Avian Influenza H5N1 *: Infection control*

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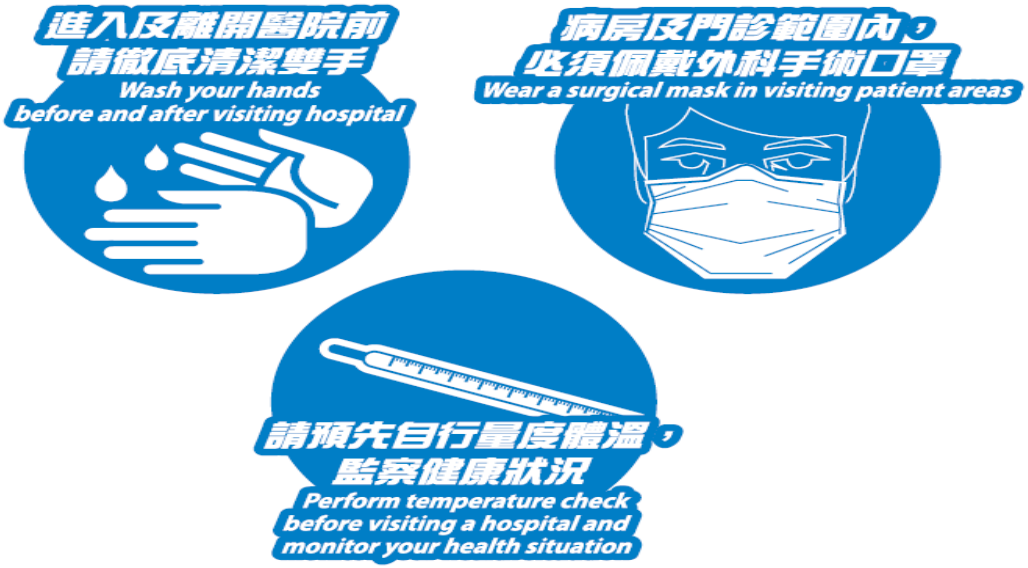
S2 Level

嚴重
SERIOUS

因應特區政府流感大流行應變計劃，
醫院管理局現已實施嚴重級別措施
所有公立醫院訪客及公眾人士必須遵守下列措施：

In accordance with the Hong Kong Government's Preparedness Plan for Influenza Pandemic, the Hospital Authority has implemented measures for the Serious Response Level. Hospital visitors and public please follow instructions below:



每次探病只限2人
Only 2 persons are allowed for every visit

S2
Response

Mode of transmission

B. Infectivity and human to human transmission

1. Direct avian-to-human H5N1 virus transmission is the predominant means of human infection. Handling of sick or dead poultry during the week before the onset of illness is the most commonly recognized risk factor. As of the date of this document, no sustained efficient human-to-human transmission of avian influenza A is known to have occurred, and there is no evidence to suggest airborne transmission from humans to humans.[27] But limited, non-sustained human-to-human transmission has probably occurred during very close, unprotected contact with a severely ill patient. Respiratory secretions and all bodily fluids, including faeces, should be considered potentially infectious[29] In one quarter or more of patients with influenza A (H5N1) virus infection, the source of exposure is unclear, and environment-to-human transmission remains possible[21].

Avian influenza (" bird flu")

http://www.who.int/mediacentre/factsheets/avian_influenza/en/index.html

All evidence to date indicates that close contact with dead or sick birds is the principal source of human infection with the H5N1 virus. Especially risky behaviours identified include the slaughtering, defeathering, butchering and preparation for consumption of infected birds. In a few cases, exposure to chicken faeces when children played in an area frequented by free-ranging poultry is thought to have been the source of infection. Swimming in water bodies where the carcasses of dead infected birds have been discarded or which may have been contaminated by faeces from infected ducks or other birds might be another source of exposure. In some cases, investigations have been unable to identify a plausible exposure source, suggesting that some as yet unknown environmental factor, involving contamination with the virus, may be implicated in a small number of cases. Some explanations that have been put forward include a possible role of peri-domestic birds, such as pigeons, or the use of untreated bird faeces as fertilizer. At present, H5N1 avian influenza remains largely a disease of birds. The species barrier is significant: the virus does not easily cross from birds to infect humans. Despite the infection of tens of millions of poultry over large geographical areas since mid-2003, fewer than 200 human cases have been laboratory confirmed. For unknown reasons, most cases have occurred in rural and periurban households where small flocks of poultry are kept. Again for unknown reasons, very few cases have been detected in presumed high-risk groups, such as commercial poultry workers, workers at live poultry markets, cullers, veterinarians, and health staff caring for patients without adequate protective equipment. Also lacking is an explanation for the puzzling concentration of cases in previously healthy children and young adults. Research is urgently needed to better define the exposure circumstances, behaviours, and possible genetic or immunological factors that might enhance the likelihood of human infection.

