza outbreak

Clinical criteria	Seasonal influenza outbreak	Pandemic influenza outbreak
Mortality and morbidity rates	Similar to previous years	Unprecedented mortality and morbidity rates
High mortality age groups	Very old and very young	Young healthy adults may have mortality rates as high or higher than those at the extremes of age
Effective vaccine available	Yes, a trivalent vaccine of the prevalent strains are available at the beginning of the outbreak	None available until several months later
Control of epidemic	Targeted vaccination of at risk groups	Mass vaccination is required to stop it
Strain of influenza A virus	Existing subtype	Totally new subtype

Source: Cinti, 2005 (adapted)

Incubation period and infective period. Drawing on the seasonal influenza as the behaviour of the pandemic flu (which may need to be amended when the pandemic influenza arrives), the healthy person infected with the virus may be able to infect others one day before becoming symptomatic and for 5 days after he or she develops symptoms. Young children and those with immune compromised systems may be infective for longer than a week. The incubation period can range from 1-4 days with a mean of 2 days.

Diagnosis

Case Definition of pandemic influenza (MOH Singapore, Dec 2005)

To guide clinicians, MOH Singapore has for the moment, formulated the following case definitions of pandemic influenza:

a. Probable case. Persons are considered probable pandemic influenza cases when the following conditions are fulfilled:

- (1) Abrupt onset of fever more than or equal to 38 degrees Celsius (except in persons aged 60 years and above); and
- (2) Non-productive cough; and either
 - (a) a positive epidemiological link (travel to country with pandemic influenza or contact history with an infected person); or
 - (b) a positive rapid test kit result, if available (*The use and type of rapid test kits to be used will be determined in the event of an influenza pandemic*).
- (3) Fever may often be absent in persons aged 60 years and above. Therefore, in the absence of fever, any of the following symptoms, in addition to non-productive cough, should raise a high index of suspicion for persons in this age group: (a) malaise; (b) chills; (c) headache; (d) myalgia.

b. Confirmed case. Persons are considered confirmed pandemic influenza cases when there is laboratory confirmation of infection with pandemic influenza.

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ANNEX B

INFLUENZA-LIKE ILLNESSES

Is influenza distinguishable from other upper respiratory tract infections clinically?

Distinguishing influenza from other influenza-like respiratory infections can be challenging. A number of aetiological agents present as influenza like illness (Table B1). If epidemiological surveillance shows that influenza A virus is circulating, adds to the certainty in the diagnosis. Common causes of atypical pneumonia in the community – mycoplasma, chlamydia and legionella species, can also present initially with influenza-like symptoms and these agents should be considered if laboratory testing is negative for respiratory viruses. Although pneumonia, particularly streptococcal pneumonia, is a common complication of influenza infection, it is unusual for influenza to present with a pneumonic picture.

Table B1. Aetiological agents causing an influenza-like illness

o	Respiratory syncytial virus (RSV)
o	Picornaviruses (small RNA viruses that include enteroviruses and rhinoviruses)
o	Parainfluenza
o	Adenovirus
o	Human metapneumovirus (hMPV) – bronchiolitis-like illness among children
o	Several coronaviruses (OC43 and 229E) – common cold symptoms
o	Atypical pneumonia in the community – mycoplasma, chlamydia and legionella species, can present initially with influenza-like symptoms.

Source: Kelly & Birch, 2004

A systematic review of the history and physical examination to diagnose influenza by Ebell et al (Ebell et al, 2004) has contributed to the diagnostic process:

- κ Clinical features useful in ruling in influenza when present:
 - o Rigors (likelihood ratio (LR) + 7.2)
 - o Fever and presenting within 3 days of onset of illness (LR + 4.0)
 - o Sweating (LR + 3.0).
- κ Clinical features useful in ruling out influenza when absent:
 - o Cough (LR – 0.38)
 - o Not being able to cope with daily activities (LR – 0.39)
 - o Being confined to bed (LR – 0.50).
- κ Individual symptoms are of limited value for the diagnosis of influenza.
- κ Combining symptoms is a more useful strategy for diagnosis.