Assessment of possible cases. Investigations of all the most recently confirmed human cases, in China, Indonesia, and Turkey, have identified direct contact with infected birds as the most likely source of exposure. When assessing possible cases, the level of clinical suspicion should be heightened for persons showing influenza-like illness, especially with fever and symptoms in the lower respiratory tract, who have a history of close contact with birds in an area where confirmed outbreaks of highly pathogenic H5N1 avian influenza are occurring. Exposure to an environment that may have been contaminated by faeces from infected birds is a second, though less common, source of human infection. To date, not all human cases have arisen from exposure to dead or visibly ill domestic birds. Research published in 2005 has shown that domestic ducks can excrete large quantities of highly pathogenic virus without showing signs of illness. A history of poultry consumption in an affected country is not a risk factor, provided the food was thoroughly cooked and the person was not involved in food preparation. As no efficient human-to-human transmission of the virus is known to be occurring anywhere, simply travelling to a country with ongoing outbreaks in poultry or sporadic human cases does not place a traveller at enhanced risk of infection, provided the person did not visit live or "wet" poultry markets, farms, or other environments where exposure to diseased birds may have occurred.

All human cases have coincided with outbreaks of highly pathogenic H5N1 avian influenza in poultry.

Isolation precautions

- **Standard** precautions incorporated with cough etiquette
- **Contact** precautions
- **Droplet** precautions

For all confirmed and suspected H5N1 patients

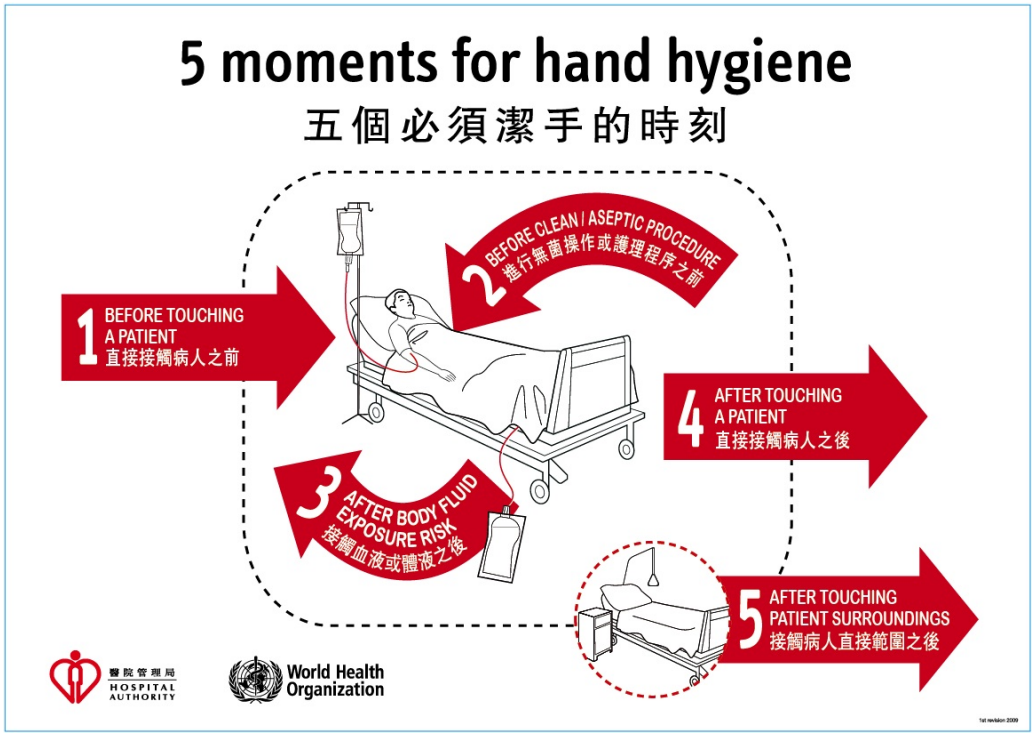
Surgical mask :
Patients with
respiratory symptoms

Avian Influenza, Including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guideline for Health Care Facilities

Date of most recent amendment: 10 May 2007

Initiation of AI infection control precautions in health-care facilities

Patient	Infection control measures
Patient enters triage with symptoms of acute febrile respiratory illness	**Follow standard and droplet precautions** ⇨ HCWs should use facial protection (surgical/procedure mask, goggles/face shield) ⇨ Place a surgical/procedure mask on the patient when in the waiting room; if no masks are available, ask the patient to cover mouth and nose with a tissue when sneezing or coughing ⇨ If possible, accommodate patient in a place that is separate from other patients
plus exposure history	
Patient admitted for investigation of influenza A/H5	⇨ Single room adequately ventilated (≥12 air changes per hour) room, if possible ⇨ If single room is not possible, cohort patients ⇨ Staff should use barrier precautions*



At points of care

Hand Hygiene Reminder

Door –

Keep Closed

Recommended Staff PPE in HA Hospitals during Serious Response Level (S2), and Emergency Response Level (E1 and E2)

Standard precautions for all patients # Transmission based precautions as indicated			
Activity **(based on risk assessment)**	**High risk patient areas* for caring suspected or confirmed Avian Flu**	**Other patient areas**	**Non-patient areas**
Enter into isolation room (no patient contact)	N95 respirator/ surgical mask **	Surgical mask #	***
Close patient contact (< one metre)	N95 respirator/ surgical mask ** Eye protection Disposable gown	Surgical mask #	***
Procedures with • **aerosol generating potential or,** • **extensive dispersal of droplets or,** • **prolonged close contact of dependent patients (for high risk areas only)**	N95 respirator Disposable gown Eye protection Latex gloves Cap	Surgical mask/ N95 respirator # Disposable gown Eye protection Latex gloves	***

visitors entering into clinical areas

3. Eye protection refers to face shields/ goggles/ visors. Please refer to Supplement 9 section on face and eye protection for details.

4. Please refer to Supplement 8 for high risk procedures.

HH upon removing PPE

* High risk patient areas refer to triage stations of GOPDs, whole designated clinics, A&E Department (triage stations, resuscitation rooms, waiting areas/consultation rooms & isolation room in fever triage cubicles) and, isolation wards for confirmed avian influenza patients or for triaging suspected avian influenza cases. All staff working in high risk patient areas should put on uniform or working clothes.

** Based on risk assessment including clinical condition of patient and physical condition of the patient placement

*** Individuals with signs and symptoms of respiratory infection should put on surgical mask.

Prepared by: HA CCIDER and ICB, CHP
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Title: HA Infection Control Plan
for Avian Influenza

Supplement 8: Precautions for High-risk Procedures/Activities

High-risk procedures/ activities refer to:

a) Patient care procedures

i) Aerosol-generating procedures, such as endotracheal intubation, nebulizer therapy, nasopharyngeal aspiration (NPA), tracheostomy care, chest physiotherapy, open system airway suctioning, diagnostic sputum induction, resuscitation, post-mortem excision of lung tissue and bronchoscopy.

ii) Procedures with extensive dispersal, such as high flow oxygen, non-invasive ventilation (BiPAP & CPAP).

iii) Prolonged close contact with confirmed/ suspected cases, such as extensive nursing care for dependent, confused or uncooperative patients.

b) Maintenance work in high risk patient areas

i) Heavily splashing procedures, such as maintenance on sewage system.

ii) Particle-generating procedures, such as changing HEPA filter in isolation area or local exhaust.

Aerosol-generating procedures

Table 6 . Risk of transmission of respiratory pathogens during aerosol-generating procedures

Procedure	Type of study
Documented increase in risk of respiratory pathogen transmission	
○ Intubation, cardiopulmonary resuscitation and related procedures (e.g. manual ventilation, suction)	Epidemiological studies on tuberculosis and SARS
○ Bronchoscopy	Epidemiological studies on tuberculosis
○ Autopsy/surgery	Epidemiological studies on tuberculosis
Controversial/possible increase in risk of respiratory pathogen transmission	
○ Non-invasive positive-pressure ventilation and bilevel positive airway pressure	Epidemiological studies on SARS
○ High-frequency oscillating ventilation	Epidemiological studies on SARS
○ Nebulization	Epidemiological studies on SARS

Table 1. Infection control precautions for HCWs and caregivers providing care for patients with ARDs according to a sample of pathogens