The features that help to differentiate a common cold and influenza are shown in Table B2.

Table B2. Comparison of influenza and the common cold

Features	Influenza	Common cold
Onset*	Abrupt	More gradual
Fever*	Common: 37.7-40.0°C	Uncommon, or only 0.5°C increase
Cough (dry)*	Common, severe	Mild to moderate
Myalgia*	Severe, common	Uncommon
Arthralgia	Severe, common	Uncommon
Anorexia	Common	Uncommon
Headache	Severe, common	Mild, uncommon
Malaise	Severe	Mild
Fatigue, weakness	More common than in common cold. Lasts 2-3 weeks	Very mild, short lasting
Chest discomfort	Common, severe	Mild to moderate
Stuffy nose	Occasional	Common
Sneezing	Occasional	Common
Sore throat	Occasional	Common

* Clusters of more severe or common features are more predictive of influenza. Source: Monalto & Byrd, 2003

ANNEX B cont'd

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3. Montalto NJ, Byrd RC. An office-based approach to influenza: clinical diagnosis and laboratory testing. *Am Fam Physician* 2003; 67(1):111-8.

Is avian flu clinically distinguishable from the usual seasonal influenza?

Avian flu H5N1 may resemble seasonal influenza initially but typically, differs from it in that other symptoms like respiratory distress supervene. A history of exposure to sick migratory birds or poultry helps in early diagnosis. The subtype H7N7 (seen in the Netherlands) causes conjunctivitis but can also result in death.

Based on cases admitted to hospital in outbreaks in 2005 in Vietnam and Thailand, the clinical features of human H5N1 avian influenza were:

- κ fever (higher than 38°C)
- κ one or more of symptoms of cough, sorethroat, shortness of breath, myalgia
- κ atypical features of diarrhea, bleeding from nose and gums.

Exposure history to the following should thus raise the suspicion:

- κ live poultry or dead poultry from illness or inadequately cooked poultry; or
- κ confirmed case of A/H5N1 or a person with unexplained acute respiratory illness that later had severe pneumonia or death; or
- κ work in a laboratory processing material from patients suspected of HPAI (highly pathogenic avian influenza) infection

Other features:

- κ Lab tests: Lymphopenia, thrombocytopenia, moderately elevated aminotransferase
- κ Positive confirmatory tests: PCR test

Early diagnosis and treatment with oseltamivir can be life saving.

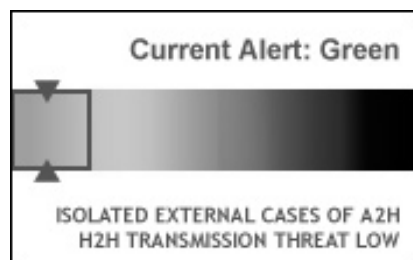
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ANNEX C

DORSCON-FLU ALERT LEVELS: SINGAPORE DISEASE OUTBREAK RESPONSE SYSTEM FOR PANDEMIC INFLUENZA

Pandemic Alert Period



Alert Green 1 (WHO Phase 3)

- Isolated animal-to-human cases
- Human-to-human transmission risk remains low
- **Strategy** – Step up vigilance and preparedness to meet the potential threat.

Action:

1. Advise public to practise good personal hygiene habits & responsible social behaviour.
2. Encourage healthcare workers & high-risk groups to get vaccinated against seasonal flu.
3. Instruct use of personal protection equipment
4. Test readiness measures.



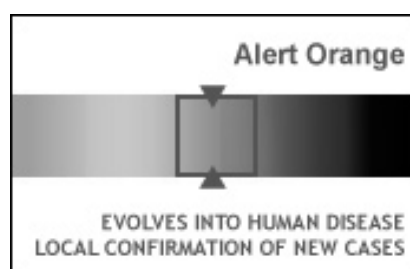
Alert Yellow (WHO Phase 4)

- Inefficient H-H transmissions of novel virus, requiring close and sustained contact to an index case.
- Risk of import into Singapore elevated.
- Isolated imported cases may occur but no sustained transmission.
- **Strategy** – Prevent further import of cases. Ring fence & isolate cases to prevent spread. Provide treatment of all cases. Antiviral prophylaxis to contacts & exposed healthcare workers.