Precaution		No pathogen identified, no risk factor for ARD of potential concern (e.g. influenza-like illness without risk factor for ARD of potential concern)	Pathogen					
			Bacterial ARD[a]	Parainfluenza RSV & adenovirus	Influenza virus with sustained human-to-human transmission (e.g. seasonal influenza, pandemic influenza)	New influenza virus with no sustained human-to-human transmission (e.g. avian influenza)	SARS	Novel organisms causing ARD[b]
Hand hygiene[c]		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gloves		Risk assessment[d]	Risk assessment[d]	Yes	Risk assessment[d]	Yes	Yes	Yes
Gown[e]		Risk assessment[d]	Risk assessment[d]	Yes	Risk assessment[d]	Yes	Yes	Yes
Eye protection		Risk assessment[f]	Risk assessment[f]	Risk assessment[f]	Risk assessment[f]	Yes	Yes	Yes
Medical mask on HCWs and caregivers		Yes	Risk assessment[f]	Yes	Yes	Yes[g]	Yes[h]	Not routinely[b]
Particulate respirator on HCWs and caregivers	for room entry	No	No	No	No	Not routinely[g]	Not routinely[h]	Yes
	within 1m of patient	No	No	No	No	Not routinely[g]	Not routinely[h]	Yes
	for aerosol-generating procedures[i]	Yes	Not routinely[i]	Not routinely[i]	Yes	Yes	Yes	Yes
Medical mask on patient when outside isolation areas[k]		Yes	Yes	Yes[l]	Yes	Yes	Yes	Yes
Single room		Yes, if available[m]	No	Yes, if available[m]	Yes, if available[m]	Yes	Yes	Not routinely[b]
Airborne Precaution room[n]		No	No	No	No	Not routinely[o]	Not routinely[o]	Yes
Summary of infection control precautions for routine patient care, excluding aerosol-generating procedures[i]		Standard plus Droplet Precautions	Standard Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Droplet Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Airborne plus Contact Precautions

Misconceptions on the Use of Personal Protective Equipment (PPE).

1. **Good hand hygiene cannot be replaced by the use of PPEs.** Staff often has this false sense of security when they have put on the PPEs recommended. However all that entails in good hand hygiene including the five moments must continue and these cannot be substituted by the wearing of PPEs.
2. **PPEs to be used only when needed.** It should be appreciated that all PPEs have disadvantages and there is always the troublesome task of removal after use. Every time a PPE is worn, the staff must know the reason why. Wearing it just for policy sake is not an acceptable reason.
3. **Do not wear the PPE all the time.** When the reason for the PPE no more applies, it must be removed. This is really related to point "2" because if we do not recognize the reason, we will not know when to remove. Even more detrimental is the false impression that one is safe with the PPE and then putting it on all the time when caring for patients.
4. **In general PPEs should be changed after each individual patient.** This is just logical because PPEs are worn to avoid contamination. In other words, PPE should be considered contaminated after caring for a patient. A new one therefore must be worn when caring for the next patient. If the PPE is not changed, we must be absolutely certain that it has not been contaminated during patient care. This is impossible with the gown and glove because these are worn for patient contact. They should thus be changed after every patient.
5. **Proper removal of PPEs is just as important as appropriate wearing.** One must remember that on removal it is assumed to be a contaminated PPE. Thus the habit of careful removal is important for there will indeed be occasions when infectious material contaminates the PPE.
6. **The main aim in the use of gloves is *not* to prevent HCWs' skin contact with infectious material.** *Up till the present we know of no infectious material that can penetrate the intact skin.* Infectious material on our hands however can be harmful if it subsequently touches mucous membrane such as our eyes. Regular hand hygiene to remove these infectious materials is the best protection. Rather gloves are worn mainly for dirty tasks with significant contamination (e.g. changing diapers) because subsequent hand hygiene may not remove all the infectious material. This is the reason why gloves must be immediately removed after such "dirty tasks" followed by hand hygiene. Sterile gloves are also worn to establish a "sterile field" for surgery. Finally gloves are also recommended for venipuncture because with needle-stick injury, the risk from a contaminated needle is significant lower if the needle first penetrates the glove material, which will "take up" some of the infectious material before the needle penetrates our skin.
7. **Surgical masks act as a barrier and not for filtering air.** Most respiratory infections are not airborne but the cough can produce infectious droplets. The surgical mask is a barrier to protect the mucous membrane around the mouth and nose from these droplets. It is thus vital that material landing on the mask do not soak through which is also the reason for making the outer layer of the mask water proof.
8. **Even for airborne infection the patient only needs a surgical mask but not a N95.** Presently there are only three common airborne diseases which are MTB, measles and chicken-pox. However to produce infectious aerosols, the patient must firstly cough. Then, the cough must be completed with a propulsive force to produce small particles of the aerosol. The surgical mask will not stop the cough but is fully adequate to interrupt the propulsion when the patient coughs and so N95 is not necessary.
9. **Caps and shoe covers are not needed but eye protection may be required.** As the skin is fully protective and the head and feet never touch the patient, caps and shoe covers are deemed unnecessary. However our eyes are lined by mucous membrane and thus eye protection may be needed.
10. **Any lapse with gross contamination must be immediately managed.** Staff wearing full PPE often feel safe and ignore such contamination. There is always the danger of "soaking through" and also spreading the infectious material to others. Thus it is prudent to change the PPE followed by adequate washing.

Thank you and have a good weekend.

WH Seto, for CICO Office

Appropriate use of PPE

Patient placement

a negative pressure single isolation room whenever possible

Airborne precautions
should be adopted in performing high risk procedures/ activities

Health Care Equipment

- Individual equipment dedication is necessary, especially for items that cannot be readily disinfected, for suspected / confirmed avian influenza patients

7.2.3 Decontamination of Environment

- Clean and disinfect the environment, furniture and facilities at least once daily and terminally at discharge or more frequently depending on risk.
- Contaminated area, especially isolation and procedure rooms should be disinfected after use by a high-risk patient. Mop the area with one part of household bleach (5.25% hypochlorite solution) in 49 parts of water, leave for 15-30 minutes. Then rinse with water.
- If blood spills occur, the blood should be removed by disposable absorbent material soaked with one part of household bleach (5.25% hypochlorite solution) in 4 parts of water, leave for 10 minutes and then rinse with water.
- Use 70% alcohol for metallic items.

Waste

- All waste from a room/ area housing patient(s) with avian influenza should be treated as clinical waste.

Mortuary Affairs

9) Handling of Dead Bodies

9.1 Standard precautions should be applied.

9.2 Appropriate PPE should be worn.

9.3 Dead bodies of patients with known avian influenza are classified as Category 2 with the following precautionary measures:

- ✧ Autopsy should generally not be performed.
- ✧ The body should be bagged in a robust, plastic bag.
- ✧ Hygienic preparation in funeral parlour is not advisable.
- ✧ Viewing in funeral parlour is allowed.
- ✧ Embalming is not allowed.
- ✧ Cremation is not mandatory.

HCWs – if respiratory S/S

- Should seek medical advice .
- SESAS

NDORS

Please be reminded that Influenza A (H5, H7, and H9) is a notifiable disease. Any suspected case meeting the reporting criteria (https://ceno.chp.gov.hk/casedef/casedef.pdf) should be reported to the Central Notification Office of CHP via fax (24772770), phone (24772772) or CENO On-line (www.chp.gov.hk/ceno). Please also contact the Medical Control Officer (MCO) of the Department of Health at Pager: 7116 3300 call 9179 when reporting any suspected case.

Enhanced surveillance for H5N1 Influenza A

Reporting Criteria

- Commencing 17 November 2010

Fever (≥38°C) and ILI; (sore throat or cough

+

In the 7 days prior to onset:

History of visiting the wet market or had contact with poultry in Shanghai, Nanjing or Hangzhou

Actions Required for fulfilling criteria

Send Specimen : For cases fulfilling the case definition, please arrange taking specimen for testing for Influenza A (H5N1).

E-flu reporting : Hospital/Cluster ICOs and ICNs are responsible for the e-Flu reporting- **by 9 am on the next working day is OK**

Cases fulfilling the case definition above should ALSO be reported to and e-Flu, which had been activated since 2 pm on 19 November 2010.
HAHO MICC will use the e-Flu figures as at 1400hrs in every day to tally with the CHP for statistical reporting.

Conclusion (1)

Applied to all patients at all times

Conclusion (2)

1. Transmission-based precautions – droplet and contact for suspected / confirmed
2. Aerosolizing : N95 in airborne room
3. PPE –use when needed and appropriately
4. Reporting :

- e-flu for Enhanced surveillance -for fulfilling criteria
  - NDORS for suspect / confirmed Notifiable diseases