Action:

1. **Alert Green** actions apart, institute home quarantine for close contacts of cases.
2. Healthcare workers to take temperature twice a day.

3. Institute temperature screening & impose restriction on hospital and clinic visitors.
4. Clinic recording to facilitate contact tracing.
5. Institute temperature screening for passengers arriving from affected countries at border control checkpoints.
6. Travellers from affected countries given Health Alert Notices (HANs) & advised to monitor their temperature daily for 1 incubation period.
7. Restrict inter-hospital movement, except in emergencies.



Alert Orange (WHO Phase 5)

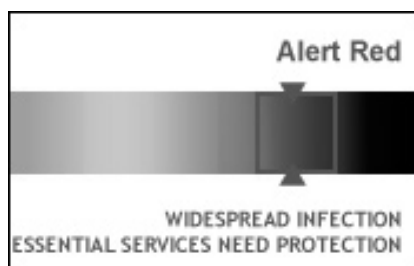
- Larger clusters appear in 1-2 places outside Singapore but pandemic is not yet declared. A cluster of cases may also occur in Singapore but H-H spread remains localized.
- Virus better adapted to H-H but not yet fully transmissible.
- Requires close contact with index case.
- **Strategy** – Contain spread from any local cases and suppress spread of transmission, while preserving essential services & resources.

Action:

1. **Alert Yellow** actions.
2. The GP clinic is a high risk area. PPE and mask are needed definitely from Alert Orange onward
3. Implement “No visitor” rule at all hospitals.
4. Restrict all inter-hospital movement of patients or healthcare workers.
5. Encourage temperature taking at schools and all non-healthcare workplaces, markets, places of mass gatherings etc.
6. Carry out temperature screening for in-bound & outbound passengers at all air, sea and land border checkpoints.
7. Consider closing of schools & suspension of public gathering & events.

ANNEX C cont'd

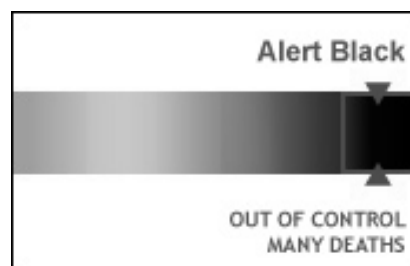
Pandemic Period

**Alert Red (WHO Phase 6)**

- WHO declares that an influenza pandemic has begun. Singapore eventually also affected.
- Higher risk of acquiring the disease from the community once pandemic spreads to Singapore.
- **Strategy** – Regain control of the situation.

Action:

1. **Alert Orange** actions
2. Closing of school and suspension of selected events to prevent congregation of large groups of people.

**Alert Black (WHO Phase 6)**

- High rates of severe disease & deaths.
- Emergency measures implemented to bring situation under control.
- Healthcare & social support systems are overwhelmed by pandemic.
- Economic activities are severely disrupted.
- **Strategy** – ensure that medical & public health measures take precedence over social & economic considerations.

Action:

1. **Alert Red** actions.
2. Focus is to contain the “damage” and regain control of the situation.
3. Drastic measures like stopping all social events may be implemented.
4. Suspend all public gatherings, schools and Institutes of Higher Learning (IHL) closures.
5. Issue advisory to public to stay home or even consider imposing curfew.

Sources and notes:

Sources: (1) MOH Singapore Influenza Pandemic Readiness and Response Plan (Dec 2005); (2) http://www.flu.gov.sg/pandemic/alert_levels.html. Singapore Government Flu Website; (3) Modifications to the above 2 sources in the light of College Workgroup discussions & MOH Workgroup discussions.

Notes: Idea of dedicated Flu clinics felt to be impractical; use of prophylaxis for HCWs only in Alert Red and onward (information as of 9 May 2006).